Barriers effects & a Secure System for payments over Mobile in Sudan

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Abstract: The advancement in the Information Technology and Communications worldwide cast its shadow during the latest decades over the entire walks of life. Thanks to this augmentation, the world become like an interconnected village where data and information are exchanged through various media, based on the wish and the requirement. One of the most important of such modern technologies is the Mobile phones. They nowadays have become an essential part of the lives of the many, something which led several countries and institution to utilise it as a tool for payment of bills and remitting funds. This process was facilitated by the dissemination of the Mobile Telephone around the world, where the number of mobile telephones is currently estimated to reach about six billion device in the whole universe by 2020, thus the Mobile Telephone turn out to be a significant element in integrating countless individuals in the financial and banking spheres, or it is known as Financial Inclusion. This Paper discusses the main problem of security that is being faced during payment through the mobile in Sudan, which was initiated in 2016. The solution for security problem is addressed in this paper by introducing gateway for security in the process of transactions and the results showed great significance in the payment gateway in terms of protection, speed and time.

Keywords: Communication, Financial Inclusions, Gateway, Mobile phones.

I. INTRODUCTION

These mobile phones has a great significance in communication between individuals, thus narrowing the gaps among them, until it became an important acquisition for everybody regardless, of not only age, educational levels or living conditions, but also even their geographical regions. One of the crucial applications of this device that is being used mostly these days is banking transactions. The Banks play an important role in pushing the cycle of economy and with the technological development the electronic banking operations not only emerged, but their role become greater and new banking service application were innovated which are characterised by efficiency and speed in performance, easiness and cost effectiveness that in turn lead to decrease of

operation taking place in the bank branch which now stand at 10% (World Bank, 2015) of the total operations in the advanced countries and the remainder take place through electronic channels such as Automatic Teller Machines (ATM) and the Electronic Points of Sale in addition to the possibility of conducting banking operations from the Personal Computer through the Internet "Home Banking" that saved time and effort of bank customers and secure easy operations such as opening an account, obtaining Credit Cards, paying bills and transfer funds between accounts round-the-clock. Mobile phones are used in many countries for banking operations such as transfers and inquiries about bank balances and others, whether on a small scale or a large scale, yet it can be updated to become the new construction design for the bank in the twenty-first century.

1. 1 Definition of Mobile Banking:

It is an expression coined for the Modern Banking Services rendered to the bank customers completing sale and purchase transactions, applying for Credit Cards, paying of bills and transfer money between accounts and that means performing cash transfers from any bank or account to other account whether inside or outside the country.

1.2 The Mobile Banking Service and its working:

During the last years, the Mobile Banking saw the light in Sudan when the President of the Republic announced it in 2016. It means availing the service through the Mobile Telephone whereby the customer from any place and at any time during the day may request by calling a specific number to get an answer from a system loaded by a data programme asking the caller to enter a Personal Identification Number (PIN) previously allocated to him by the bank for page to appear with all the data of this customer and can immediately avail the service he requires. Despite the modernity of this system, it had been established that it secures profits to the bank that may reach six-fold the profit of the ordinary bank (World Bank, 2016) and that because the Mobile Bank uses information technology to improve relations and widen the field of transactions with the customer through dealing with personal information it has about the customer in a smart way, so as to market its services such as opening the account and paying the bills and transfer funds between accounts. The three-telecommunication companies 'Zain', 'Sudatel' and 'MTN' are competing to provide some various banking services with the bank and the transfer of funds through the mobile via their networks.

II. LITERATURE REVIEW

To increase the effect of the banking technology (Izzuddin Kamil, 2013) underlined the need to integrate the banking services with the mobile services to achieve numerous gains, including the inclusion of new strata of customers and the speed of the provided service.

Retrieval Number: A3122059120/2020©BEIESP
DOI:10.35940/ijrte.A3122.059120
Journal Website: www.ijrte.org

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Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

From my viewpoint, this idea is challenged by sluggishness of the statutory legislations and the regulatory rules and regulations on payment in addition to the alarm towards insurance and the refrainment of the banks from venturing into a risk that may distort the financial reputation of the bank, let alone the complications in charges and taxes and other customary government procedures.

Clearly, the Mobile Banking Service was adopted in several foreign and Arab countries, but it was not fully applied in Sudan until now in its comprehensive concept, but rather applied there from is the Short Message Service (SMS) or Phone Banking which means the bank electronic system provides SMS on a weekly or daily bases about the changes in the customer's account. Covered also are the enquiry regarding the account, payment of bills, transfer of balances between internal account and the enquiry about the locations of ATMs, as well as viewing the foreign exchange rates; but the transfer of funds between account externally is not yet applied in Sudan.

2. 2 Study on trends of using the Mobile Banking:

According to the (World Bank, 2013) report, international experiments proved that the countries where this type of banks spread, the leading banks there closed numerous branches due to the dependency of customers on this new banking system. In Britain, For instance, myriad bank branches were closed down as a consequence of this system as customers increased their usage of mobile banking and internet due to the advantages of utilising the Mobile Banking, which include:

- Efficiency of time management and the speedy response to the service requirements, which means saving time and effort.
- The system allows the provision of many services, as well as maintaining the secrecy of the accounts.
- Personal realisation of the customer as the usage of the mobile gave the customer the feeling that he is the focus of attention because the service will be directly between him and the bank.
- The productivity and the effective performance as the mobile telephone could be depended upon to overcome productivity and performance hindrance during the times of work pressure or presence away from the workplace.
- Alleviating costs on the bank to open new several branches in different places inside and outside the state to provide services to growing number of customers and doing away with congestion and that because the Mobile Banking shifts the bank and its different services to every customer wherever he was.
- The ability to access the needed data easily and swiftly.
- The easiness of using the service in comparison to other services
- The services are not confined to where the bank is located
- Limitation of fraudulent operations by hackers who transfer monies from the customers' accounts to their personal accounts exploiting the inability of some customers to conduct periodic follow-up of their banks balances, particularly those which were kept for a long period of time.

2.3 Existing system-Payment through Mobile Telephone in Sudan:

Payment via mobile is one of various means of payment by transferring funds thru the Mobile Phone or Mobile Portfolio in general which point out the payment service that work under the financial organisation and the performance from or through the mobile device instead of payment in cash, cheque or by Credit Card. The customer could use the Mobile Telephone to pay for wide range of services and commodities, whether digital or fixed. Despite the concept of utilising, the existing system based on other than the currency – which had a long history – yet lately, the technology supports such systems that became widely available. The Mobile Telephone services are considered as accessories to the electronic services to enable the public to use government services anywhere and at any time through provision of these services via smart mobile devices such Mobile Telephones, laptops, Personal Digital Assistance (PDA) and others; and as per the report of the National Telecommunication Authority (July, 2018) the mobile users reached around more than 29 million. In the context of keenness to apply the current strategy of the Electronic Government, the Sudan ministries of communications introduced (2016-2020 Plan) changes in the usage of government service with the shift from the traditional channels to the electronic channels including self-service and portal devices, especially the Mobile Telephone channel and to boost the participation of the user therein. The telecommunications ministries in Sudan aim to avail to the citizens, the business sector and other government bodies the Mobile Telephone services. The Mobile Electronic Government can be defined as a strategy which is related to the field that comprises the usage of wireless and mobile communications technology and services, applications and devices and the knowhow of applying this strategy to improve the benefit of the citizens, the business sector and other government bodies thru utilisation of the electronic services. In the year 2014, a partnership between the banks and telecommunication operators was announced between Khartoum Bank and Zain Company for a service based on the banking technology under the name (Hassa). According to the Manager of Khartoum Bank (Fady Saleem, 2014), the service is technology that allows Mobile Telephone bearers to conduct most of the banking operations and financial services such as transfer of funds, purchase of various services and payment of bills as well as benefiting from the automatic teller services in addition to the points of sale and that without the need to open the regular accounts at any bank. This service is available for customers of Zain only through charges depending on the transferred amount not exceeding (2%) of that amount when the transfer is from an account to another. Followed was a partnership be Faisal Islamic Bank and Sudan Telecommunication Company, Sudani, to provide a similar service under the name (Qrooshy) which include transfer of funds and purchase of services. Noticed was the weakness of marketing in the institutions that provide services and commodities that require the usage of the banking technology to save time and effort, something that necessitates additional ffort to lure traders and those in-charges of services targeting the public to include the same as an essential ingredient in commerce and services.

2.3.1 Problems in the existing system:

These services are considered as big push to the banking technology as they connect the customer of the Mobile Telephone Companies with the banking system and enable him to carry out financial services via the Mobile Telephone, which will increase the number of fund transactions among customers of the Mobile Telephone Companies. In my judgement, this is much delayed due to the sluggishness of regulations, insurance procedures, and the reluctance of banks and telecommunication companies towards the safety of the communication channels. The banking technology regulators should have urged banks and operators to apply the service years ago to facilitate the financial transaction through the mobile for a wider public that used to resort to transfer the balance as an alternative to the lack of a swift banking channel through the mobile in remote areas, such as gold-mining places where there are no banks available and where there is a risk of carrying money, whereas the called is purchased as a balance an then easily transferred in short time, something which result in the fact that money is working outside the financial cycle and economic control. This requires the introduction of a plan to transform the concept of transferring balances from communication companies that are treated as calling units to guaranteed payment financial units with safe and secured bank coverage through the enhancement of the electronic systems of the companies to conform with the financial arrangement of the Sudan banking apparatus.

Knowledge of the existing differences between mobile services and e-services is very important to accommodate any kind of suitable and appropriate services that must be taken into consideration.

Mobile services do not necessarily replace e-services, but it may be an enhancement and supplement for e-services. Mobile services are necessarily available on mobile phones, and may be available on tablets and other smart mobile devices. Mobile services basically have two main objectives: to enhance the ability to use and access government services, to promote and facilitate government procedures and to communicate with all parties.

2.3.2 The Obstacles that Face Payment Though the Mobile:

The Bank of Sudan issued a decision that the Banking Services Company is the company that performs this service in cooperation with telecommunications companies and banks. However, this decision was opposed by some telecommunications companies, especially Zain, which believes that the payment services must be inside the telecommunications company for the privacy of its customers, as well as the company can provide support to solve its customers' technical problems. Because of such disagreement, Zain has not been associated with the Banking Services Company in pushing the mobile service forward, especially, half of the subscribers in Sudan use Zain mobile service. This led to the failure of upgrading the payment service via mobile. Many other telecommunications companies agree with Zain, but in a different concept. Such companies think that service servers, protection devices and technical support should be under the control of telecommunications companies.

There are other obstacles facing this service, such as the training of employees on the service and modern technologies. Such training requires money and effort by the operating party and I do not think that the Banking Services Company has sufficient financial resources for the requirements of this size to improve this service. However, telecom companies have more financial ability than the Banking Services Company, and they have the potential to bring in highly qualified and experienced employees in this field, as well as the ability to attract investment into this field on which this service largely depends.

III. METHODOLOGY

In this paper, we will discuss some possible solutions to overcome some obstacles faced by the mobile payment service and upgrade it to keep pace with the global development in this field. This is because most countries of the world are increasingly using this service, because it saves effort and money for subscribers. Telecommunications companies should continue to adopt a series of awareness and guidance policies aimed at increasing the awareness of banks, enhancing their sense of security and enhancing the principle of "confidentiality of personal and financial data" for customers, a principle that confirms the non-disclosure of personal and banking data because it represents the key to accessing customer accounts. Banks should be careful not to write numbers. The idea of a payment gateway is the best solution to these problems, especially I most of the countries of the world have tended to use the payment gateway to the government of money and safety of payment and also in terms of security

3.1 Payment gateway:

The payment gateway is called the trusted third party or the entry point to any network. It is used in the e-commerce system for a safer transaction. Online shopping allows customers to sit indoors and purchase goods from all over the world. Likewise, it allows the merchant to sell his products to all parts of the world from home. Most residents will use online payment in the near future.

There is a need for a secure online payment gateway. There is requirement of an electronic payment gateway from the point of view of the customer and the merchant. On the basis of these facts, a new secure payment gateway has been designed and developed. This online payment gateway provides these payments safely and can be performed by merchants themselves on their web servers or alternatively they can be provided to merchants by third-party online payment service providers.

3.2. Proposed systems and its working:

Connecting all banking network, services provide network, telecommunications companies, and the Central Bank of Sudan through the payment gateway, establishing a unified database and information to facilitate payment governance, and creating a unified specialized web software (Mobile App application) that includes all government payments and online purchases. The customer connects via the Internet to the electronic payment gateway through the Internet (computer or mobile). The portal contacts the bank and checks whether its bank accounts are sufficient to purchase the required product. Online customers can visit the merchant site through the portal. This provides secure payment that facilitates e-commerce by enabling merchants to accept credit cards and electronic checks Payment methods for goods and services sold online.

The portal acts as a bridge between the merchant's website and the financial institutions that process payment transactions. Online payment data is collected from the shopper and presented to the portal for real-time authorization.
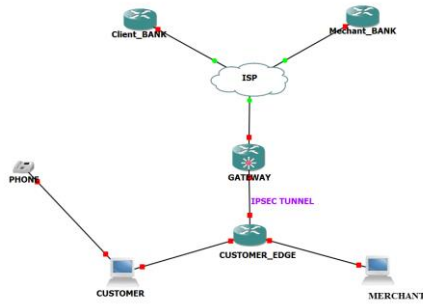

Figure 3.1: The payment gateway model is illustrated with the GNS3 program

Smartphone is the fastest growing device in the world today, as it connects consumers with resources online anytime and anywhere. Mobile Growth creates a new channel for customers to complete important financial transactions that drive business. The growth of this channel represents a great opportunity to encourage more customers to use electronic payment programs.

Payment gateway is an e-commerce application service provider that provides tools for processing payments between a customer, merchant and banks across the World Wide Web. It helps secure the purchase and payment information of a customer in a transaction. Payment gateway protects payment information by encrypting sensitive information, such as credit / debit card details, to ensure that the information is passed securely between the customer and the payment processor. Besides encrypting payment information, the payment gateway also helps in authorizing payments and protecting against financial fraud. Many online merchants use payment gateways for their security, reliability and prompt payment authorization.
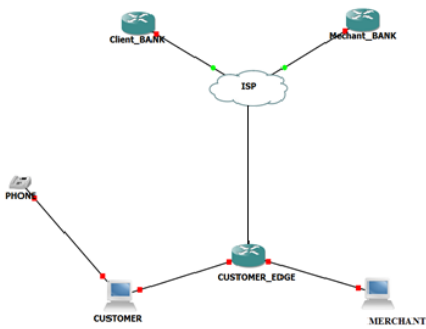

Figure 3.2: E-payment model without gateway is illustrated with the GNS3 program

You can also see from our model that the use of the IPsec protocol with the payment gateway in the mobile payment process provides safe instant payments and facilitates the settlement and matching of the payment. The electronic payment gateway is safe and comprehensive by a large percentage of all transactions that are made through the electronic payment of cards, payment and the rapid response code or any other means.
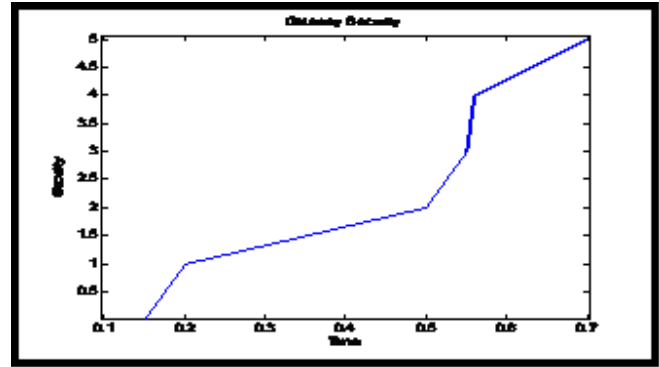

Figure 3.3: Flow chart diagram for E-Payment gateway

Links all the networks with payment gateway under the supervision of the Central Bank of Sudan and establish a unified database and information to facilitate payment governance, including all government payments, private companies and online purchases.

Establishing special centers for these services are needed to be introduced as front ends to solve the problems of users and their inquiries. One of the challenges facing the mobile payment process is to educate citizens about the payment process. Improving and developing services in government centers, service providers companies, telecommunications companies, banks, and qualifying employees to keep pace with modern technology. Resolving disputes between the customer and service providers as quickly as possible and using modern technology so that the customer does not lose the credibility of this service, especially that the payment gateway contains a database that includes all banking transactions on mobile payment.

IV. RESULTS

Activating the payment gateway with the protection protocol will be the best solution to collect the problems facing the mobile payment process, especially that Activating the payment gateway with the protection protocol will be the best solution to collect the problems facing the mobile payment process, especially that the results showed great using the payment gateway in terms of protection, speed and time

You can see from Figure 3.6 that the proposed payment model using gateway will be safer than other models that do not use the gateway technology, and therefore our model will increase the security of the mode, and also you can see from Figure 3.7 that the proposed payment model with the gateway will be faster than other models that do not use the gateway technology, and therefore our model will increase the speed of the payment operations. You can also see from our model that the use of the IPsec protocol with the payment gateway in the mobile payment process provides safe instant payments and facilitates the settlement and matching of the payment. The electronic payment gateway is safe and comprehensive by a large percentage of all transactions that are made through the electronic payment of cards, payment and the rapid response code or any other means.
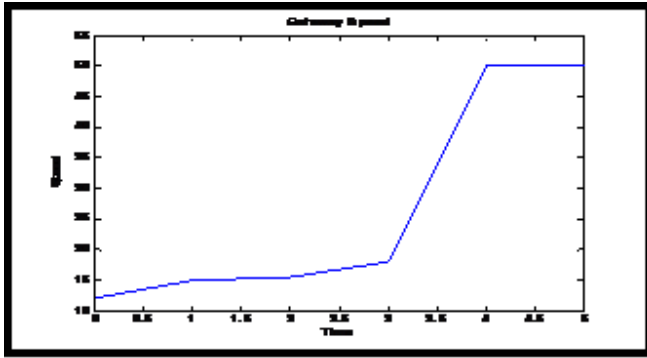
Figure 3.4: Proposed payment gateway for time and security.

You can see from figure (3.4) that the security of the proposed gateway E-payment system increases rapidly with increasing time.
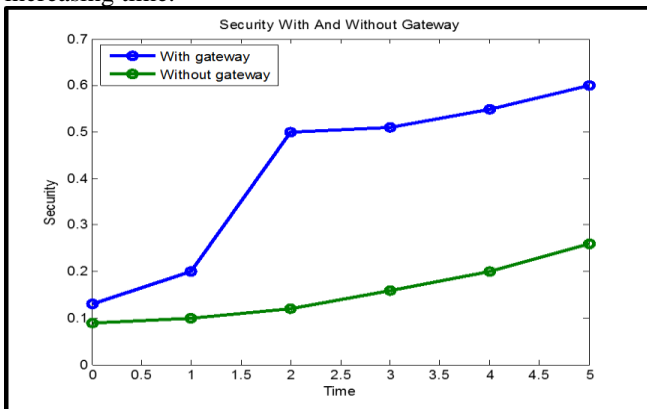

Figure 3.5: The proposed payment gateway is a comparison of speed and time.You can see from figure (3.5) that by using the gateway model the e- payment process will be faster.
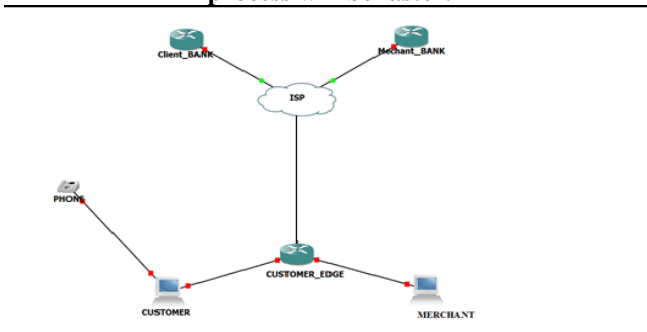

Figure 3.6: Security with and without Gateway

You can see from figure (3.6) that proposed with gateway will be more secure than other models that don't use gateway technique, so our model will increase the security of used models
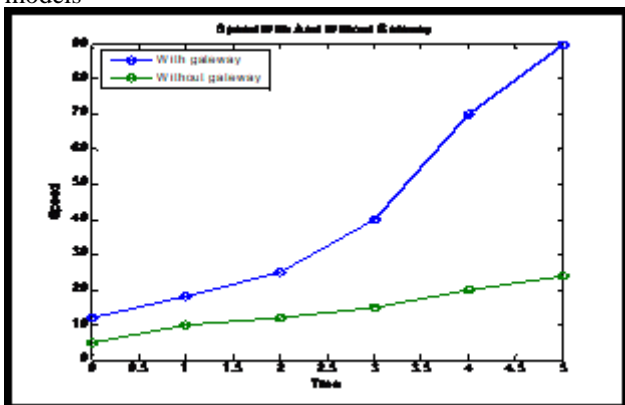

Figure 3.7: Speed with and without gateway.

You can see from fig (3.7) that proposed with gateway will be faster than other models that don't use gateway technique.

V. CONCLUSION

The mobile payment service in Sudan has been delayed a lot compared to other countries. Success in implementing the mobile payment system in Sudan requires governance and tight coordination between all stakeholders in it to achieve its desired goals and for Sudan to keep pace with technological developments in the field of electronic payment systems, which always seeks to provide fast and safe services that contribute to the development of the economy and the welfare of society. In our proposed work, the payment gateway and protocol were implemented to protect the customer and encrypt the data, and the results were good in terms of protection, speed and time. All countries of the world started implementing the payment gateway and the results showed great progress in the mobile payment process in terms of protection and attracting users to activate the service. Therefore, it is suggested activating the payment gateway system in Sudan so that the payment gateway is the main outlet for all mobile payments and the end results of the system shows the performance, applicability.

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Retrieval Number: A3122059120/2020©BEIESP
DOI:10.35940/ijrte.A3122.059120
Journal Website: www.ijrte.org

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2638

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