POTENTIAL OF BLOCKCHAIN IN FINANCIAL SERVICES

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Abstract

Blockchain is a shared ledger database, in a distributed network, which allows two parties to execute a transaction securely without any intermediary and records the transaction permanently. It maintains a list of chronologically ordered records called blocks. Each block is linked to a previous block, thus forming a Blockchain. Smart contracts can be made with Blockchain technology where the provisions implied by a contract are embedded in the Blockchain to be executed with the transaction. Blockchain could be applied in many areas in financial services like trade finance, payments, securities settlement, regulatory compliance, etc. The Blockchain technology can significantly bring down the costs and reduce inefficiencies in the financial sector. This paper seeks to investigate the potential of the Blockchain application by examining exactly what it is, the most likely areas within financial services where it could be applied, the current state of application of Blockchain in the industry, the implication of the technology on the current financial market participants, the multiple uses to which it can be put, the challenges in implementing the technology in the financial markets, the future prospects of the Blockchain technology.

Keywords: Blockchain, Emerging Trends, Financial Services.

I. INTRODUCTION

Blockchain is a shared ledger database, in a distributed network, which allows two parties to execute a transaction securely, without any intermediary, and records the transaction permanently. It maintains a list of chronologically ordered records called blocks. Each block is linked to a previous block, thus forming a Blockchain. It is a technology in which transactions are recorded in a manner in which data, once entered, cannot be altered but can only be sequentially updated. It has the potential to breakthrough the way in which business is done, lifestyle of the people, the institutional setup and the governance. It is basically a technology on which we can build applications as per our requirements. The most widely used applications of Blockchain are Bitcoin and Smart Contracts.

Bitcoin is an electronic form of digital currency that is created and used on the internet. Bitcoins are virtual, unlike real money, they’re produced by people all around the world, using a software that uses cryptography. It is the first ever cryptocurrency. Bitcoin’s most important characteristic that makes it different from the conventional money is that it is decentralized. That is, it is not controlled by any bank or institution.

Smart contract is a set of instructions recorded in a computer language that is capable of facilitating, executing, and enforcing the negotiation or performance of an agreement using blockchain technology. The entire process is automated and can act as a complement, or substitute, for legal contracts.

The main task of blockchain businesses is integrating cryptocurrencies with traditional banking system and the financial markets. The blockchain can also be used for maintaining smart property where an asset can be registered as a digital asset and controlled and accessed through a private key. Another example of blockchain based financial
service is crowdfunding which is a decentralized peer-to-peer model of fundraising.

**The Mechanism of Blockchain’s Distributed Ledger.**

A blockchain is a distributed ledger that stores records or transactions without any control by a central authority. It uses a consensus-based mechanism to validate the transactions, wherein new blocks could be added only after the consensus is reached about its validity. This enables disintermediation and reduces interruption by any external force. The validation process enables participants to trust the transactions even without a central authority. It is impossible for anyone to manipulate any data on the blockchain as it maintains a permanent record of transactions which could not be altered.

**Current State of Application of Blockchain Technology In Financial Services**

At present, the blockchain technology is put to various applications in the Financial Markets and Services. A brief overview of the currently used blockchain applications is given below:

1. **Currency**

The Blockchain technology has played an active role in the introduction of the decentralized digital currency called bitcoins. At present, the cryptocurrencies in use are Bitcoin, Litecoin, Dogecoin, etc.

Bitcoin is the first of its kind virtual form of money based on the blockchain technology. It uses peer-to-peer technology and issuing and managing of bitcoins is carried out by the players of the network and not by any central authority or banks. Bitcoin is open-source, meaning nobody owns or controls it and anyone can use it.

Litecoin is a decentralized online currency created in the year 2011. Litecoin can be used to purchase goods or services over the internet. The transactions are verified immediately in the blockchain network. Money can be sent anywhere to anyone in the world without any delay and both the parties have proof of the transaction. The charge or fee for processing the transactions is considerably less. Litecoin can be stored safely and securely on the computers or mobile phone devices. Litecoins can be exchanged for dollars, euros or any fiat currencies.

2. **Payment Infrastructure**

Apart from using Bitcoin to send money around the world, Merchants can use the blockchain network to transfer funds and remittances. Examples: BitPay, Abra.

BitPay is a global bitcoin payment service provider headquartered in Atlanta, Georgia. It was founded in May 2011 by Tony Gallippi and Stephen Pair. BitPay provides payment processing services for merchants, and is one of the largest bitcoin payment processors.

Abra is a digital wallet app that lives on a smartphone that enables the users to send or receive money worldwide with no sending fees or to transfer funds to bank accounts or bitcoin wallet or to withdraw cash from a growing network of Abra Tellers.

3. **Digital Assets**

The blockchain can be used to create and maintain digital assets such as stocks, bonds, land titles, etc. Recently, NASDAQ has launched Linq which is a blockchain based platform to digitally managed shares in private companies.

Openchain is another blockchain based ledger technology. It uses the partitionned consensus which
is slightly different from the consensus mechanism used in bitcoin based technology. That is, instead of one single central ledger each organization controls its own openchain instance and instances can connect to each other. Openchain helps to acquire and maintain securities, land titles, music or software licensing, gift cards, etc.

4. Identity

The blockchain technology also helps companies to offer identities that can be used to sign in to various software applications and websites, digitally sign documents, etc. Companies offering such identities are Onename, Keybase, etc.

Blockstack from Onename is a decentralized naming and storage system that provides a blockchain ID that acts as an online identity that can be controlled by the user. With the block chain ID, users can sign into applications locally without remote servers or identity providers.

Keybase is a free, open source security application, which is also a public directory of people. It helps to perform cryptographically-secure operations like chatting, file sharing, even publishing public documents.

5. Verifiable Data

Verifiable record of any data, file, or business process can be created on the blockchain. Some examples of the companies providing such services using the blockchain technology are Tierion, Proof of Existence and Factom.

Tierion turns the blockchain into a global platform for verifying any data, file, or business process. The blockchain is quickly becoming the new standard for trust and verification of data. Developers use Tierion to anchor data to the blockchain to prove the integrity and timestamp of any data, file, or process.

Harmony is a new blockchain base document technology that helps the mortgage industry. It helps to create and maintain unalterable loan files, manage lost and trailing documents and eliminates documentation issues. Thereby resulting in the reduction of compliance, litigation and documentation expenses.

6. Smart Contracts

Smart Contracts are blockchain transactions that contain instructions which enables negotiation and performance of a contract. Decentralisation, self-sufficiency and autonomy are the features that distinguish smart contracts from traditional contracts. Examples of the Companies that enable the use of smart contract are Ethereum and RootStock.

Ethereum is a decentralized platform that runs applications, called smart contracts, that are programmed to run exactly as per the instructions given in codes. These applications run on a custom built blockchain that can move value around and represent the ownership of property. An important aspect of the Ethereum smart contracts is that they have their own address in the blockchain.

RSK is the first open-source platform for smart contracts. RSK goal is to add value and functionality to the Bitcoin ecosystem by enabling smart-contracts, near instant payments and high-scalability and security.

Impact on the Current Financial Market Participants

Blockchain technology is expected to have a significant impact on the role of current financial market participants:

Clients - The clients would enjoy the benefit of reduction in costs of capital market dealings and securities servicing

Custodians - The role of Custodians would be eliminated by the maintenance of portfolio holdings in electronic format

Central Counterpart Clearing Houses - The role of CCPs in post-trade processing and settlement would be eliminated
Central Securities Depositories - The distributed ledger may become the primary destination for asset issuances, thereby restricting the role of CSDs to providing governance and independent verification of assets.

Investment Brokers - Blockchain technology could facilitate issuer led auctions of new securities, resulting in the reduction of the investment banking fee.

A need for a regulatory body for regulating and controlling the blockchain driven activities would arise.

**Benefits of Blockchain**

1. **Decentralisation**

   The decentralization of blockchain refers to placing trust in a network and not in a single entity like a government, a bank, or a multinational company. The types of assets that can be stored are limitless: intellectual property, identity information, land titles, financial assets, genetic information, social graphs, and supply chain information, to name only a few. Decentralized systems do not have any central points, hence it is very expensive to attack, destroy or manipulate the information stored in the blockchain.

2. **Transparency and Trust**

   As blockchains are shared and everyone can see what is on the blockchain, this allows the system to be transparent and as a result trust is established. This is more relevant in scenarios such as the disbursement of funds or benefits where personal discretion should be restricted.

3. **Faster Transactions**

   Transaction processing by banks can become more faster in terms of clearing and final settlement. Blockchain transactions can reduce the time taken for interbank transaction processing to minutes and ensure that the transactions are processed irrespective of the working hours.

4. **No Double Spending**

   A blockchain is a distributed ledger that stores records or transactions without central coordination using a consensus-based mechanism to check the validity of transactions. Blockchain thus can help to avoid the double-spending problem without the need for a central authority.

5. **Disintermediation**

   The main feature of a blockchain is that it enables a database to be directly shared without a central authority. Without any centralized processes, blockchain transactions have their own way of validation and authorization of data. Hence, with the consensus mechanism where the players of the network validate and authorize the blockchain transactions, these transactions can be processed independently.

6. **Immutability**

   Once the data has been written to the blockchain, it is extremely difficult to alter or delete it. It is not truly immutable, but, due to the fact that changing data is extremely difficult and almost impossible, this is seen as a benefit to maintaining an immutable ledger of transactions.

**Limitations of Blockchain**

1. **Complexity**

   Blockchain technology involves the use of program codes and software terms. It is really difficult for a common man to understand its workings and use it. In order to develop smart contracts, the instructions have to be designed using codes which cannot be done without proper training and knowledge.

2. **Network size**

   The blockchains requires a large network of users otherwise it cannot give maximum benefits of the transactions at minimized expenditure.

   Blockchains are huge networks, which have no resistance towards the bad players and hence may respond to attacks.

3. **Transaction costs, network speed**
The companies providing the blockchain technology services promise minimum cost to the users, but Bitcoin currently has notable transaction costs and the charges paid to the miners for validation also have to be borne. Another big challenge of the blockchain technology is that the smooth functioning of the transactions depend on the network speed of the user.

4. **Human error**
   Since blockchain is used as a database, the information going into the database needs to be of high quality. The data stored on a blockchain is only man-fed and could not be error free.

5. **Slower Performance**
   The Blockchains will be slower than centralized databases. Because, when a transaction is processed, blockchain has to do signature verification, consensus mechanism and a check for redundancy apart from the things that a regular database does.

6. **Network Influence**
   There is one important flaw in bitcoin and other blockchains, that is, if more than half of the nodes of the blockchain network validate a wrong information, the information will become strong and validated. This is called a '51% attack' and was highlighted by Satoshi Nakamoto when he launched bitcoin. Therefore the network has to be closely watched for such activities.

7. **Forking**
   Since there is no governing centralized authority, there are ample chances for disagreements among the different communities. These disagreements would result in forking, that is when a blockchain diverges, a new rule is introduced as to the validity of the transactions or the network’s transaction history when a majority of a blockchain's users have agreed to it.

8. **Adoption**
   Adoption of the blockchain technology will be slow to happen, since this involves uprooting of existing technology platforms.

**Potential of Blockchain in Financial Services**

The most likely areas within financial services where blockchain could be applied are as follows:

- In Banks for quick Transaction Processing
- Ledger Consolidation of Business Transactions
- Smart Contracts
- Faster Clearing and Settlement
- Lowering of Systematic Risk
- Auditing and Corporate Compliance
- Recordkeeping and Retention of Documentation
- Corporate Finance: Private Equities and IPO
- Securities Trading and Settlement
- Reference Data Management
- Post Trade Processing and Settlement
- Loan Origination and Servicing
- Foreign Exchange Markets
- Derivatives Markets
- Corporate Shareholder Voting
- Reducing Counterparty Risk
- Cross-Border Payments

**II. Conclusion**

Blockchain has the potential to transform the current state of financial services in an effective and efficient manner provided the blockchain’s characteristics are matched with that of the application to which it is put in. It could be used as an effective means of embedding socially beneficial services. Block chain technology could be put in vigorous applications so that it delivers more value to the society at large.

**III. Reference**

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