# An Online ATM Card Request and Instant Issuance Platform Using Blockchain Technology

MAGNUS CHINONSO OKERE[1], ELEBIRI EBERE[2], A. O AGBAKWURU[3]
[1, 2, 3] *Department of Computer Science, faculty of Physical science, Imo State University Owerri, Nigeria*

***Abstract-*** ***The aim of this study is to develop an online ATM card request and instant issuance platform using block chain technology while the objectives are to develop a system that could provide an interface for customers to request for an ATM card remotely, provide a secured platform for easy, fast and instance verification of customers credentials before issuance of ATM card, a platform that could enable ATM cards to be delivered to a customer remotely from any designated bank location and to use the IBM Blockchain Hyper ledger Composer tool to create a decentralized database for the storage of customers ATM card related transactions. The motivation towards this study was based on the delay and insecurity of ATM card request and delivery processes witnessed in most banks in Nigeria. An object oriented analysis design methodology (OOADM) was employed for the system analysis, design and development of the proposed system applied MySQL as backend the distributed database for storing ATM card requests by customers remotely together with hyper text preprocessor (PHP), hypertext markup language (HTML) and cascading style-sheet (CSS). These development tools were chosen because of their simplicity and flexibility in coding, easy integration and deployment and implementation of an online system. The results was able to provide an online platform for users to apply for new ATM card remotely and for the bank staff/management take proper accounts of documents and request made by their clients.***

***Indexed Terms-*** ***Online ATM Card Request, and Online ATM delivery System***

## I. INTRODUCTION

The advancement of payments in recent time has left from cash to cheques, and then payment cards such as credit cards and debit cards. Interestingly, automated teller machine (ATM) cards are the most rapidly growing methods of payments in several countries around the world. Information and communication technology (ICT) and the development of internet have also provided new products and value-added services to be delivered using the same electronic infrastructure. In recent years, the use of different channels for banking and financial services has changed the whole way bank customers and their banks interact and with the increasing popularity of the internet, more and more industries are seeking ways to utilize this popular medium in an effort to keep up with the changing technological preferences of their customers.

An ATM is an electronic banking outlet that allows customers to complete basic transactions without the aid of a branch representative or teller. Anyone with a credit card or debit card can access cash at most ATM branches. More so, an ATM provides easy convenient, allowing consumers to perform quick self-service transactions such as deposits, cash withdrawals, bill payments, and transfers between accounts. With the huge importance placed on the use of ATM, it means that banks must find a way of providing easy and fast means of getting their ATM cards remotely without delay. Also, in other to grant adequate confidence to customers and build stronger trust with their customers, the banking industry in general should find a way of implementing an advanced security to their bank transactions and strengthen the server and file security. In other to provide such services, this study adopt an advance security technology called blockchain that would help in modernizing the security of the ATM banking transactions and activities involving customers and the bank for a more effective service delivery. Blockchain is a distributed database solution that keeps track of a growing list of data entries that are verified by the nodes that make up the network. The information is kept in a public ledger, which includes

details on every transaction ever made. Blockchain is a decentralized system that eliminates the need for a third-party intermediary. Every transaction that has ever been performed in Blockchain is shared and accessible to all nodes.Customers face a lot of problems trying to request and get their ATM cards in most banks in Nigeria such as standing under the hash sun or rain in queues, manual file storage system by keeping customers ATM application records in days before attending to the files which sometimes cause loss of files and adaptation of centralized storage technology for customers files leading to poor security of the requested ATM applications by these customers, therefore, with the outlined problem stated identified by the researchers, the aim of the study is to provide online ATM card request and instant issuance platform using blockchain technology while the objectives is to provide a secured interface for customers to request for an ATM card remotely, a system that can provide an instance verification of customers credentials before issuance of ATM card, and a system that will provide a more secured interface by using the IBM Blockchain Hyper ledger Composer tool to create a decentralized database for the storage of customers ATM card related transactions.The significance of this study is not only based on providing a more secured, remote and instant ATM card request and issuance to customers but also to facilitate banking service and build stronger customer relationship for two parties. When organizations have strong confidence on her service delivery with improved and secured technology, there will be increase in the output and customers feedback. The significance of this study is not only beneficial to the customers only but to the general public at large. When the problem of delay in service delivery is resolved, and customers could request and receive their ATM card instantly without delay, then there will be rapid increase of trust to the business transaction between the banks and general public, hence improve the economy at large.

## II. LITERATURE REVIEW/RELATED STUDIES

### 2.1 Automated Teller Machine (ATM)

An ATM card is a media issued by a card issuer to carry out card transactions in accordance with the terms and conditions of the parties' agreement. AS defined by ATM (Automated Teller Machines or Automatic Teller Machines) are automated teller machines with customers, which performs customer identification via ATM card (debit card, credit card) or compatible devices, and help customers check account, withdraw cash, transfer money, pay for goods and services[1].

[2] discussed about Online payment systems for e-banking and blockchain technology which expressed that Online banking payments play important roles in improving financial intelligibility and stimulating business growth and consumption. How successful a banking system would be depends on the quality and efficiency of clearing system of the industry. [3]Talked about the value proposition of blockchain technologies and its impact on Digital Platforms in contrast that there has been an emergence of a radically different approach to trust creation through Blockchain Technology. Instead of assuming orchestration and decision-making functions by the platform manager, The Technology is based on trusting open source, open verified code where data management, transaction, monitoring and rules of engagement happen in a decentralized manner across multiple nodes according to [4].According to [1] worked on a topic “customer satisfaction towards ATM Services: A Case of VietcombankVinh Long, Vietnam” which stated Cards as non-cash payment instruments issued by financial institutions and credit institutions to customers

#### 2.1.1 Blockchain

A blockchain is made up of a series of blocks. A blockchain database is a shared, distributed, fault-tolerant, and append-only database that keeps track of records in blocks [5]. Blocks cannot be erased or changed, despite the fact that all blockchain users have access to them. A blockchain database is made up of a series of blocks. Each block comprises numerous validated transactions and contains the hash value of the preceding block[6]. Also as stated by[7], Blockchain is a distributed database solution that keeps track of a growing list of data entries that are verified by the nodes that make up the network. The information is kept in a public ledger, which includes details on every transaction ever made. Blockchain is a decentralized system that eliminates

the need for a third-party intermediary. Every transaction that has ever been performed in Blockchain is shared and accessible to all nodes. This property improves the system's transparency over centralize activities requires a third party. Furthermore, all nodes in Blockchain are anonymous, making it safer for other nodes to confirm transactions. The first application to use Blockchain technology was Bitcoin. Bitcoin established a decentralized crypto currency environment in which users may buy and sell products using digital currency [8].

Furthermore [9], a Blockchain network has a distributed ledger that records all network transactions. As a result, a Blockchain ledger is frequently referred to as decentralized since it is copied across a large number of network participants, each of whom contributes to its upkeep. Decentralization and collaboration are also important characteristics that reflect how businesses exchange goods and services in the real world.IBM Blockchain is a fully integrated enterprise-ready Blockchain platform for accelerating the development, governance, and management of multi-institution business networks: With IBM Blockchain, developers may utilize the hyper ledger Composer tool to easily create a highly protected and highly functional Platform on the Cloud Infrastructure.

2.1.2 Types of Blockchain Technologies

As outline by [10]on the various types of blockchain technologies stated as follows: Public Blockchain, Private Blockchain, Consortium Blockchains and Hybrid blockchains.

1. Public Blockchains: Public blockchains are permissionless and entirely decentralized, allowing anybody to participate. This means that all nodes of the blockchain have equal rights to access, create new blocks and validate data
2. Private (or Managed) Blockchains
   Private Blockchains, also known as managed blockchains, are permissioned blockchains that are administered by a single entity. The central authority in a private blockchain decides who can be a node.
3. Consortium Blockchains: Consortium blockchains, unlike private blockchains, are permissioned blockchains administered by a consortium of organizations rather than a single institution.As a result, consortium blockchains have more decentralization than private blockchains, resulting in increased security.
4. Hybrid blockchains
   Hybrid blockchains are those that are managed by a single entity but have some oversight from the public blockchain, which is necessary to conduct certain transaction validations. IBM Food Trust is an example of a hybrid blockchain, which was created to improve efficiency across the whole food supply chain.

2.2 Empirical Studies

According [13] talked about the value proposition of blockchain technologies and its impact on Digital Platforms in contrast that there has been an emergence of a radically different approach to trust creation through Blockchain Technology. Instead of assuming orchestration and decision-making functions by the platform manager, The Technology is based on trusting open source, open verified code where data management, transaction, monitoring and rules of engagement happen in a decentralized manner across multiple nodes according to [14].In summary the researcher presented the concept of blockchain technology as one of the best technology that is required in the security of banking activities, and as such, the aspect of customers ATM card request and instance issuance is high needed that all transactions be secured. Though, Blockchain with its key characteristics has shown its potential to reshaping traditional industry, in this research, the scholar first introduces what is blockchain and bitcoin and how bitcoin gave birth to blockchain. Then the core concept and architecture of blockchain is explained, then discuss consensus algorithm of blockchain, application areas of blockchain technologies which therefore shows how important the new technology is to the society in general.

## III. ADOPTED METHODOLOGY

In the course of this research, object oriented analysis design methodology (OOADM) and Blockchain Consensus algorithm (Proof-of-Work) was adopted. The OOADM was used because it is a popular technical approach for analyzing and designing an application system, or business by applying object-

oriented programming, as well as using visual modeling throughout the development life cycles to foster better stakeholder communication and product quality. The Online ATM request and instance issuance system was designed following the OOADM stages /approach: Object-Oriented Analysis, Object-Oriented Design and Object-Oriented Implementation together with the Proof-of-Work algorithm. Ultimately, this research work uses a process of requirements engineering (RE), to complement OOD modeling using the Unified Modeling Language (UML). Consensus algorithm (Proof-of-Work) helps to model the security architecture of the ATM request between the participants of the proposed system.

### 3.1 System Analysis

In system analysis, prevailing situation of problem is carefully examined by breaking them into sub-problems.

#### 3.1.1 Analysis of the Existing System

In the current system, a customer visits the bank to request and obtain a new ATM card. once the person gets to the bank, the bank staff in charge will issue a form to the customer to provide all the relevant information needed for the purpose of being issued a new ATM card, after which the customer will submit the form back to the staff who forwards it to the manager for approval. After approval the manager returns the form to the staff to be entered into the system. After proper documentation, an ATM card is then validated and issued to the customer to create pin for the ATM card. Many organizations still utilizes this method of card issuance which is merely paper based this often results in downright waste of time in generating reports or documenting customers' records and loss or damage of files. This is an arduous task for organizations as it is an expensive process and there are lots of delays due to complex activities required of both customers and bank staffs in order to issue an ATM card.

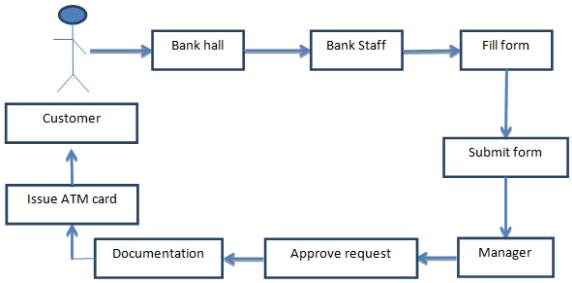



Figure 1: Analysis of the Existing System

#### 3.1.2 Analysis of the Proposed System

The proposed system is an online System where the customer can directly request for an ATM card by selecting a bank and card type from the list available, make payment, and view the status of his or her request. For instance, once the customer visits the online platform on the basis of requesting for an ATM card, the application is received by bank organization that will have two modules the bank staff, which are the pick-up and the bank manager which is the admin. The staff logs in and looks at the requests submitted and forwards the request to the manager (admin) who will approve requests and then forwards the approved requests back to the staff who then communicates with the customer on the issuance of the ATM card.

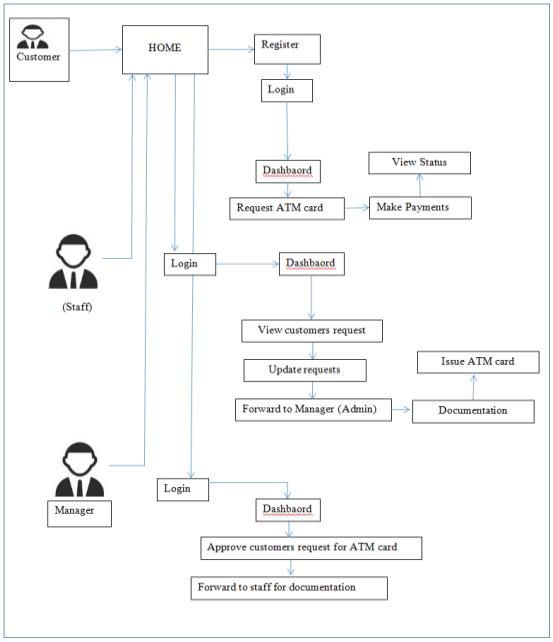
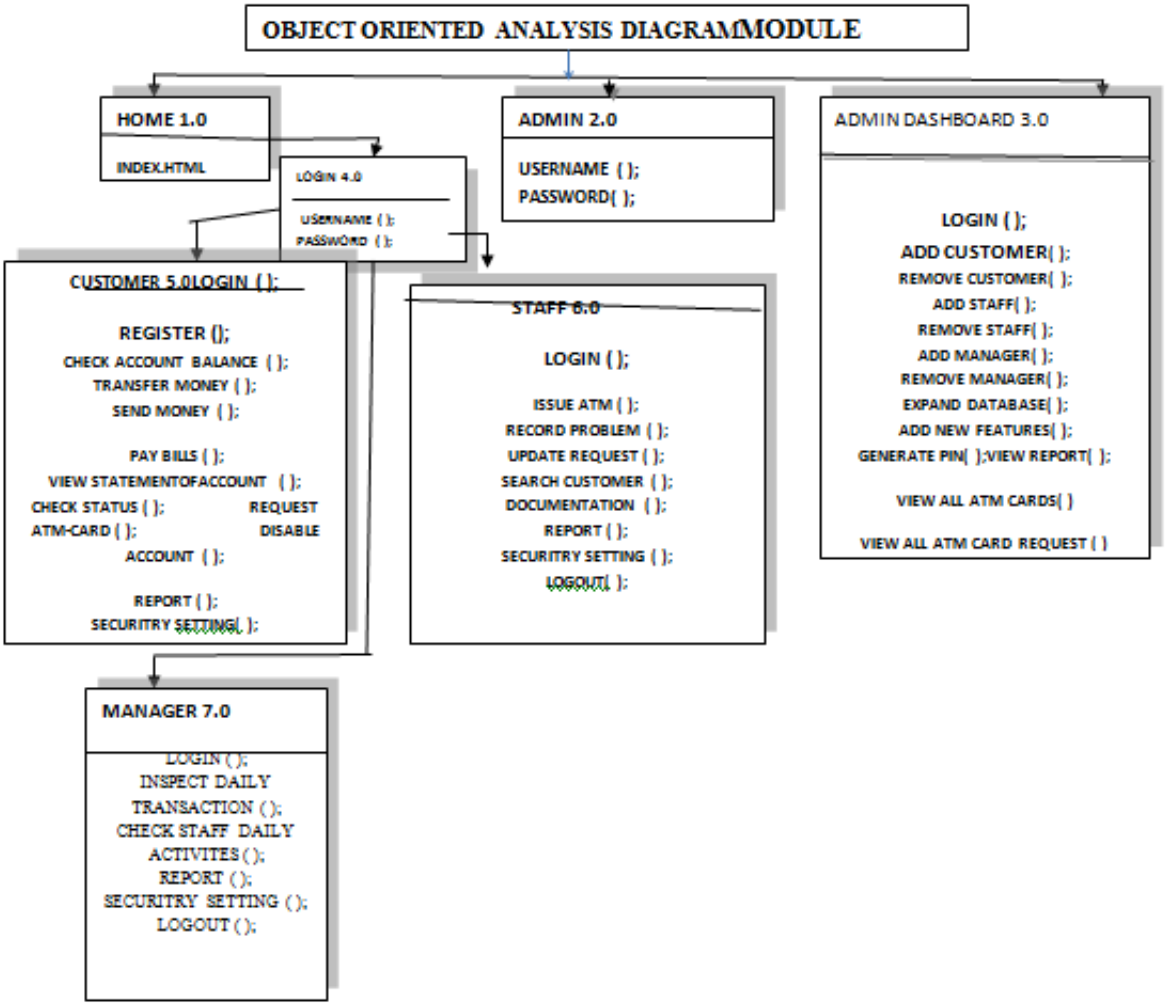



Figure 2: Analysis of the proposed system



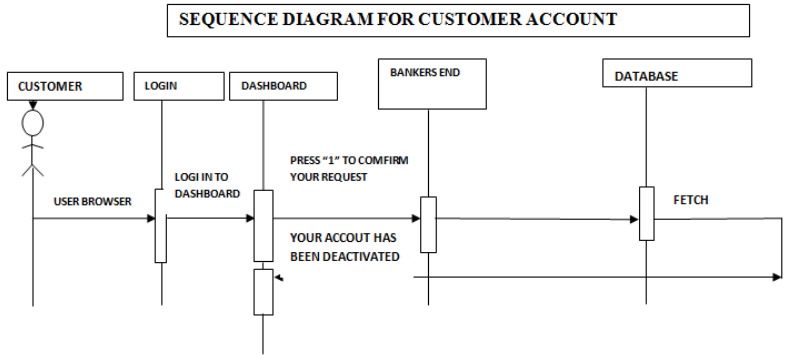




Figure 4: Object diagram of proposed System

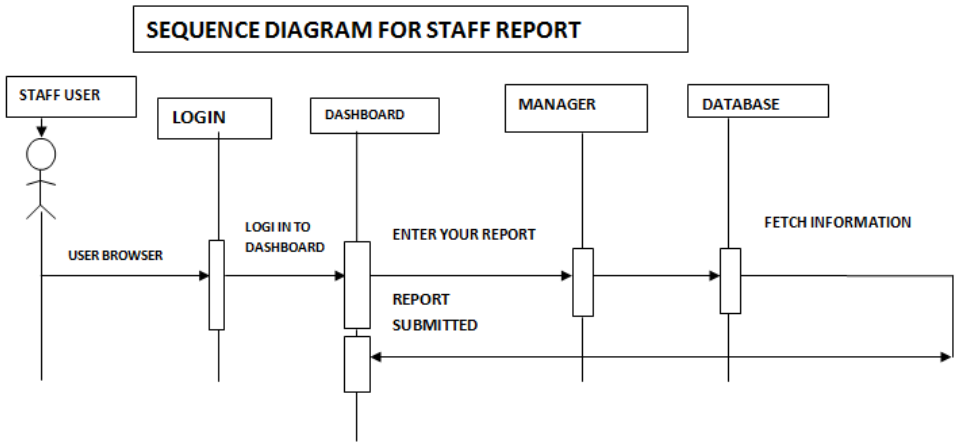



Figure 5: Staff Login Sequence Diagram

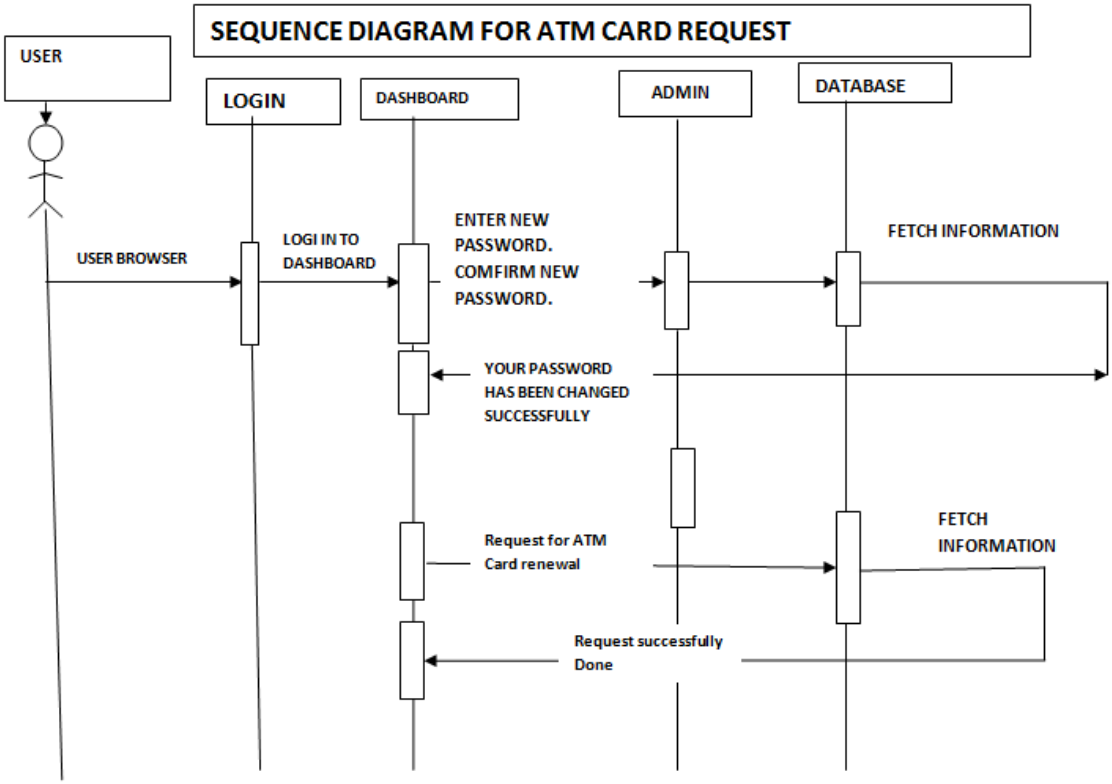



Figure 6: Sequence diagrams for ATM card Request

3.1.3 Analysis of the Proposed Model Using the IBM Hyperledger Fabric Architecture

A Blockchain distributed ledger is a type of database, or system of record, that is shared, replicated, and synchronized among the members of a network: The distributed ledger records the transactions, such as the exchange of assessor data, among the participants in the network. This shared ledger eliminates the time and expense of reconciling disparate ledgers. The IBM Hyperledger contains every record in the distributed ledger which has a time stamp and unique cryptographic signature, thus making the ledger an auditable history of all the transactions in the network

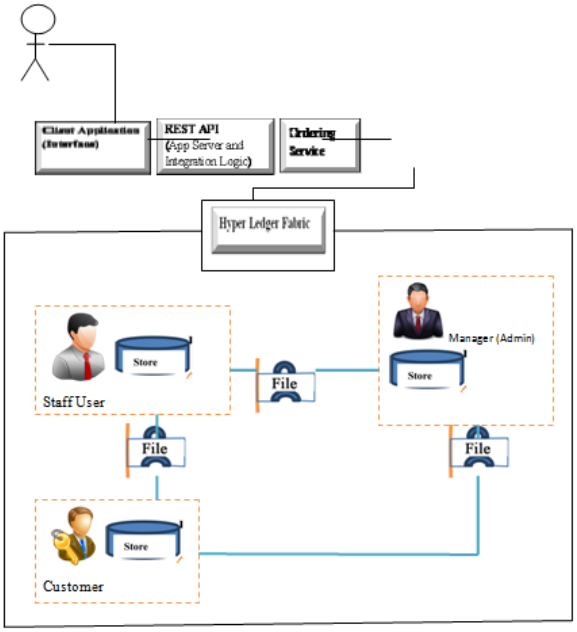



Figure 7: Analysis of the Proposed Model Using the IBM Hyperledger Fabric Architecture

In the context of Hyper-ledger Fabric, the ledger is composed of two components: The blockchain itself and the world state database [15].Looking at figure 5the full analysis of the proposed system, shows the transactions of the three users of the system while figure 10, displays how the IBM Hyperledger platform operates or handles the activities of the various participants on the proposed ATM request and instance issuance system. In the analysis of the proposed model using the IBM hyperledger fabric architecture, each user has its own data store and both the store are connected in a block form linking all the stores together. This makes it impossible for alteration of any file by any of the participants to take place unless a consensus is agreed by all parties on the platform.

3.1.4. High Level Model of Proposed System

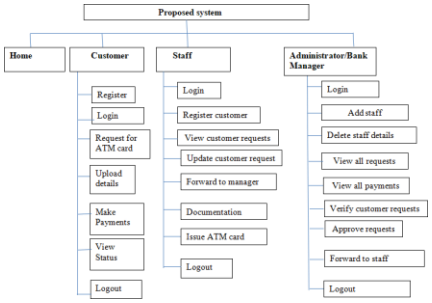



Figure8: high level model of proposed system

## IV. RESULTS

An online ATM request and instant issuance has been able to solve the problems as stated by the researcher faced by Nigerian when dealing with financial transactions. The proposed system can be accessed remotely without constraining the customers to the bank and their ATM card can be processed and received after requesting.


Figure 9: Landing Page of the proposed Online ATM card request Platform

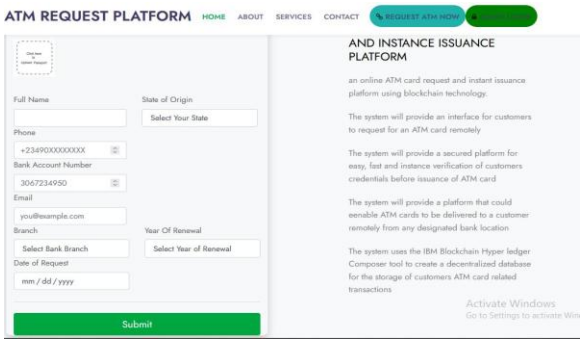



Figure 10: The online ATM card request Form

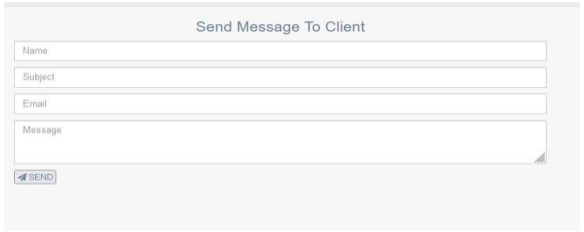



Figure 11: Admin Message to Customers Interface

## V. CONCLUSION AND RECOMMENDATION

Banking activities especially this period of cashless policed introduced by the Nigerian government, the need and importance of the automated teller machine (ATM) has increased beyond measure and the citizens needs fast access to these tools for immediate

transactions. The proposed system has proven its highly need at these period as it has given the people an online access to ATM care request and improve their confidence in terms of security of their transactions because of the involvement of the IBM hyperledger blockchain architecture. The study was able to present the concept of blockchain technology and also highlighted areas it could be applied and types of blockchain technology. How the blockchain technology protects the customers transactions on the distributed server. The study therefore makes some recommendation that the Nigerian financial sector should look at the application of blockchain technology and an online systems security to build stronger confidence to the people which in turn help strengthen their hope in the financial system of the country. More so, school managements and the educational heads should put more effort towards the integration and implementation of blockchain technologies in the school system to enable more security of documents/students records.

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