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Integration of Blockchain Technology in Finance

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Shilpi BathamAddress for Correspondence: serviceheb@gmail.com***Abstract**

Blockchain is a kind of a book with continuously growing list of records called blocks which are linked and secured using cryptography. The term cryptography means it uses a digital hash which is like a fingerprint. If somebody were to tamper with the data, its hash changes and no longer match with this fingerprint. Every block has its own hash and then the previous hash which is contained within the block as a reference of previous block. Blockchain make possible the secure, verifiable transfer of value between parties who do not know each other, without the use of a mutually trusted third party. Though it is still young and facing many technical, commercial and security challenges but many developers are working on its open source project to improve and overcome its protocols and applications. Properly introduced, the technology can mitigate the 'cost of trust', which manifests itself in numerous ways within the financial system and the economy (Casey and Vigna, 2018a; 2018b.) In so doing, it could lower overall costs, reduce economic rents and create a more secure and fairer financial system.

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Introduction

Blockchain technology was introduced by Nakamoto (2008) to bypass middleman actors such as financial institutions by allowing direct peer-to-peer transactions. To achieve this goal, Nakamoto suggested a peer-to-peer distributed ledger. In this way, payer and payee can exchange directly over the network, utilizing encryption and consensus mechanisms (Guo & Liang, 2016; Tsai, Blower, Zhu, & Yu, 2016; Zhu & Zhou, 2016) to make transactions tamperproof since any modification to the historical data record is detectable by participating blockchain network nodes (B. Lee & Lee, 2017; Tapscott & Tapscott, 2017).

Financial transactions are foundational to the national and global economy. The global financial systems transact trillions of dollars daily and serve billions of customers (Tapscott & Tapscott, 2016). Workie and Jain (2017) distinguish three phases of a blockchain-based financial transaction: 1) the initiation phase, where a client accesses the blockchain network to buy or sell financial assets, 2) the verification of financial assets in the blockchain ledger by involved stakeholders, and 3) the recording of the information into the blockchain ledger.

The growth of blockchain has brought many new changes the way people do financial transactions in the financial sector. This new technology has the potential to disrupt the old way of doing business and make significant impact on global financial services.

This innovative technology is useful in other sectors also like as supply chain management, medical service and real estate. Therefore, many financial institutions are coming up with consortium of global blockchains such as IBM Hyperledger Project, Enterprise Ethereum Alliance and R3CEV (the consortium of banking industry.)

Bitcoin is the most notable currency powered by blockchain, which debuted in 2009 and over the year's other alternate coins like Altcoin, Ethereum have been springing up as well, but bitcoins remain most valuable.

Research Methodology

This paper explores potential impacts of blockchain technology on financial transactions. The methodology adopted is analysis of the extensive literature about blockchain technology concerning financial transactions; perception analysis based on interviews with financial executives, subject matter experts, and researchers; and a theoretical interpretation of articles in journals, magazines, news media and published business, government and international body. Qualitative research is done to gain deeper understanding and to uncover trends in thoughts and opinions.

Literature Review

Various research papers, academic journals national and international are studied. Some of the sources are

mentioned below:

1 “Bitcoin: A Peer to Peer Electronic Cash System” (S.Nakamoto):Satoshi Nakamoto proposes a peer to peer network where every participant of the network has a copy of full blockchain and all participants are synched up which makes it impractical to attack the chain if honest nodes control the majority.

2.Swan M. Blockchain- Blueprint for a new Economy: Under this she explained blockchain as an important public ledger which can be used as decentralized record. Melanie explained its importance not only in financial sector but also in registration of land records, inventory and transfer of all tangible and intangible assets such as votes, software, ideas and health data.

3. The Fed: The Use of Distributed Ledger Technologies in payments, clearing and settlement- in this discussion series participants discussed about potential use cases in payments, clearing, and settlement include cross-border payments and the post-trade clearing and settlement of securities.

4. Global Insight- Blockchain in Banking: Disruptive Threat or Tool? By Morgan Stanley-This in-depth study suggests several misconceptions & identifies 10 hurdles to overcome & make blockchain a reality in banking.

Coinmarketcap, Crypto-Currency Market Capitalizations; 2016. Accessed: 20/11/2018
<https://coinmarketcap.com/>

Research Findings

S. Underwood (2016, p 15) wrote that “Blockchain technology is expected to revolutionize the operating modes of commerce, industry, and education, as well as to promote the rapid development of knowledge-based economy on a global scale. Due to its immutability, transparency, and trustworthiness for all transactions executed in a blockchain network, this innovative technology has many potential applications.

1. International Payments Accessible and Faster:

Current approach to cross borderpayments is slow, uncertain,risky and expensive.First potential application of blockchain technology is in remittances and foreign currency payments. The biggest 22 banks formed a group called R3CEV which leads the consortium of global financial companies in the sphere of research and development of blockchain technology in financial system. The benefits of these consortiums are many like increased transparency in the system, reduced liquidity constraints and quick settlement may outweigh the challenges imposed by distributed ledger technology.

2. Digital identity/know your customer Regulations:

All financial institutions haveto comply with ‘know-your-customer’ obligationsand verify numerous data points about every corporate and individual customer to minimize financial crimes

and money laundering activities. With blockchain technology widely adopted, every customer can be verified independently, and the identity of a customer can be availed to other financial institutions since the customer has already been verified on the blockchain network. This process saves financial institutions a lot of money and duplication of customer records. For example: In Singapore, a group of banks joined forces with the Infocomm Media Development Authority of Singapore to build new system on a blockchain platform.

3. Issuance, Clearing and Settlement of Securities:

Blockchain promises a wide range of benefits, like better and more secure way to trade in the form of reduced transaction costs and trade settlements within a short time. Many companies used blockchain as a new means to raise capital, to issue corporate bonds and loans as all parties have a shared record of the transaction and updates. Security transactions are executed in Nano seconds but clearing and settlement may take few days to weeks' time. Blockchain technology may shift this to near real time by eliminating the need for reconciliation of duplicative records.

4. Clearing and Processing of Derivatives & Use of Smart Contracts:

Derivatives transactions are significantly more complex than securities transactions, with post-trade life cycles of weeks or up to many years. Smart contracts allow the automatic execution of commercial transactions and agreements. Smart contracts have more security than traditional contracts, and since there are no middlemen, transaction costs get reduced to the bare minimum. Different contractual clauses forming derivatives transactions such as collateral management, expiry on payment etc. can be coded directly into smart contracts, enabling automatic execution and enforcement of contractual terms.

5. Post-trade reporting:

Distributed ledgers include a full audit trail for each transaction, thus facilitate more streamlined post-trade regulatory reporting. Participating financial institutions may standardize and streamline the process, so that reporting becomes automatic and comprehensive.

6. Trade Finance:

Trade finance is a complex process. Different checks and verifications are required at various points by various parties such as exporters, importers, banks, truckers, shippers, custom agents and regulators. fulfilling of contract depends on successful completion of the previous phase and on reliable information. Digitization of trade finance can solve the problem of falsified bills and personalize defaulter among buyers.

Some of the blockchain-enabled trade finance platforms or networks with common standards enabling interoperability.

- i) **Batavia Platform-** Batavia is a global trade finance platform based on blockchain and built on the IBM Blockchain Platform. It is being collaboratively developed by a consortium of five banks and IBM as equal member to the banks, in consultation with transportation industry experts and the banks' customers. Batavia is an open ecosystem can be accessed by organization around the world thus creating multi-party, cross-border trading networks. It has the potential to bring transparency and trust to each step of the trade process.
- ii) **Marco Polo-** This platform is built by TradeIX, R3 and a group of banks on the Corda blockchain framework, using TradeIX's open-source tools to test, pilot and manage open account trade finance transactions. It aims to enable real-time connectivity between trade participants, improve visibility into trade flows and simplify access to credit and risk mitigation services throughout the trade lifecycle.

Types of Blockchains

Public Blockchain-In this each user has a copy of ledger and participates in confirming transactions independently. This is based on Proof of Work (PoW) consensus and is open source and not permissioned. Anyone can participate, without permission and has following features i)open access, everybody can download a copy of blockchain ledger ii) No censorship or overlooking body, anonymous transactions, leaves scope for illegal transaction and risk of a fraudulent transaction iii) anybody can join the network to become a validator.

Private Blockchain-In this permission is required for users to have a copy of the ledger and verify transactions internally. Features include i) Authorized access, the read and write permissions for blockchain are restricted ii)Follow KYC norms, Anti Money Laundering/ CFT norms due to focus on industry level implementation iii)Government Bodies, Frameworks could be codified- smart contracts, government approved validators group of FIs and Consortiums and hence high degree of accountability.

Recommendations & Conclusion

There can be different possible scenarios regarding blockchain technology based on our research of various papers, case studies and available data.

Scene1: Failure of Blockchain Technology- There are many technical challenges around performance, scalability, privacy, security and interoperability which currently inhibiting blockchain technology adoption. There is a discord and confusion in the ranks of the community. Obviously, these problems are solvable, because a code is just a tool, humans must take the lead. We found the solution in the last research proposal for the global solution networks (GSNs) which will allow to achieve cooperation, social change, and management of underlying technologies (D. Tappocott, S. Underwood).

Scene 2: Strong Impact on Financial Sector and slow on other Industries- Crypto Currency Market data show the existence of countless blockchain platforms. But, our research has shown that many of them are still developing. Table 1 shows the top 5 platforms

Name	Market Cap(\$)	Price (\$)
1.Bitcoin	63,440,935,698	3,617.03
2.Etherium	12,803,218,905	122.09
3.XRP	12,367,942,964	0.300134
4.Litecoin	2,554,625,008	42.24
5.EOS	2,520,457,521	2.78

Source: Coinmarket.com on 15/2/2019.

Blockchains have the potential to disrupt, transform, and drive innovation across many areas. These changes will not happen overnight. One, who would be able to innovate quickly and would take on the market challenges would walk away with the major market share

Scene 3: Fast change in Financial Sector and other industries- While blockchain technology poses many risks, those risks are not so far from the existing risks that institutions manage. There is a need to adopt an integrated approach with clear rules of road bringing clarity and compliance and brought it within public policy and legal frameworks. This innovation could lower costs, risks and economic rents in the financial system if adopted with general acceptability and consensus.

Limitations

While Blockchain is seen as technology that would solve several business problems, it has its own limitations as well. Performance, scalability and efficiency of blockchain is a main challenge, though many advances incorporated but it has a complex design structure to provide security in a decentralized system. Secondly bitcoin process 7 to 10 transactions per second but Ethereum approximately 20 transactions per second but VISA process 24000 transactions per second. Sometimes, bitcoin transaction takes hour to settle if transaction fee attached are not very high. The criminal connection or concerns about security to guard against illicit activities such as money laundering, tax evasion or terrorism financing should be carefully guarded. Apart from that blockchains are vulnerable to 51% attack also. Blockchain design must be streamlined and optimized to minimize these inefficiencies to result in widespread adoption.

About the author

Shilpi Batham is JRF & twice NET qualified. She is a commerce graduate from Aligarh Muslim University, Aligarh (B. Com (Hons.))& completed her MBA with major in Finance from Faculty of Management Studies & Research, AMU, Aligarh. She has the distinction of being placed in the merit list of the examinations conducted by University as well as the Institute.

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