# Block chain –The strong contender of Disruptive Technology and Its Impact on Various Sectors

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## ABSTRACT

*The Block chain, primarily developed as a ledger, is assuming the recognized status of an innovative platform. Innovators are finding many uses of the unique features of the framework to devise multiple approaches for solving real world problems of the financial world. The permutation and combination using the Cryptographic keys embedded in this technology has assumed the velocity of a rapidly spreading viral fever and is impacting everyone. Banks, Security agencies, IT companies, Insurance companies, other financial institutions, Judiciary system and Stock exchanges had shown eagerness to innovate and improvise their operations by using the block chain technology. Latest uses are from the fields of stock, option and currency trading. It's going to make easy and full proof systems for Anti money laundering, fraud monitoring, consortium funding and information security. Sky is the limit, when one tries to forecast the usage of this technology in several fields. The paper discusses about the technology and how it operates by highlighting its strengths and weaknesses. May be it will not give complete business solution but surely it will provide basic process to have a secure and easy information flow which will improve transparency and efficiency. The information and data sharing capabilities inside the network is key capabilities of this system. Confidentiality and consensus in the form of non-discretionary and simultaneous information is its one of the features. Along with its smart contracting feature this technology can lead to efficiency, savings of cost and transparency. So new recipes are being developed using these basic ingredients to be used in other fields.*


**Keywords:** *Cryptographic keys, Information Security, Data sharing, Transparency, Smart contracting*

## I. INTRODUCTION

Today with this strange digital currency at an all-time high, opinion is divided on whether its value is a sign of a growing rebellion against a monetary system controlled by corrupt Governments or alternatively whether it is providing heaven for criminals. But it is clear that Satoshi Nakamoto, whoever she or he might be had transformed our world.

Bit coin was invented in 2008. Since that time, the Bit coin block chain has operated without significant disruption. Block chain technology has come to afar distance within last 10 years when a pseudonymous paper was published on bit coin and block chain ledger that would record transactions in it.

Fed Nominee comments, "Whether it's the application of block chain, or their core processing, or delivery to customers or clients, financial services today is being disrupted by technology."

"The block chain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value."Don & Alex Tapscott, authors Block chain Revolution (2016)

## II. OBJECTIVES OF THE STUDY

1. To study the Block chain Technology
2. To study the pros and cons of the this technology
3. To study use of Block chain Technology in administering Crypto currency bit coin
4. To study and understand the latest usages of Block chain technology in diverse fields

## III. RESEARCH METHODOLOGY

This research work is conceptual in nature and based mainly on secondary data. The data is collected from Internet and newspapers. The different websites were referred for collecting latest information. Based on the collected data conclusion is drawn.

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### 3.1 Meaning

The block chain is an open electronic ledger system invented to provide a platform for bit coin, a crypto currency. It was an idea of bit coin inventor 'Satoshi Nakamoto'. This method was invented for verifying while guaranteeing anonymity, transactions involving a digital currency that was not issued by any central authority. Any currency requires universal recognition of its value, location and it must have features of not being replicated. Counterfeiting must be recognizable using easy tools. All these features were translated in to the ledger for bit coins, known as distributed ledger in block chain parlance. In common currency, exchange of value happens as ownership information is instantly published everywhere in all connected blocks using what is called cryptographic hash functions. In block chain a unique value or hash value is generated for each message of transaction. The technology ensures that this value tag cannot be duplicated and any tampering becomes immediately evident through the 'Magnification' features of the technology.

To get a sense of the technology, imagine having banknotes protected by combination locks with over 100 digits- locks which, moreover can't be removed without destroying the notes itself. The underlying mathematics makes it impossible to make duplicate copies of bitcoin. Like gold Bit coin is mined by giant power hungry computers. Bit coin miners solve the complex mathematical problems needed to verify transactions and thus build the block chain. In return they are issued a certain number of Bit coin

The euphoria is bringing to the mainstream what was once considered the provenance of computer developers, futurists and libertarians seeking to create an alternative to central bank controlled monetary systems.

### 3.2 Process

To use bit coin users have to first get a digital wallet, which can be used on computers or mobile devices. Every wallet can contain one or more unique addresses, which are like account numbers. An address- a string of characters like 17qKre DGte4326jEThd765KotesW8901Y- lets a user receive or buy bit coin. This is the only information which one has to give out. Along with this each user has a private address, which gets never shared with anyone else. This let the user to send Bit coin.

### 3.3 How a block chain transaction works:

Information held on a block chain exists as a shared and continually reconciled database. This is a way of using the network that has obvious benefits. The block chain database isn't stored in any single location, meaning the records it keeps are truly public and easily verifiable. No centralized version of this information exists for a hacker to corrupt. Hosted by millions of computers simultaneously, its data is accessible to anyone on the internet.

1. A and B wish to conduct an 'interaction' or transaction'
2. Cryptographic keys are assigned to the interaction that both A and B hold
3. The interaction is broadcast and verified by a distributed network
4. Once validated a new block is created
5. This block is then added to the chain, creating a permanent golden source of the interaction
6. The transaction between A and B is completed

## IV. UNIQUE FEATURES

- Whenever a bit coin transaction is conducted, the bit coin allows anybody to verify three things:
  1. The specific bit coin used actually exists
  2. The coin is held by the entity that is trading
  3. It is not being used simultaneously used in other transactions
- When all block chain users agree that these conditions are met, the transactions is verified and recorded.
- The block chain has a record of all transactions made with every bit coin.
- This verification is public, transparent and uses a peer to peer network.
- The identity of the transacting entities is concealed by using private-public key combinations.
- Everyone knows each other's public keys and this enables everyone to verify that coin exists
- But transactions can be conducted by using the private key and that is only known to the owner.

### 4.1 Positive sides

Its ledger or database is not controlled by any authority or single party and is spread across multiple computers making it hard to break. Once entered any information cannot be altered or tempered with. By storing data across its network, the block chain eliminates the risks

that come with data being held centrally. Its network lacks centralized points of vulnerability that computer hackers can exploit. Today's internet has security problems that are familiar to everyone. We all rely on the "username/password" system to protect our identity and assets online. Block chain security methods use encryption technology.

- By using Smart Contracts, the owner of information can easily tweak who has access to what. The use of block chain could considerably reduce the cost of certain transactions while raising the bar of security.
- Along with that it also allows individuals to insulate themselves against high inflation

**4.2 Negative side**

- The hash proof claims have not been well established.
- Scalability is another sore point. In markets like India where volume, transaction concurrency, peak loads and downstream consistencies are key success factors, block chain has not been able to establish enough used cases.
- As diverse uses and private block chain proliferate, security protocol standardization continuous to be a big challenge.
- Lack of interoperability, service and support are nagging issues.
- Digital market places such as Silk Road which has been now shut down by FBI was using encryption and crypto currency for narcotics, stolen credit cards and hacked passwords anonymously. Ross Ulbricht, founder of Silk Road is in prison now.

## V. DISRUPTION BY BLOCKCHAIN TECHNOLOGY IN OTHER AREAS

"The traditional way of sharing documents with collaboration is to send a Microsoft Word document to another recipient, and ask them to make revisions to it. The problem with that scenario is that you need to wait until receiving a return copy before you can see or make other changes because you are locked out of editing it until the other person is done with it. That's how databases work today. Two owners can't be messing with the same record at once. That's how banks maintain money balances and transfers; they briefly lock access (or decrease the balance) while they make a transfer, then update the other side, then re-open access (or update the same time, and the single version of that document is always visible to both of them. It is like a shared ledger, but it is a shared document. The distributed part comes into play when sharing involves a number of people. Imagine the number of legal documents that should be used that way. Instead of passing them to each other, losing track of versions, and not being in sync with way. Instead of passing them to each other, losing track of versions, and not being in sync with the other version, why can't all business documents become shared instead of transferred back and forth? So many types of legal contracts would be ideal for that kind of workflow. You don't need a block chain to share documents, but the shared documents analogy is a powerful one."

- ***Use of Smart Contracts***

At the technology's present level of development, smart contracts can be programmed to execute simple functions. For example, a derivative could be paid out when a financial instrument meets certain yardstick, with the use of block chain technology and Bit coin enabling the payment to be programmed.

- ***The sharing market***

With companies like Uber and AirBnB boom, the sharing economy is by now an established achievement. At present, however, users who want to call a ride-sharing service have to depend on a mediator like Uber. By enabling peer-to-peer payments, the block chain opens the door to straight interface between parties — an actually decentralized sharing economy outcome.

- ***Crowd funding***

Crowd funding initiatives like Kickstarter and Gofundme are doing the progressive work for the up-and-coming peer-to-peer economy. The fame of these sites shows public want to have a straight say in product progress. Block chains take this concern to the next level, potentially creating crowd-sourced venture capital funds.

By making the outcome fully apparent and widely available, disseminated database technology could bring complete transparency to elections.

- ***Supply Chain Auditing***

It can be used in Supply chain auditing e.g. Consumers increasingly want to know that the ethical claims companies make about their products are real or not.

Distributed ledgers provide an trouble-free way to verify that the back stories of the things we buy are authentic. Transparency comes with block chain-based time stamping of a date and location eg. for ethical diamonds

The UK-based Provenance provides supply chain auditing for a variety of consumer goods. With use of the Ethereum block chain, a Provenance pilot project ensures that fish sold in Sushi restaurants in Japan has been sustainably harvested by its suppliers in Indonesia.

- ***File storage***

Decentralizing file storage on the internet brings obvious benefits. Distributing data throughout the network protects files from getting hacked or misplaced.

Inter Planetary File System (IPFS) makes it easy to conceptualize how a disseminated web might run. An internet made up of totally decentralized websites has the prospective to speed up file move and streaming times. Such an upgrading is not only handy. It's an indispensable improvement to the web's presently congested content-delivery systems.

- ***Protection of intellectual property***

Mycelia use the block chain to generate a peer-to-peer music distribution system. Founded by the UK singer-songwriter Imogen Heap, Mycelia helps musicians to trade songs straightforwardly to audiences, as well as license samples to producers and divvy up royalties to songwriters and musicians, all of these functions being mechanized by smart contracts. The capacity of block chains to issue payments in fractional crypto currency amounts suggests this case for proving that block chain has a strong prospect of hit.

- ***Governmental functions***

Governments are previously exploring ways to accumulate some data, such as land records, contracts and assets in block chains. As Publicly-accessible ledgers, block chains can make all kinds of record-keeping well-organized. Property titles are a case in point. They tend to be vulnerable to fraud, as well as expensive and labor demanding to administer. This year, the Republic of Georgia made a deal with the Bitfury Group to develop a block chain system for property titles. Reportedly, Hernando de Soto, the high-profile economist and property rights advocate, will be advising on the project. In recent times, Sweden announced it was experimenting with a block chain application for property titles.

The United States Air force (USAF) has funded research into how block chain could ensure its data is not distorted. In May, the Defense Advanced Research Project Agency (DARPA) awarded a grant to the company behind an encrypted chat program to make a secure messaging service based on the block chain. One amendment has been made to the U.S. Senate defense bill where it is expected from the Govt. to report back on the potential offensive and defensive cyber applications of block chain technology and other similar distributed database technologies and to find out how criminals, Governments and extremist might be using them.

Britain too is exploring several uses of the block chain. The UK's justice ministry is using block chain to ensure that evidences such as videos, emails, documents have not been tempered with.

There are several other applications for such trust less contracts. For example, a municipality may tender out a road repair, put the payment in escrow and ask citizens to verify if the work has been completed satisfactorily. The payment will be automatically transferred but only after a successful peer review. The municipality can no longer hold up payment and the contractor cannot fudge.

- **Stock trading**

Numerous stock and commodities exchanges are prototyping block chain applications for the services they propose, including the ASX (Australian Securities Exchange), the Deutsche Börse (Frankfurt's stock exchange) and the JPX (Japan Exchange Group). Most high profile because the acknowledged first mover in the area, is the Nasdaq's Linq, a platform for private market trading (typically between pre-IPO startups and investors).

- **Financial System**

The block chain primarily developed as a ledger is assuming the cult status of a platform; innovators are finding many uses of the unique features of the framework to devise multiple approaches for solving real world problems of the financial world. Apart for bit coin for which it was invented, block chain has since proved to have far wider applications. SBI had brought 'Bank chain', a multinational consortium of banks. SBI's this move could initiate wider use of

block chains across multiple banking processes. Investment banks and other financial institutions are now using block chain to probe internal fraud.

Newer uses are in the field of trading in currencies, stock and option trading, AML and fraud monitoring, consortium funding related information exchange etc. The hyped up possibilities has generated the hyped pace of attempts to adopt. Banking and finance sectors has been at the forefront of this race. The main uses so far have been in remittance and trade finance arena, given the necessity of information flow that need simultaneous and exact similar notification in the value chain. In case of remittance, these are the remitter, remitter's bank, selling bank, beneficiary, beneficiary's bank, Nostro bank etc.

In case of trade finance, 'to be notified' entities are the LC opening bank, negotiating bank, discounting entity, shipper, insurer etc. Each one of the recipient could be redefined as a block and chained through programmed protocol. The efficiency and speed of closing of transactions are the USP of technology in block chain, a typical; trade transaction cycle comes down from 10 days to 2 days.

In India, large banks like SBI have adopted multiple projects with multiple partners to test out the possibilities. SBI has already initiated experiments in trade finance, consortium information, Asset tracking record management and e KYC etc. In association with TCS and IBM and startups like prime chain it is working to take block chain adoption to next level by using their hyper ledger and BVC technology.

## VI. CONCLUSION

The block chain can be adapted to all types of processes that require peer verification and transparent recording of transactions, eg. Wine merchants can use it to track claimed vintages, and museums and auctioneers can check for forgeries as a block chain record makes it difficult to sell two copies of same painting.

Block chain technology is transformative and numerous experts imagine that it will have a immense economic impact like to the one the Internet has had in the past few decades. Block chain technology is still in an early, decisive stage, and crypto currencies are only its first main use case. Ahead of crypto currency, block chain technology will modify how we conduct and how we do documentation and validate dealings. This will transform contracts and trim down friction in the exchange of assets. In the next few decades, block chain technology will seep into our organizations and institutions and change the way we transact with one another. Just as the Internet continues to power developing technologies, we can anticipate seeing new use cases of block chain technology across all sections of the economy.

At the forefront of the block chain dilemma is the confusion and lack of understanding that it is not a complete business solution but only a basic protocol to ease information flow and improve transparency and efficiency. Therefore the fever around riding the bandwagon of block chain is expected to remain mild and not go so viral in India for some time to come.

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