

Blockchain Implementation to Manage Banking Mobile Payments

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Mobile payment Blockchain technology can potentially disrupt the banking and financial industry if they can't reap the benefits of future technology. Today, most of the banks want to turn into blockchain technology for fraud reduction, secure, faster transaction, lower cost, improved data quality, KYC, smart contracts, Payments, and trading platform. In this paper, we proposed a new conceptual framework for using mobile payment blockchain which can eliminate the banks and financial authorities concerns and adopt the customers (both merchants and retails) needs for faster, safe, cheaper, real-time and secure payments that also eliminate the need of the intermediary parties to approve and reconciliation the transaction. The framework reduces the operational risk as all the transactions are transparent and unalterable.

Keywords: blockchain, mobile payment, private blockchain, distributed ledger, payment security

1. INTRODUCTION

The Blockchain is a distributed ledger technology (DLT) that uses community validation, underlying most cryptocurrency adaptations, through synchronized ledger contents replicated across multiple users. For example, Bitcoin is one of the cryptocurrencies that rely on blockchain technology, which is a distributed peer-corroborated time-stamped ledger that sequentially reveals all legal trades. All participants in the network can publicly audit the ledger, either via individuals or through autonomous agents. Based on the usage of a devolved ledger plus blockchain computerization, a high-tech payment model has been fashioned which occasions financial infrastructure branded by cheapness and pellucidity. Making payments using BlockChain in Banking System has many benefits that can be drawn from the advantages of blockchain technologies such as:

1. The capability of boosting the efficiency and speeding up in executing transactions and optimization of transaction time.
2. Through digitization and verification of records, blockchain technology has the potential of reducing the procedures and the continued progression of commercial contracts.
3. The capability of substantially lowering the charges for forex dealings, transmittals, credit card commerce and other merchandises.
4. By promoting smart contracts, blockchain technology has the potential of increasing the competence of dealings and expenditures stocks.

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5. Blockchain technology, through automatic recording and monitoring of information, creates transparency in the purpose and destination of cash, preventing ills such as money laundering.

Blockchain technology has the potential of having a significant impact on the global financial market. It is gaining acceptability in businesses where all dealings require an authentication, involving securities, contracts and insurance. This paper aims to propose a conceptual framework for using mobile payment blockchain and outline the advantages and disadvantages of using blockchain technology in making payments within the banking system. It also presents the different ways that Blockchain has and can be applied within the financial sector as a whole.

The remainder of this article is as follows. In Section 2, an overview of trends and published research in the area of mobile payment and Blockchain is discussed. In Section 3, a framework and solutions for various problems in the mobile payment banking system are presented. In Section 4, a discussion of multiple aspects of the proposed method. Finally, Section 5 is the conclusion.

2. TRENDS AND RELATED RESEARCH

When Blockchain technology is used to point out the wide-ranging class of distributed ledgers based on community consensus [1], depict how the technology, which accomplished reputation as the premise for Bitcoin – the first broad decentralized digital currency – represented a critical worldview shift. Through its utilize of community, approval to support DLT, blockchain technology decentralized control over currency, in this manner moving clients believe from people to machines. The authors investigate this evolution and technology's potential to drive different modern services. Distributed-ledger technologies are ledger techniques that incorporate the whole enchilada of approaches used for decentralized record-keeping of transactional and data distribution throughout manifold, countries, institutions or servers. According to [2], the 2008 global financial crisis resulted in the world, placing more determination in constricting banking and financial activities by implementing. Sterner rules, protocols and regulations [3, 4]. This has led to a decrease in transparency and trust. Since Blockchain relies on several validating peer nodes to implement the network-consensus protocol for a given transaction [5] while at the same time all the nodes are having the right of entry to the information in accordance to their access-permission level, financial records and transactions can, therefore, be traceable and transparent. Lee assessed financial technologies (fintech) listing all emerging technologies that have and will play a significant role in the financial sector. The authors state that new and disruptive business models arise when developers and financial institutions persistently look for ways of harnessing new technologies that advance added [6] value. One of these new technologies that they list is blockchain technology, and his fellow authors assessed the validation and verification of smart contracts. They listed Blockchain technology as one of the tools that can be used for validating smart contracts owing to Blockchain that is relying on several validating peer nodes to implement the network-consensus protocol for a given transaction. Eyal also Investigates how and why cryptocurrency blockchains have ended up the dear of the financial innovation segment. Despite blockchain technology's massive potential in progressing agreement conventions and shrewd contracts, major holes

stay between its execution as a libertarian-rooted, privacy-minded, decentralized cryptocurrency and an innovation stack that completely fulfils trade, security, and administrative prerequisites [7]. Treleaven also assessed the use of blockchain technology in the financial sector. [8] and his compatriots presented a brief introduction to the topics of Blockchain Technology, Bitcoin, and Ethereum [9]. On the other hand, looked into the use of blockchain technology in developing countries where financial laws and regulations are weak and rarely followed [10].

With regards to the implementation of Blockchain in existing financial systems, Kim proposes a Mobile charger billing system using lightweight Blockchain [11]. In their paper, the authors used Blockchain technology to appropriate charge billing. Kim, Kang, and Hong suggested a method for reducing the size of block data recommending a solution to the problem of accumulating data size of existing Blockchain to be researched. On the other hand, explored how blockchain technology can be applied to the problem of utilizing this leftover foreign currency [12]. Lundqvist provided a proof of concept implementation of a smart cable that connects to a smart socket and without any human interaction payment for electricity. Essentially, their system used blockchain technology for thing-to-thing electricity micropayments [13]. Zhang introduces a payment method, BPay, suggested that to realize secure and fair payment of outsourcing services in general without relying on any third-party entities. This proposed system is an outsourcing service that enables a suitable payment structure [14]. Blockchain technology can streamline commerce processes, whereas making secure, dependable records of agreements and transactions in banking services. [5] investigates how blockchain smart-contract applications are set to disturb the fund, legal services, and government sectors. Utilizing DLT, smart contracts might supervise the execution of lawful exchanges, consequently and in real-time [15, 16]. Tells the story of Bitcoin mining equipment and how a bunch of early adopters self-organized and made a modern industry. Bitcoin's Blockchain requires the use of an agreement algorithm that runs on equipment scattered all through the world. The machines coordinated Bitcoin exchanges into the Blockchain, and the method requires a computationally seriously proof-of-work called mining. Bitcoin mining has advanced to become a highly vertically coordinates framework with single companies owning one or more data centres, designing the chips, and keeping up the equipment. Through application-specific coordinates circuit (ASIC) clouds [17], today's Bitcoin mineworkers allow us to see the future of planet-scale computing [18, 19].

3. PROPOSED SOLUTION FRAMEWORK

In this section, a solution for mobile payments by using blockchain technology is presented. Financial organizations aim to use mobiles as the leading technology in payments [20]. This due to the incredible speed of using mobiles by people worldwide, which include all financial movements of individuals and groups. That is what is going on between the P2P, B2B and P2B to make things easy and provide safe and qualified services. Blockchain has grown to be one of the fastest spreading technologies that have a significant influence on the financial sector as well as other sectors for its upgrade of cost reduction, accelerate data exchange, scaled security, cost of trust, transparency and decentralized database [16].

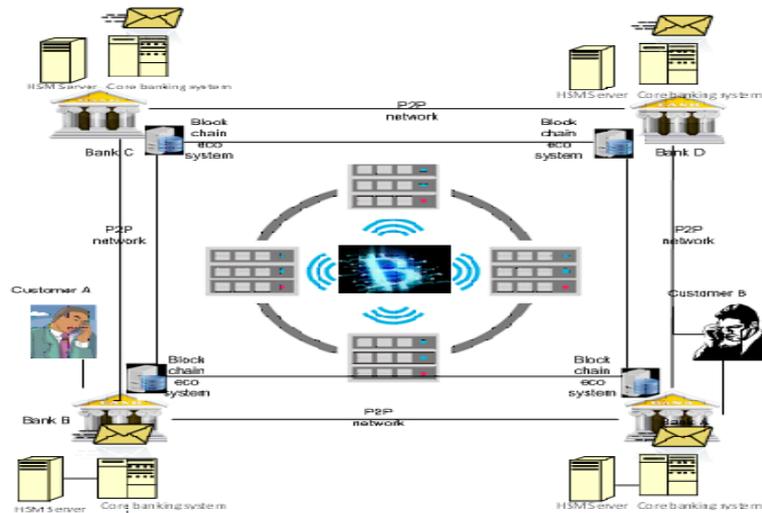


Fig. 1. New mobile payment using blockchain framework.

On the other hand, mobile payment has become one of the most required payment methods for the customer. However, mobile payment still in its first stages due to the trust and security issues in addition to the customer ownership and loyalty for the financial institutions since most of the mobile payment solutions are based on wallets and 3rd party in the middle which represents a concerning issue for both banks and customers. In Fig. 1 describes the new mobile payment method using blockchain technology, the following concepts are considered: All the banks are connected as nodes with P2P Private blockchain network, each node on the Blockchain can get the initiated transaction by the customer and check for eligibility and create the block for this transaction. Each customer has his own bank account, and the account is connected on his mobile number via IBAN, each node (bank) has to validate each transaction to be authorized transaction. The final authorization for security reasons and transaction legality must be taken from the customer account acquirer; the sender bank debited the customer account by the amount of transaction plus commission by Fiat currency (equal to the digital currency exchange) [19]. The Fiat currency will be exchanged to digital currency (via Blockchain) and will be transferred to the receiver bank. The Blockchain will deduct the commission and exchange the digital money to the receiver Fiat currency and transfer the money to the receiver bank account; all the nodes authorize the transaction and the block closed, then the commission will be distributed to the related policy and every beneficiary got his/her rate [21]. As the payments represent an excellent revenue stream for financial institutions and they expand the use of digital currencies (cryptocurrency) as a need for all the new generation of internet users and online commerce [22]. The financial institutions need to reap its benefits in the future and earn from this new technology since cryptocurrencies started to win the scene and bank ownership for customers stolen. Fig. 2 describes how the proposed solution works [23].

1. Customer A who belongs to bank A (no geographic limits) wants to send money to customer B who belongs to bank B.

2. Customer A uses his/her mobile application to initiate the transaction which includes defining the receiver mobile no. and the amount of Fiat currency and the currency type.
3. Any node which gets the request first (called Issuer) check for customer eligibility (blacklist, ML, Fraud, ...), creates the block and broadcasts to every node in the network.
4. The issuer node sends 3-digit code to the sender mobile for security request.
5. The sender enters his/her bank PIN code concatenated with the three digits that received by the Issuer.
6. The acquirer bank checks for pin validation by connection to its HSM system response and sends the validation message to all nodes.
7. The Acquirer bank does the exchange of Fiat money (transaction amount plus commission) with the digital money (Ethereum or other digital currency) in the current rate, and the Blockchain transfers the money to the receiver bank (beneficiary) after changing the digital cash to Fiat money on the beneficiary currency.
8. The Blockchain divides the commission based on the commission policy and transfers the money to the party's accounts.
9. All the nodes will validate the transaction, and the block will be closed and added to the blockchain transactions.
10. Messages sent to both sender and receiver mobiles contain the transaction success.
11. Whenever any fail in the middle of the process, everything is rolled back, and the message will be sent to the receiver of the failed transaction.
12. All the transactions and data flow are encrypted and hashed based on the algorithm used.
13. Both banks for the sender and receiver create records on their eco-systems based on the algorithm developed for the core system and blockchain connection algorithm.

4. DISCUSSION

Use Mobile payment and Blockchain are still new, and numerous work and experiments need to be carried out in financial institution to make it successful since the possible outcomes and benefits worth to start since. Blockchain mobile payment undoubtedly is going to be the future of both business and personal life [24]. We can list many of the blockchain mobile payments and financial services, but, this research will focus on the main issues and core concerns from both financial and customer perspectives as follows:

Decentralization: a decentralized technology which emphasizes on peer-to-peer transactions nullifying the need of the third party. Since Blockchain is a distributed and shared database of transactions that facilitates the exchange of values, it eliminates the need of a third party to validate transaction which is reducing fees and increasing transparency, which makes no need for a single entity to hold control over the system. All members of the Blockchain are equally responsible for enforcing all the transaction and the Issuer and acquirer (which can be any member) so that they are both responsible for approving the transaction. Utilizing the innovation offers the likelihood to diminish expenses and provides the open door for organizations to fabricate and keep up a framework that conveys abilities at lower costs than customary brought together models. Blockchain can process exchanges quicker because it doesn't utilize a brought together foundation [25].

Trust: since all transactions are recorded transparently in a distributed ledger, and no one can update or amend any block which represents high trust between members as well as customers who can monitor and retrieve any transaction belongs to them. As transparency, ownership, loyalty and trustworthiness represent high demand for customers, financial institutions and monitoring authorities of the framework will be the most relevant for business investment for availing services and reflects the reference for cost of trust reduction. Trust is the value which the consumer of products and services is looking for, which is not negotiable, and no one can skip it. Business always needs to purchase in the current traditional system. At the same time, the mobile payment blockchain framework helps to eliminate or at least reduce this problem and make new eco-system free from the need of this trust in the decentralized, secure world [26].

Security: Security is the topmost concern all over the business world and no business will remain without taking into consideration dealing with security and vulnerability issues, while in mobile payment blockchain encryption and security model, all members will be responsible in approving any transaction in the Blockchain and no one can modify, change or remove this block from the chain, also Cyber Security is also one of the most influenced by the Blockchain technology. On the other hand, hackers and other threats opportunity will be in its lowest state since Blockchain will help in maintaining data safe since the ledger is public, encrypted and verified using cryptography.

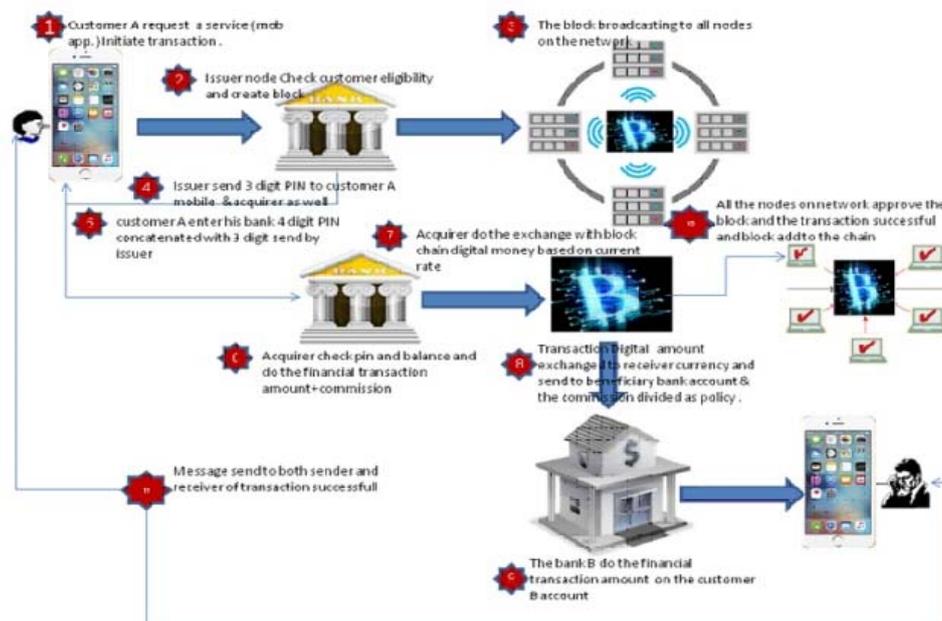


Fig. 2. Proposed solution works.

All blocks linked using cryptography hash of the previous block and each transaction is time-stamped with a high level of encryption which is making it tamper-proof and

indisputable. Also, the use of genetic of security in transaction workflow as something the customer know which is the PIN code that he is having in mind, in addition to the issuer 3-digit pin send by message, something he has which is the mobile phone that contains the application and receives the message will increase the transaction security and improve the customer satisfaction of dealing with this system. On the other hand, the mobile payment blockchain is expanding and ensuring the financial security which is vital interest area for the financial authorities for tracking, monitoring policy compliance for cash flow and money laundering as well as fraud, all policies can be implemented smoothly, and all transactions will pass through the monitoring policies .for hackers, it will be very complicated to violate the entire system since the data distributed between many nodes and encrypted which makes it difficult to hack all the nodes through the process flow at the same time and alter the information. From the financial institution side, knowing your customer (KYC) on the Blockchain, once a bank receives a new customer and authenticate his/her identity, the bank can save the KYC document in a blockchain.

Real-time: execution of payments and reducing the cost of transactions since the commission will be in the lowest rate and no need for intermediate party and reconciliation cost, also the exchange rate inflation for the digital currency (cryptocurrency) will be very low since the exchange will be done on the spot (real-time) of the transaction process for both buy and sell of digital currency against Fiat currency.

5. CONCLUSION

Portable instalment Blockchain innovation can conceivably upset the keeping money and budgetary industry if they can't receive the rewards of things to come innovation. Today, the majority of the banks need to transform into blockchain innovation for extortion decrease, secure, quicker exchange, bring down the cost, enhanced information quality, KYC, brilliant contracts, payments, and exchanging stage. In this paper, another calculated edge work for utilizing portable instalment blockchain is presented which can take out the banks and money related experts concerns and embraces the clients (the two dealers and retails) requirements for quicker, safe, less expensive, continuous and secure instalments that dispense with likewise the need of the mediator gatherings to support and compromise the exchange. The edgework diminishes the operational hazard as every one of the exchanges is straightforward and unalterable.

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