

Does blockchain mean higher transparency in the financial sector?

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ABSTRACT

This article investigates how blockchain affects transparency in the financial sector and how financial transparency might differ whether the blockchain network is public or partially private. First, the differences between partially private blockchains (consortium blockchains) and public blockchains suggest that consortium blockchains are gaining preference over public blockchains. With consortium blockchains, partial centralization, opposed to distributed control in public blockchains, is necessary for governance as it allows individuals on the platform to perform specific and sensible tasks. Although, consortium blockchains are not as decentralized and transparent as public blockchains they seem more suitable for financial institutions, presenting higher security, efficiency and control. Second, there are certain challenges along the way. Consortium blockchains seem to follow the same path of previous technologies, resulting in difficulty to disassociate consortium blockchains from intranets back in the 1990s as they present the same objective and function, therefore similar transparency, apart from cryptographic auditability and efficiency.

Classification JEL: O30, O33, F39

KEYWORDS

Blockchain, cryptocurrency, public blockchain, consortium blockchain, private blockchain, transparency, financial intermediation.

1. Introduction

Blockchain Technology, also referred to as Distributed Ledger Technology (DLT)¹ and shared Ledger Technology, created by Nakamoto (2008) as a method of validating ownership of the virtual currency bitcoin. The initial idea behind the creation of blockchain is digitizing trust, agreements and value, in addition, to significant reduction in time and costs associated to processing transactions almost to zero².

The message written on the first block, which is also known as the genesis block or block number zero, withheld a strong statement by Nakamoto regarding the unreliable corrupted intermediation system. It was based on the headline of the London Times Article dated third of January 2009, highlighting the banks bailout by the British government, “The Times 03/Jan/2009 Chancellor on brink of second bailout of banks”. Nakamoto never commented on the message he left on the genesis block, but many viewed it to have a strong political approach challenging the existing monetary system and enforcing decentralization by giving the power of control and validation to participants rather than a committee of elected politicians or a group of experts to control value and transmission of the currency. This led to creating a currency that empowers individuals to give it value and allow for more dispersed control rather than centralized making it easier for participants to transfer virtual-valued currencies without the role for central banks or middlemen.

The potential blockchain possesses is more than just a digital public ledger for transactions related to the virtual currency, “The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value.” (Don Tapscott, 2017). This new decentralized information system could become a disruptive innovation that could provide an information platform for the financial system, businesses or institutions (including government departments and third-party regulators) based on openness, transparency, neutrality, reliability and security. This article examines the characteristics of blockchain networks, especially the different features of consortium and public blockchains, to bring some light on the expectations that many voices raise on the increase of transparency in the financial sector.

1. Public versus private blockchain Part 1: permissioned blockchains. <<https://bitfury.com/content/downloads/public-vs-private-pt1-1.pdf>>.

2. Today’s transactions must pass through multiple intermediaries in order to be legalized. Transactions are stored in central ledgers maintained and monitored by an authority such as the central bank in the case of financial transactions or the Mortgage Electronic Registration System (MERS) for mortgages.

2. Blockchain's potential in the financial industry

This innovation without a doubt will revolutionize the financial system and change the way it works. Banks are already becoming aware of the threat and opportunity this technology poses, R3CEV, a blockchain technology company found initially by nine bank members in September 2015, the member's number has increased to more than 40 today³. Based on the potential this technology holds in the financial market, Wall Street estimated a spending on blockchain that could reach \$400 million within the next few years. Blockchain-based systems will be able to cut what usually takes three days for trades to settle, down to minutes or even seconds.⁴ This is considered a breakthrough, where competitive advantage is measured in nanoseconds, especially for complex-derivatives trades where the market conditions change before a trade is settled, and reducing substantial counterparty risk.

The commodity Futures Trading commission conducted a study in order to measure DLTs potential in the derivatives market, Nasdaq CEO Bob Greifeld has announced "Through this initial application of the blockchain technology, we begin a process that could revolutionize the core capital markets infrastructure systems" after using blockchain for its first trade. Even though blockchain remains at its infancy, it's potential savings in processing and bookkeeping costs fall within the range of 50%-80%.⁵ Central banks have observed great appeal in terms of cutting costs associated with moving money in a more reliable way between their depositors, but they are afraid of issuing a virtual currency that may narrow down the banking system.

Central banks historically have never taken deposits from the public, because of the sheer volume of required record keeping and customer contact would be overwhelming (Winkler, 2015). They are willing to integrate blockchain into their system for payment processing, transaction clearing functions, in addition to others, to reduce the time-consuming procedures because of sophisticated security obligations and verifications required to prevent fraud and theft that remain an issue even when central parties are involved. The use of this technology in the banking sector has the potential of increasing profits significantly by increasing banks efficiency and automation, a report by Santander estimated savings of up to \$20 billion per year

3. Blockchain technology ushers in the "internet of Value".
<<https://newsroom.cisco.com/feature-content?articleId=1741667>>.

4. DonTapescott.

5. Max Raskin & David Yermack.

for banks by 2022⁶. Taking into consideration the risk that will enable this technology to replace traditional banking with peer-to-peer transaction system has been addressed by BNP Paribas analyst Johann Playchata about applying the underlying bitcoin technology to securities trading that could possibly result into making sections of the financial industry “redundant”⁷. Regardless of this issue, the bank has already proceeded with their project on how blockchain can be applied to corporate payments, crowdfunding, SME post-trade operations and share registry.⁸ Several well-known banks such as Santander, UBS, Goldman Sachs have already set up research labs to test where this technology can be applied with the common goal of making their systems smarter, Mariano Belinky, head of Santander InnoVentures has announced that they have further identified 20-25 use cases where the underlying technology can be applied in the banking industry.⁹

3. Public blockchain and financial institutions

The combination of four features in one technology is what distinguishes public blockchains from other distributed ledger technologies:

- Transparency
- Anonymity
- Decentralization
- Digital assets

Public platforms are decentralized by design, meaning that no central party has control over the performance of the network. Public networks are based on a consensus protocol that requires the agreement of 51% of users to make successful changes in the ledger. The mining process is the motive

6. Santander: Blockchain Tech Can Save Banks \$20 Billion a Year.

<<https://www.coindesk.com/santander-blockchain-tech-can-save-banks-20-billion-a-year/>>.

7. The French bitcoin revolution: BNP Paribas testing crypto on its currency funds. <<https://www.ibtimes.co.uk/french-bitcoin-revolution-bnp-paribas-plans-add-crypto-its-currency-funds-1512360>>.

8. BNP Paribas Asset Management completes fund transaction blockchain test. <<https://www.finextra.com/newsarticle/31512/bnp-paribas-asset-management-completes-fund-transaction-blockchain-test>>.

9. Santander is experimenting with bitcoin and close to investing in a blockchain startup. <<https://www.businessinsider.com/santander-has-20-25-use-cases-for-bitcoins-blockchain-technology-everyday-banking-2015-6?IR=T>>.

that promotes the security of the platform, where miners compete to solve complex puzzles to earn monetary or utility tokens through validating transaction to be added to the blockchain. This process does not require the submission of personal information unless it is required for legal purposes.

Bitcoin is a well-known permissionless blockchain platform, where any node of the network can mine blocks. Participants would require sufficient computational power to confirm transactions and produce new blocks to the chain. This process is called POW (Proof-Of-Work) and is a quite competitive process as miners compete to complete transactions on the network to be rewarded.¹⁰

Even though legal and regulatory problems arise because of the anonymity of the bitcoin miners, it is necessary to be able to identify the processors of the transactions to be able to consider it an appropriate medium to conduct transactions. If an institution requires the authentication of its transactions to be mined by authorized miners, they will need to send their transactions through a secure channel directly to these miners instead of broadcasting them publicly over the network. Based on the bitcoin protocol, the admission of non-broadcast validated transactions are accepted into blocks.

Controversy remains because of public blockchain's "openness". There are growing concern among bitcoin client's confidentiality of their transaction history and the fear of it being used in illegal activities. Tracking a user's transaction history and ownership of bitcoins became easy with their public key. Users tend to use the same public key or bitcoin address (derived from the public key) throughout their activities on the bitcoin blockchain. Since one of the key features of this platform is anonymity, Bitcoin does not have user identification. Transparency allows other users to see your transaction history and the destination of transactions using the public key. This process however, can compromise user's financial privacy. This problem led to the creation of Hierarchical Deterministic (HD) wallets. HD wallets are able to generate new public key for every transaction using an algorithm that does not require the private key, simplifying the process of fund recovery and increasing anonymity making it more difficult to track users from their public keys. This could have a counter effect in terms of reducing transparency making it more difficult to trace funds back to their origin and allowing for illegal activities such as money laundering to take place.

Blockchain's decentralized nature driven by P2P transactions system and lack of supervision has allowed it to be an easy channel for money laundering, trading illegal drugs and weapons on the dark web. The idea of bit-

10. Proof-of-Work Explained. <<https://cointelegraph.com/explained/proof-of-work-explained>>.

coin has attracted the attention of libertarians and cyber-anarchists who are fond of the idea of lack of authoritative figures, regulation and third parties monitoring their activities. Silk Road is one of the infamous websites that was closed due to illegal activities that were being carried using a bitcoin payment system for money laundering and drug trafficking that insured the anonymity of its users¹¹.

Another controversial factor that is leading financial institutions to lean towards consortium blockchains is the immense energy consuming mechanism of proof-of-work algorithm. This could raise various arguments regarding the preservation of energy and the environment.

Finally, financial institutions prefer a design that involves fiat currencies or assets for conducting transactions other than the native tokens such as bitcoin used in the public networks. Native tokens in public blockchain motivates miners to maintain the security and constant growth of the system, the rewards obtained from creating new blocks is a consistent measure for security within the public platform. This is not necessarily required in consortium blockchain, as we will see in the following section, due to the structure of the platform eliminating several costs in return.

4. Consortium (or partially private) blockchains and financial institutions

For simplicity purposes, in this article we only analyze public blockchains and partially private blockchains, also called consortium blockchains. Fully private blockchains are no different from centralized systems, except for their cryptographic auditability as Vitalik Buterin, creator of Ethereum, made the difference clear in his statement:

“So far there has been little emphasis on the distinction between consortium blockchains and fully private blockchains, although it is important: the former provides a hybrid between the ‘low-trust’ provided by public blockchains and the ‘single highly-trusted entity’ model of private blockchains, whereas the latter can be more accurately described as a traditional centralized system with a degree of cryptographic auditability attached.”

In consortium blockchains, instead of allowing any person with an internet connection to participate in the verification of transactions process (public) or allowing only one company to have full control (fully private), a

11. Blockchain: The future of the finance industry?

<<https://www.rolandberger.com/en/Point-of-View/Blockchain-The-future-of-the-finance-industry.html>>.

few selected nodes to validate are predetermined (consortium). A consortium platform provides many of the same benefits affiliated with private blockchain—efficiency and transaction privacy, for example—without consolidating power with only one company. It is similar to trusting a council of elders. The council members are generally known entities and they can decide who has read access to the blockchain ledger.

Consortium blockchain platforms have many of the same advantages of a private blockchain, but it operates under the leadership of a group instead of a single entity.

Financial institutions and other companies are more doubtful towards the concept of public blockchains because of their decentralized public nature, whereas consortium blockchains are much more favored in terms of their ability to control transactions, transparency, confidentiality, ease of adjustments and modification for protocol purposes. Proof-of-work is no longer relevant in a consortium blockchain, so a business model can be implemented with reduced operational costs and a much higher transaction throughput.¹² Having a permissioned chain grants easier integration into the legal and regulatory system, unlike public blockchains where they encountered problems because of the technology's "openness", it is essential to identify who your payment processors are.¹³ Alex Batlin, founder and CEO of Trustology, pointed out how people misunderstood the banks intentions when it came to the necessity of having control through consortium blockchains, which is a false statement, one of the key aspects banks focus on is transaction volumes and easier integration to the existing legal and regulatory framework. The characteristics blockchain has when it comes to security and ability not to be manipulated, edited or deleted makes it an attractive alternative to the existing system used by financial institutions.

"...proper financial controls are already somewhat decentralized, thanks to a 'human blockchain' of accountants, auditors, etc. checking each other's work." (Nick Szabo, creator of smart contracts)

Szabo's statement is pointing out the fact that our system is already decentralized in a more concentrated aspect (since central banks are still in control), automating this process will take society a step further towards a distributed system. According to a survey by world Economic Forum¹⁴ by

12. Public vs private blockchains whitepaper part 1: permissioned blockchains.

13. UBS reveals its interest in Sidechains as well as Ethereum <https://www.ibtimes.co.uk/ubs-reveals-its-interest-sidechains-well-ethereum-1519706>.

14. Deep Shift Technology Tipping and Societal Impact. http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf.

year 2027, 10% of global gross domestic product (GDP) will be stored on blockchain, and by year 2023, tax will be collected for the first time by the government through blockchain. Although, even with blockchain's unregulated nature and lack of control over the monetary policy it still serves the purpose of collecting tax through a new mechanism. This is not taking into consideration the unpredictable side that could have significant impact due to lack of centralization such as corruption, central banks and monetary policy, role of the government and real-time taxation. The application of this technology to governments ledger for land and cities financial budget records is a step towards technological advancement where it will be impossible to manipulate these records, permanently keeping them from being altered or faulted (mayoral candidate of London, 2016).

Financial institutions are leaning towards permissioned ledgers as more and more companies start to create customized and craft solutions based on their demands, some of these examples are R3CEV, Chain, Clearmatics and Hyperledger. Permissioned blockchains are not necessarily fully private, there are numerous levels of access to blockchain, and restrictions include user's ability to only access transactions that directly involves them. There are also restrictions on both creating new blocks of transactions and proposing new transactions to be included into the blockchain.¹⁵The third level of access is restricted to a limited number of institutions such as banks, jointly collaborating on the administration of permissioned blockchain granting access to their clients to read their transactions to provide a technical transparent way to guarantee the safety of the client's funds. This type of access offered to clients is limited, full access to the blockchain is granted to regulators to meet regulatory requirements and agreement.

Consortium blockchain are more predictable and controlled than public blockchains. These features appeal greatly to institutions that operate timestamped registries and ledgers, especially when it comes to fulfilling legal requirements for the registration of registry processors. Consortium blockchains do not have native tokens. The tokens in public blockchains rewards miners for keeping the system safe and prevents participants from misbehaving. Accountability and legal prosecution replace reward-based validation system in consortium blockchains.

Financial institutions are uneasy with structure of the public blockchain run by anonymous miners and driven by unregulated, volatile currencies. That is why entities are replacing anonymous miners with known participants, making it easier for institutions to remove and replace native

15. Public versus private blockchain Part 1: permissioned blockchains.

currencies and the energy intensive complicated process of (POW), with less resource consuming and efficient consensus algorithm.¹⁶

“To remove vulnerability, banks also have to remove individual human control and the individuals in charge or with root access. Banks naturally hate that loss to their power. But they don’t have any choice if they want to gain the benefits of having an army of independent computers that rigorously, constantly and securely check each other’s’ work.” (Nick Szabo)¹⁷

5. Blockchain Transparency

The structure of the underlying technology and the way it functions is what makes the currency so valuable. Blockchain eases transaction processing and other financial and non-financial services without the need for intermediaries or central parties for validation. However, there are risks associated with security and privacy that might reduce the appeal of consortium and public blockchains. Addressing these issues raises several questions such as, what type of blockchain provides better financial transparency whilst guaranteeing security and privacy. Will blockchain promise a leading-edge resolution through disintermediation and transparency?

Transparency in blockchain defines the ability to view public addresses where you will be able to access transaction history, assets etc. without limitations or boundaries. This degree of transparency has never existed within the financial system or businesses from before, which led to raising doubts and concerns in some industries. Transparency comes with a flexible level of privacy in consortium platforms that could end up in limiting transparency or even eliminating it. Meaning, with consortium blockchains permission to gain access to a ledger will require the approval of specific central body member(s), which is what financial institutions are interested in applying to their system. Many financial institutions are investigating the uses of blockchain through research labs to assess the possibility of integrating blockchain to their payment system. Hyperledger Fabric, for instance, is a consortium platform designed to create projects tailored to specific needs and uses.

With consortium blockchain, partial or full centralization is necessary and required for governance purposes allowing for individuals in the platform

16. Global blockchain benchmarking study (Dr Garrick Hileman & Michel Rauchs, 2017).

17. Public versus private blockchain Part 2: permissionless blockchains. <<https://www.ibtimes.co.uk/nick-szabo-if-banks-want-benefits-blockchains-they-must-go-permissionless-1518874>>.

to perform what their job specifies, as opposed to dispersed control. Level tiers in consortium blockchains have been created for consortium blockchain users to enhance job-oriented performance. Consortium blockchains are not as transparent as public and neither are obligated to be as their creation was designated to meet the specification and standards for particular entities. Applications of consortium blockchain includes auditing and database management, which do not necessarily require for public access or display. It is highly unlikely that financial institutions will adopt public blockchains and use cryptocurrencies systems. The anonymity of the miners brings the risk of transaction reversal by cyber-attacks and lack of liability. The law clashes with this technology due to anonymity of miners when it comes to accountability. It is difficult to hold a specific entity liable for any possible losses.

Historically, the lack of transparency has negatively affected financial institutions. These institutions have the leverage of accessing their depositors and customers funds without their knowledge and it may not always be in the sincerest way. The financial crisis of 2008 can be taken as an example of lack of transparency, several crypto visionaries including the former vice president of J.P Morgan Chase believed that if blockchain existed before 2008 the financial crises would not have happened. Some believe that its existence now is going to help prevent the next Great Depression from happening; ex-wall street executive also supports this observation regarded by Pan Hua-dong.¹⁸ Moreover, one of the strategies used by the notorious investment bank Lehman brothers was to run two parallel ledger, that is, one internal, and one for the public. The belief that blockchain's transparency would have helped save Lehman brothers from bankruptcy seems quite false. The fact that they owned an internal and a public ledger to hide their debt and overestimate the value of their assets to deceive regulators and the public can happen with blockchain as well with the ability of limiting transparency and access to only a set of members on a consortium platform. The existence of blockchain back then would have helped with maintenance of records in timestamped order because of scalability limitations of the existing bookkeeping system. Lehman's balance sheets grew in complexity and tracking records of assets to their origin became extremely complicated. Claiming that the technology's existence back in 2008 would have eliminated bankruptcies or a financial crisis is a bit of a stretch. However, we are aware that the full potential of this technology has not yet been discovered, and its application to different areas in the financial sector is still being experimented with. Blockchain is deafen-

18. Will Blockchain Protect the World Economy from Financial Crises?
<<https://cointelegraph.com/news/will-blockchain-protect-the-world-economy-from-financial-crises>>.

ingly at its infancy, several of these claims lack supporting data due to insufficient applications and development of the technology in the financial system, leading to underestimating its potential as a result of lack of application.

Some of the consequences that came with transparency in public platforms is the freedom and ability to access, read and write transactions, which initiated black market trading. The energy consuming consensus protocol led to the majority of the participants that live in countries where electricity is cheap being the leaders of the network resulting in users taking advantage, imposing centralization and illegal actions that ultimately made the network vulnerable to changes on electricity subsidies. This led to consortium blockchains gaining much more preference over public blockchain particularly for those reasons, encouraging businesses and banks to implement them with the objective of increasing security that will ultimately create greater control that might reduce and put a limitation to the level of transparency through potential recentralization. The last statement is implying tailored transparency particularly because of the features of consortium blockchains, where the operators possess the leverage of controlling who can read the ledger of verified transactions, submit and validate transactions. The information in consortium blockchain can be displayed publicly, but it is mainly up to the entity's intentions on how much they would like for the public or clients to access and read (assuming if it remains unregulated).

Despite the lower transparency in consortium blockchains, this technology will help central banks in the decision-making process, and to manage monetary policy based on the transparency provided through establishing a consortium with other banks, allowing for more effective decision making based on dispersed control and consensus protocol, for example, monitoring how lowering interest rate can affect the economy. The impact can be monitored on the platform observing the effects this decision had on both spending and the economy, instead of relying on third parties to collect information. Regulators can also have access and monitor the performance of banks to see whether banks are taking on excessive risk and the possibility of an upcoming credit crunch, in addition to reduced costs of having to validate and monitor the performance of all the banks individually to determine whether they are following rules and regulation.

6. Conclusion

The constant innovation of distributed database technology made an impact on the creation of blockchain enabling for significant reduction in costs in the remittance market in addition to being the first decentralized

system to solve the double-spending problem. Blockchain concludes solutions to common problems that are encountered in the traditional centralized system in terms of security, transparency, efficiency and cyber-attacks.

While public blockchains seem to be prepared to solve most of these problems, including the increase of transparency. Consortium blockchains seem to follow the same path of 1990s intranets. It is quite hard to dissociate consortium blockchains from intranets due to similarity as they present the same objectives and function, apart from consortium blockchain's cryptographic auditability and efficiency. Intranets invention was precisely for transparency related reasons but it was quite expensive to maintain and soon enough became difficult to handle, complicated to grasp and slow in function that ultimately lead to their extinction. Blockchain seems much more efficient than these old intranets. However, uncertainty plays a major role in a technology that is still growing and under inspection, not just from the aspect of technological advancement, but from regulatory adaptability as well. It is still early to be able to foresee where the technology is headed, and whether consortium blockchains will encounter the same fate as previous technologies with more or less changing the level of anticipated transparency to enhance the efficiency of the financial system.

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