

AN ANALYSIS OF THE IMPACT OF MOBILE PHONE-BASED PRODUCTS ON THE PROVISION OF FINANCIAL SERVICES TO THE INDIVIDUAL ZIMBABWEAN CUSTOMER

Tapera, Julius

Lupane State University, Bulawayo, Zimbabwe

jtapera@lsu.ac.zw juliustapera@gmail.com

Abstract

This research paper focuses on analyzing the impact that mobile phone-based products have had in providing financial services to the individual Zimbabwean customers. In recent years telecommunication companies have ventured into the provision of financial services that can be accessed through mobile devices such as cell phones, iPads, iPhones and even through the Internet in the comfort of people's homes or offices. In this research the researcher focuses on evaluating the extent to which the introduction of mobile banking services has benefited the rural communities, which are currently unbanked in the Zimbabwean economy. The findings from this research reflect that the introduction of this facility and its roll out to rural communities has significantly improved these communities' access to banking services, which they would otherwise need to travel to urban centres to access. There are however certain challenges that the customers are currently facing in using this facility and this research makes some recommendations in addressing these challenges that the customers have highlighted.

Keywords: mobile banking, application, convenience, security, speed, cost effective, network availability, rural community.

INTRODUCTION

The advent of technological advancement has seen financial institutions and telecommunication companies in Zimbabwe introducing cellular phone-based financial services which include settling service bills such as water, electricity and telephone bills, money transfers to other mobile phone users with or without bank accounts, purchasing airtime among other services. The introduction of such services has resulted in financial institutions and telecommunication companies being able to offer financial services to the Zimbabwean community which is currently unbanked, that is, those who do not have bank accounts. The Zimbabwean financial services sector has some history of failure that saw the collapse of a number of financial institutions between 2003 and 2004, which resulted in the general populace and the corporate world losing confidence in the banking system. Subsequent to this loss of confidence on the financial services sector has been a significant reduction of the number of individuals and

corporates who operate bank accounts, be they savings or investments. The stringent requirements to open bank accounts, exorbitant bank charges and relatively high minimum balances are some of the inhibiting factors that have seen very few people resuscitating their individual and corporate accounts alike. The effect has been a situation where there is more money circulating outside the banking system, contributing to the liquidity crisis that the country has been facing. The liquidity crisis has, however, also been attributed to sanctions imposed by the western countries, externalization of funds by some multinational corporations, and some financial institutions through the NOSTRO accounts held outside the country's borders. The delivery of financial services to the entire Zimbabwean population has been hampered by these developments as a significant portion of the population does not hold bank accounts. A number of innovative banks and other non-banking institutions have since introduced some mobile phone-based financial services in a bid to cater for those who do not hold bank accounts but would need to carry out some financial transactions through a safe and reliable system. It is against this background that the researcher seeks to ascertain the effectiveness of these mobile-phone based financial services in addressing the needs of the unbanked community and how the target market has responded to these innovations. Some of the services are available to bank account holders and are actually linked to their bank accounts. The researcher will also seek to establish how those who hold bank accounts have received these products and how effective they have been in addressing their needs. The research will also seek to establish the impact of these new financial products on the performance of the existing ones, their ability to reach out to those that are currently not operating banking accounts, including those in the remote areas of the country. More focus in this research will be on the impact of this concept of mobile banking on the rural communities where access to formal banking facilities is limited, and also on the youth who have a passion for technology and would stop at nothing to explore every new development on the technological front. Two rural communities, Matopos and Nkayi will be targeted in this research, mainly for their proximity to Bulawayo, where the researcher is domiciled.

Problem Statement

One of the major challenges for the Zimbabwean rural communities is access to financial services, for the purposes of safely keeping their savings, investments, as well as conducting transactional business. This has largely been the case due to the limited number of financial service providers who have opened branches in remote areas where the rural communities can easily access these services. The cost of maintaining transactional accounts with financial institutions have also been prohibitive to most of the rural populace and as such they have generally been excluded from accessing financial services, resulting in them being seriously

inconvenienced and exposed to the risks of losing their money, which they could otherwise bank had these facilities been placed within proximity.

Rationale of the Study

The advent of mobile banking has opened a new page of financial inclusion within the Zimbabwean financial services sector whereby even those in the rural communities can now access financial services conveniently. Mobile banking products like include Kingdom Bank's Cellcard, Econet Wireless' Ecocash, Net One's Easywallet, Telecel's Tecocash and ZB Bank's E-wallet have been on the market for a while and they are all meant to bring convenience to both the banked and unbanked communities. This research seeks to investigate the impact that these products have had in bringing financial inclusion to the Zimbabwean rural communities that traditionally have been excluded in the provision of financial services. The extent to which the lives of the rural communities have been improved economically and socially will be an indicator of the relevance of these services in achieving the objective of financial inclusion. It also envisaged that this research will reveal the areas that would need improvement so that the levels of efficiency and effectiveness in providing these mobile banking services to the rural communities are enhanced. The outcome of this research is also envisaged to be of great value to the banking and telecommunication regulatory authorities (Reserve Bank of Zimbabwe (RBZ) and Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) in reviewing the policy frame work for mobile banking to significantly improve the level of financial inclusion for the rural communities.

RESEARCH AIM AND OBJECTIVES

Research Aim

To evaluate the impact of mobile banking services on rural communities that are not formally banking with the financial institutions.

Research Objectives

This research aims to achieve the following objectives: -

- To evaluate the extent to which the lives or rural people have improved economically through access to mobile banking service
- To evaluate the extent to which the lives or rural people have improved socially through access to mobile banking service
- To evaluate the extent to which financial inclusion through access to mobile banking services has increased the level of security and minimized risks for the rural communities.

LITERATURE REVIEW

Mobile Banking Overview

Rajaraman (2010) defines mobile banking as “any banking transaction which is initiated by a customer using hand-held mobile devices and wireless telecommunication infrastructure.” Kim, Shin and Lee (2009) add that mobile banking enables customers to access their bank accounts through mobile devices to conduct conventional and more advanced financial transactions. According to Ahonen and Barrett (2004) mobile banking services were offered as far back as 1997, when banks sent customers SMS alerts regarding their account details. Over the years it has grown the world over with the continuous improvement in technology. According to Kondabagil (2007), features and services offered by mobile banking can be accessed through personal digital assistants (PDAs), pagers, cellular phones and other similar devices.

On the Zimbabwean financial services market a number of financial services institutions and other non-financial institutions have over the years developed various products that are cell phone based. Some of these products include Kingdom Bank’s Cellcard, Econet Wireless’ Ecocash, Net One’s Easywallet, Telecel’s Tecacash and ZB Bank’s E-wallet. Other financial institutions have not necessarily developed any new products as it were but have simply capitalized on the advent of the continuous improvement on the mobile phone handsets, which can now allow customers to access internet “on-the-go.” Customers are now able to access Internet banking services while they are mobile. Some of the institutions that have gone this route include MBCA Bank Limited, CBZ Bank, Standard Chartered Bank,

The International Business Publications in the Banking and Financial Handbook (Malaysia) Volume 1(2011) draws a comparison between internet banking and mobile banking. They assert that mobile banking is similar to internet banking in that it provides a fast and convenient way of performing common banking transactions. They further indicate that all one needs to enjoy mobile banking is a mobile phone that is equipped with the features required by one’s bank that provides this service. Once one obtains a registered account for mobile banking from his/her banking institution, he/she will be able to carry out banking transactions from anywhere that has mobile telecommunication coverage.

Gilani (2012) asserts that the banking industry has enjoyed tremendous success in the application of high-end information systems and technologies. Technological advances have reshaped the size and nature of the financial industry, allowing it to extend beyond the traditional, brick-and-mortar concept of borrowing and saving. Internet banking, digital wireless banking and mobile banking are an extension of the technological progression that is now characteristic of the banking sector. Mobile banking involves the access to, and provision of, banking and finance services through mobile devices. The Zimbabwean banking industry has been no exception to this tremendous growth spurred by the advent of mobile banking. The

introduction of mobile banking in the Zimbabwean banking industry came against a background of a formerly troubled banking industry wherein the bulk of the citizens quite reserved to reengage the banks for savings, investments and conducting transactions at both individual and corporate level. Mobile banking has also been introduced onto the Zimbabwean community where a good number of the elderly citizens, especially in rural communities, have no access to banking institutions, with very few banks having taken the initiative to establish branches in rural communities.

Mobile banking provides banking services to inaccessible (mountainous and remote) areas. It provides financial services to clients, allowing them the flexibility of accessing their account details from anywhere in the world. Its introduction on the Zimbabwean banking industry has now made banking services accessible to these rural communities. This kind of development has been experienced on the Zimbabwean market where most of the mobile banking products and services that are on offer are now accessible to all remote areas, especially rural communities who ordinarily have very limited access to formal banking services.

According to Zheng and Ni (2010) mobile banking offers a host of traditional banking services; it allows users to access transactional and statement details; transfer funds between accounts; trade stocks with brokerage and notification; make payments and confirm cheques. In addition to making banking services to remote areas, mobile banking has also made banking more convenient to those who hold traditional accounts with banks as they are now able to access their accounts, transfer funds, make various payments, check balances and various other transactions from the comfort of their homes and offices.

According to O'Farrell, Levine and Algroy (2008) mobile banking is safer than Internet banking, with fewer reported frauds. Access to mobile bank accounts requires a PIN (personal identification number) and a secure password every time a user wishes to log in. All information sent from and received by a mobile phone has 128-bit encryption that protects the information during its broadcast.

Mobile banking, like other types of traditional and online banking systems, is susceptible to security breaches. Some banks limit mobile banking services to balance inquiries, transaction alerts and service requests to limit and reduce security vulnerabilities and protect sensitive financial data from falling into the wrong hands.

The Difference between Mobile Banking and Online Banking

Currently, mobile banking provides almost the same kind of services as online, credit/debit card banking. When mobile banking services first started, the mobile devices were not able to support all mobile banking services and they were lacking hardware and software support. The initial mobile banking service offered was the SMS banking; while online banking was very well

developed and was offering all kinds of banking services. Credit/debit card systems are also fully developed and people were able to use their cards at merchants' point of sale and online for payments. However, technological advancements in mobile devices have enabled users to use mobile banking related services via SMS, web browser and mobile web applications. Currently available mobile devices have the same processing power as computers and they are still evolving. In some countries, mobile banking was started in the early 90's and now offer a full suite mobile banking solution, which has features of online banking and credit/debit card banking. Customers are using their mobile devices to replace cash and cards. While mobile banking services in the USA were started at the end of 2006, on the Zimbabwean market, this is a recent phenomenon, which started late 2010. Most banks are still not offering full mobile banking solutions to their customers. Mobile banking systems in most countries are less developed compared to online, credit/debit card banking in terms of services. However, as number of people enrolled in mobile banking increases and banks offer more services with a full range of solutions in the US, the line between mobile banking and online/credit/debit card banking will get thinner and, in the future, mobile banking will provide a combination service of online and credit/debit card banking.

In terms of security, mobile banking is as secure as online banking and offers the same security features and protections. However, there is less number of users for mobile banking than online/credit/debit card banking, which reduces the risk of security threats. The hacking community is more targeted towards the online/credit/debit card banking for financial gain. A large number of antivirus and antimalware/spyware available for online banking are not widely available for mobile banking. But with the increase in number of users for mobile banking, the software is also increasing. Mobile banking also carries the risk of some attacks called Vishing, SMishing and spoofing that are only possible in mobile devices. The security features and countermeasures for them differ from online banking. However, mobile banking provides the same security protections as the online banking, as most of them are derived from the experience with online banking.

Mobile Banking Services

Mobile banking systems allow users to perform bank related transactions like balance checks, account transactions, bill payments, fund transfers, credit/debit card management, etc. through mobile telecommunication devices like mobile phones or PDAs (personal digital assistants). Mobile banking can be divided in three different concepts based on an academic model: (1) Mobile accounting, (2) Mobile brokerage and (3) Mobile financial information services. Mobile accounting services can be divided into account operations and account administration. Account operations include fund transfers, bill payments, and account administration includes ordering checks, updating profiles and personal information, managing lost or stolen cards. Mobile

brokerage is related to buying and selling of stocks, securities, and obtaining current information about securities. Mobile financial information divides into account information and market information. Account information includes information on branch and ATM locations, credit/debit cards, statements, alerts, and balance inquiries, while market information includes products and services, currency exchanges, and interest rates.

Mobile banking offers many advantages to both, users and service providers. It is fast and easy to use and saves time. For online banking, an internet connection is an essential which is a major problem in developing countries. However, many individuals can find mobile connectivity at places where internet connection cannot be found. Mobile banking is cost effective for providers as cost of mobile banking is much less compared with onsite banking. Various kinds of banking services and transactions can be performed with mobile banking. However, mobile banking has many disadvantages too. Security issues are the major concern. Phishing scams, viruses and Trojans and physical loss of the mobile device are some of the security issues that affect mobile banking. In certain markets the cost of the mobile devices, which are compatible with the mobile banking application and still quite high. Mobile banking requires a data plan and text messaging services, which is an added cost to the user. Some providers charge for software and mobile banking services as well.

Different Types of Mobile Banking Architecture

Mobile phones have three types of architectures available to support mobile banking applications. Mobile banking was initially performed through SMS or mobile web until 2010. However, following the advancement in mobile phones and the success of Apple's iPhone and other operating system based phones; mobile banking is increasing through the special client applications. The three different architectures that are now available include:

- SMS Or MMS Based Mobile Banking
- Mobile Website
- Mobile Client Application

SMS or MMS Based Mobile Banking Architecture

SMS based mobile banking was the first mobile banking service offered, based on plain text message interaction. SMS banking works in two different modes; Pull mode and push mode (<http://money.howstuffworks.com>). Pull mode is a one-way text message system where the bank sends a text message to the users informing them about certain account situations. It can be used to promote other mobile banking services. Push mode is a two-way message system where users send text messages to the bank requesting specific transactions or services with

predefined request codes and the bank replies with specific information pertaining to the transactions or services through plain text messages.

There are two different kinds of text messaging systems: SMS and MMS. SMS is a short form of short message service, which includes sending or receiving plain text messages from the bank. It has a limitation on the number of characters can be included in a message. MMS, known as multimedia messaging service, is the second type of messaging service, which can carry larger text messages and works on the same platform as SMS. To use message based mobile banking, a customer has to enroll his/her cell phone to the bank and the bank sends a text message with a onetime password. Each bank has its own SMS banking number and commands for mobile banking. The message based system has some advantages. It is cost effective and familiar technology, virtually available in each and every cell phone regardless of manufacturer, model or carrier. It provides two-way communication between the bank and the user, so either the bank or the customer can initiate communication. It does not transmit or store the confidential information in the mobile device. However, SMS cannot carry a larger message and account information. SMS has to be limited to certain number of characters which limits its use.

Mobile Website Based Mobile Banking Architecture

Hannes (2010) asserts that mobile website based mobile banking architecture includes the use of the internet browser of the mobile device to access the bank's internet banking website. Users can connect to the internet via a wireless network or their carrier's internet service. The biggest advantage of this architecture is most of the processing is done at a remote server at the bank and much less information is stored in the mobile device. On the other hand, it doesn't require the installation of special software and most of the phones today are capable of using an internet browser.

Wireless Access Protocol (WAP) was created in 1999 and made internet access possible through mobile devices. WAP is an industry standard for wireless applications for mobile devices, which provides the same kind of user experience to the customer as the Internet banking. It does not require the installation of a special mobile banking application. However, it has some disadvantages also. Banks have to create mobile websites that are mobile friendly and can be accessed through the small screen of mobile device. It does not work with all kinds of phones and requires smart or PDA phones. There is an added cost for data plans and only customers can initiate communication. The other disadvantage is that this system is more prone to attack as mobile devices are not capable of running firewalls or antivirus protections.

Mobile Client Application Based Mobile Banking Architecture

This architecture requires the download and installation of mobile client application software to the mobile device. With the help of the application a bank can provide a wide range of services to their customers. This approach has its own merits and demerits. First of all, users have to learn a new application. The application has to be customized to different phones which increases the development cost to the banks. The applications are also susceptible to attacks and only customers can initiate communication. The older phones are not capable of running this application because of technical limitations. The use of internet requires a data plan that increases the cost on the part of customers. A data plan requires using client application based mobile banking architecture, which increases the cost on the part of customer. Some of the banks charge an initial fee for downloading and installing the mobile client application.

Mobile Banking Security Requirements

Mobile banking applications have a number of security requirements that are requisite for the effective and efficient functioning of the systems (Rosman 2013). These requirements are necessary for making the handling of transactions on mobile banking platforms more secure and they include: -

- Confidentiality
- Authentication
- Integrity
- Non-Repudiation

Security Counter-measures

Due to the increased vulnerability of wireless communication systems, security of mobile banking systems continues to be a growing concern both for the service providers and the customers. Therefore, more robust security systems are necessary to protect the private personal and financial information of the users. Below are some of the countermeasures that service providers can put in place to increase the security of mobile banking systems: -

User authentication

Authentication is process of identification of something or someone as the genuine, legal or authorized person to carry out a transaction, in the banking context. There are three different ways by which someone can be authenticated. These three categories are based on the factors of authentication:

- What you know,
- What you have or
- What you are.

Each of these factors has a range of elements. Research has suggested that for better security at least two or preferably three factors be verified. If two elements are required for authentication it is called as two-factor authentication while two or more than two factors authentication is known as multi-factor authentication. Banks are required by regulatory authorities to use multiple forms of authentication for electronic banking. All mobile banking systems need to use at least two-factor authentication for user identification.

Authentication techniques based on what user knows including a combination of the pin number, the username, the password and the onetime password for mobile banking. Research has shown security concerns with this technique as users use weak passwords, write it down or share with others. Therefore, to increase the protection of the mobile device pin protection or distributed pin verification scheme has been suggested in which one-half of the pin is stored in the mobile device and rest of the half is stored in a remote machine in the network. So the attacker can get only half of the pin from the phone's memory.

Another technique uses what user has. This includes ID card, cell phone, or credit card. Use of any of the above forms is not a reliable technique as the user must have the physical possession of them. Biometrics is another form of authentication that includes face, voice, fingerprint, DNA sequence and eye retina. In their survey, Clarke and Furnell (2005) established that 83% of populations were in favor of using biometric system for authentication. A report on biometric security for mobile banking in March 2008 discusses the different issues of the mobile banking and suggests use of biometric system for more robust security with the help of a user's fingerprint as a biometric element. Behavior analysis can also be used as a security measure where users are granted or denied access based on their previous behavior. A robust system uses multiple forms of identification before and during use of an application and if necessary asks for more accurate form of identification. Failure to satisfy these requirements will result in the customer being denied access to services.

Encryption

Encryption is the codification or transformation of information into an unreadable form to anyone with the help of algorithm. A key is required to make the information readable again through a process called decryption. Encryption addresses the confidentiality issue. Encryption can be used to protect data 'at rest' and 'in transit' meaning that there are two different ways to protect the data on the phone; encryption of information stored in the phone and encryption of the information during communication.

Digital signature

According to Rouse (2007) "a digital signature is an electronic signature that can be used to authenticate the identity of the sender of a message or the signer of a document, and possibly

to ensure that the original content of the message or document that has been sent is unchanged.” She further asserts that digital signatures are easily transportable, cannot be imitated by someone else, and can be automatically time-stamped. The ability to ensure that the original signed message arrived means that the sender cannot easily repudiate it later. A valid digital signature indicates that the message or document was sent by a known person and it was not altered in transit. Digital signature also represents non-repudiation. Therefore, once the message has been sent and digitally signed, the signer cannot deny that he/she did not sign a message. With the help of Digital signatures customer can sign the document and does not have to visit branch office. In mobile banking, adding a digital signature to the transaction proves that a customer authorized the transaction.

Wireless Public Key Infrastructure (WPKI) Technology

Public key infrastructure (PKI) is a security mechanism for wireless internet and uses public key cryptography and certificate management for communications. According to Thambi (2013), it is a process in which data is encrypted with one key and decrypted with another key where the encryption key is the public key and decryption is the private key. It is important to ensure that the private key is not determined from the public key. PKI provides all four of the security features for e-commerce: confidentiality, integrity, non-repudiation and authentication. Kranakis (2003) asserts that wireless access protocol (WAP) is developed by the WAP Forum to provide a common format for internet transfers for mobile devices. Closely related to it is the Wireless application protocol (WAP) which according to Nie and Hu (2008) is an extension of traditional PKI standards used in wired network, but is mainly used in wireless networks. WPKI applications have to work in a restricted environment like less powerful CPUs, less memory, less storage space and small displays. Therefore, WPKI must be optimized like the other security and application services within WAP environment. WPKI uses a public key system based on ECC algorithm for encryption and decryption.

Strategies for Building Strong Mobile Banking Applications

Bales (2013) identifies nine strategies that he asserts are key to developing and sustaining a strong mobile banking application: -

Get Out of the Building

Effective mobile banking applications can only be developed with the full understanding of customers' behavioral, psychological and contextual needs and this takes interacting with the customers in the market place and not necessarily in the comfort of your office.

Enlist Partners

Engage the creativity, innovation and diversity of other experts outside the banking industry who can assist you in developing a product that will give your customers delighting experiences which are not necessarily a replica of the ordinary banking facilities on a phone.

Remove Strings

Give your customers an opportunity for free trials for your product before they commit. In addition do not attach any requirements such as visiting the branch or banking hall to open an online account. They should instead have a feel of the benefits of your mobile banking product without the commitment to take up other products or services.

Leverage Personal Context

Understand your target market's context and leverage on that understanding for personalizing offerings as you develop your mobile banking application.

Build Engagement

Develop relationships that create rapport for ease of engagement so that there is two way interactions with your customers. Customers enjoy brands that give them opportunities to give value, at their convenience, with feeling that their service provider is being intrusive.

The number of people using mobile devices is rising rapidly. Advanced technology in mobile device field has overcome the limitations of the older phones. Newer phones have a wide range of functions and improvement in hardware and software support, which enabled users to use mobile devices as substitute for computers. These mobile devices are capable of performing complex functions, which enabled users to manage their finances through mobile devices.

There are three different kinds of architecture for mobile banking. SMS based system works in almost any mobile device. Web based systems are similar to internet system and they are more popular in the USA. The client application system offers robust solution to mobile banking. However, all of these systems have security issues those need to identified and addressed in a proper fashion. Confidentiality, authentication, integrity and non-repudiation are the most important security requirements for any mobile banking system.

Authentication of the user and encryption of the data presents serious challenges to the mobile banking system. Implementing the various types of authentication and encryption technology can improve the mobile banking security, which reduces customers' fear against security issues and increases their trust in the mobile banking system. Digital signature and WPKI technology can play significant role in the authentication of the user and the messages or

documents sent by them. These additional measures of security technology can have a huge impact on the mobile banking.

The mobile banking has a great potential for growth. However, as the numbers of mobile banking users increase, the security issues and threats will also increase. Therefore, banks should address these security issues and build a safe and secure mobile banking system.

RESEARCH METHODOLOGY

Research Design

In this research, the researcher used a qualitative research design. The research took the form of a cross sectional survey of the financial institutions and other telecommunication companies offering mobile phone-based financial services.

Tools

A targeted approach was used in administering questionnaires to the various users of these financial services. Depth interviews were also conducted with personnel from the various service providers. The researcher capitalized on his networks and relationships established over the seven years that he was in the banking industry in order to access the information pertaining to the various mobile banking products.

The information gathered addressed the objectives of the research, focusing on how each product functions and how the owners of the product(s) perceive their respective products to be of value to their target market. The research findings were analyzed using the Statistical Package for Social Sciences (SPSS) version 16.0.

Sample Profile

The sample profile comprised 30 male and 40 female respondents, totaling 70 respondents. The age profile of the respondents ranged from 19 to over 65 years of age. A total of 36 respondents (51.43%) were between the ages of 15 and 35, while another 25 (35.71%) were between the ages of 36 and 55. Only 11.43% (8 respondents) were between the age of 56 and 65, with only one respondent being above 65 years of age. These statistics reflect that the mobile banking products are largely being used by the young and middle aged citizens of our society, with very few elderly people making use of the product.

ANALYSIS & FINDINGS

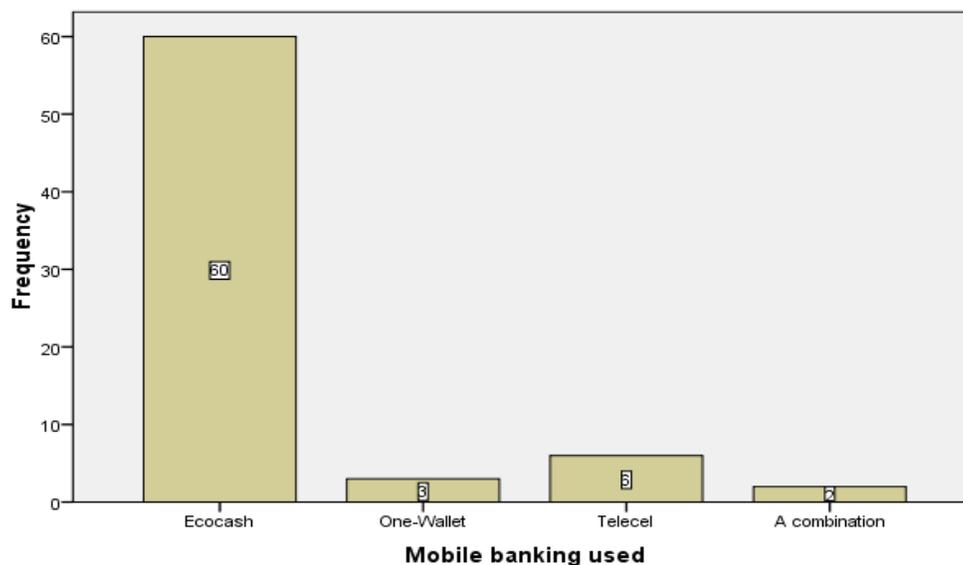
A total of 70 participants were drawn from two rural communities and one urban community, using the random sampling technique, and below is the distribution of participants by gender and by age: -

Table 1: Age * Gender Cross tabulation

		Gender		Total
		MALE	FEMALE	
Age	15-25	7	12	19
	26-35	6	11	17
	36-45	6	6	12
	46-55	7	6	13
	56-65	3	5	8
	Above 65	1	0	1
Total		30	40	70

A total of 40 respondents (57.14%) were female, while the other 30 (42.86%). This indicates that there are more female users of the mobile banking products compared to male users. The bulk of the users (61 out of 70 respondents) also fall within the 15-55 years age range, while only 12.68% (respondents) are above the age of 55.

Figure 71: Mobile Banking Service Used



85.71% of the respondents use Ecocash while the remaining 13.29% is almost evenly distributed among other service providers. This is a clear indication that currently, Econet is the leading service provider in the provision of mobile banking services to the Zimbabwean market.

Table 2: Rankings_ sending money * receiving money Cross tabulation

		Receiving money					Total
		1	2	3	4	5	
Sending money	1	2	2	0	0	4	8
	2	0	0	1	2	0	3
	3	0	0	2	1	1	4
	4	1	0	0	0	2	3
	5	0	0	0	0	5	5
Total		3	2	3	3	12	23

The most utilized function of the mobile banking services is that of sending and receiving money. All the participants indicated that they make use of this function, though what varied across the board was the frequency of use for either sending or receiving money.

Table 3: Benefits of Mobile Banking

Scale 	1	2	3	4	5	TOTAL
Advantage 						
Safety and Security	0	0	23	47	0	70
Convenience (ease of access)	0	12	35	23	0	70
Speed	0	0	0	7	63	70
Cost Effectiveness	0	12	11	35	12	70
Extended reach to remote areas with no banking facilities	11	0	12	35	12	70

A number of benefits or advantages were identified that most respondents evaluated. One of the benefits of mobile banking is that of safety and security and on a scale of 1-5 where 1 indicates least ranking and 5 indicates the highest ranking, 32.86% of the respondents ranked this benefit as average while the other 67.14% indicated that the safety and security of mobile banking services is above average (4). Convenience/ease of access was also rated lowly (2) by 17.14%, while the other 50% rated it average. This implies that there is need for significant improvement of the ease with which users can access service providers, especially in the rural communities, where 67% of the respondents were drawn from. This was closely related in ranking to the "extended reach to rural communities with no banking facilities. 15.71% ranked this point poorly (1), while another 17.14% ranked it average. 50% ranked this factor average (3) while the other 17.14% ranked it above average outstanding (5). The factor that was highly ranked is speed with which transactions can be completed. 10% rated this above average (4) while the other 90% ranked it as outstanding (5). This implies that all respondents are generally

satisfied with the speed with which they transact through their respective mobile banking service providers.

The rating of cost effectiveness was generally above average with a number of respondents however expressing their dissatisfaction. 50% of the respondents ranked this factor as above average (4) while the other 17.14% indicated the cost as affordable (5). However, 17.14% indicated that the mobile banking services are not very cost effective (2) while the other 15.71% rate cost effectiveness as average (3).

Table 4: Challenges of Mobile Banking

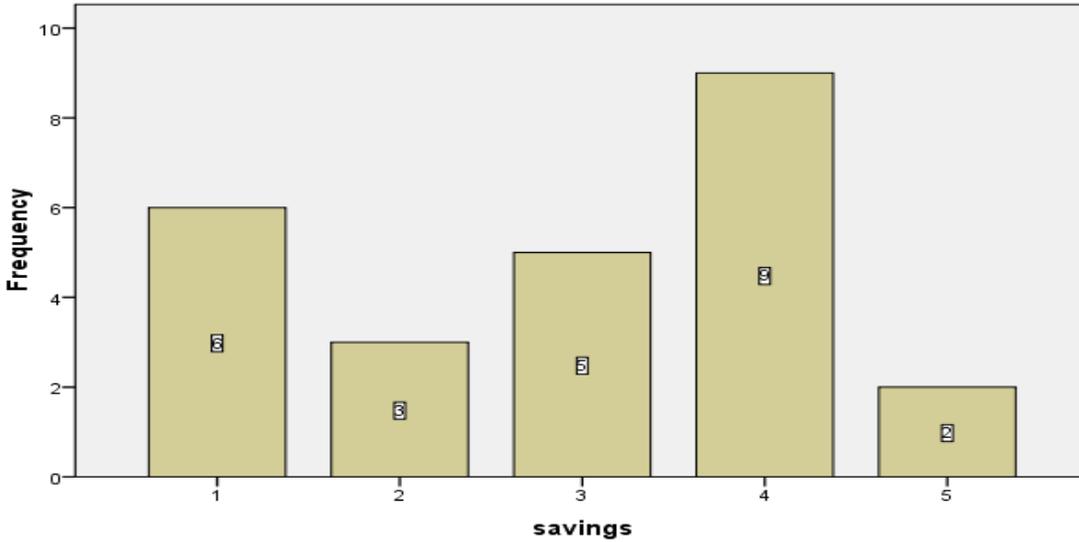
Scale 	1	2	3	4	5	TOTAL
Disadvantage 						
Network challenges (inconsistency of network availability)	14	0	28	14	14	70
Limited number of service providers within the vicinity	0	0	14	28	28	70
Inconsistency of funds availability with service providers	0	0	28	42	0	70

Some of the challenges that were identified include inconsistency of network availability, limited number of service providers within the vicinity and inconsistency of funds availability with service providers. 20% of the respondents indicated that the inconsistency of network availability was a not a very serious challenge (1) to them while another 40% rated this as an average problem (3).

The other 40% highlighted that the network inconsistency is a serious challenge (4 & 5 ratings). There is therefore need for mobile banking service providers to pay attention to the improvement of network availability so that customers are not inconvenienced. The challenge of limited number of service providers also came out quite prominently as 80% of the respondents indicated that they have a challenge in accessing service providers due to non-proximity, especially in the rural communities.

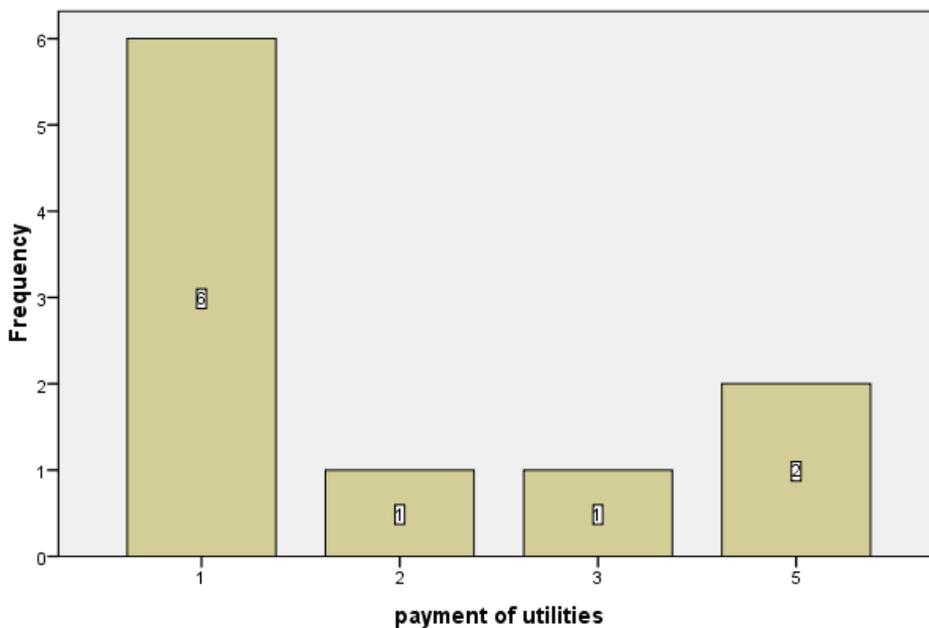
The other 20% rated the distribution of service providers/agents as average. The respondents also indicated that there is inconsistency in funds availability with most service providers. 60% of the respondents indicated that this was a serious challenge while the other 40% rated it average.

Figure 2: Savings



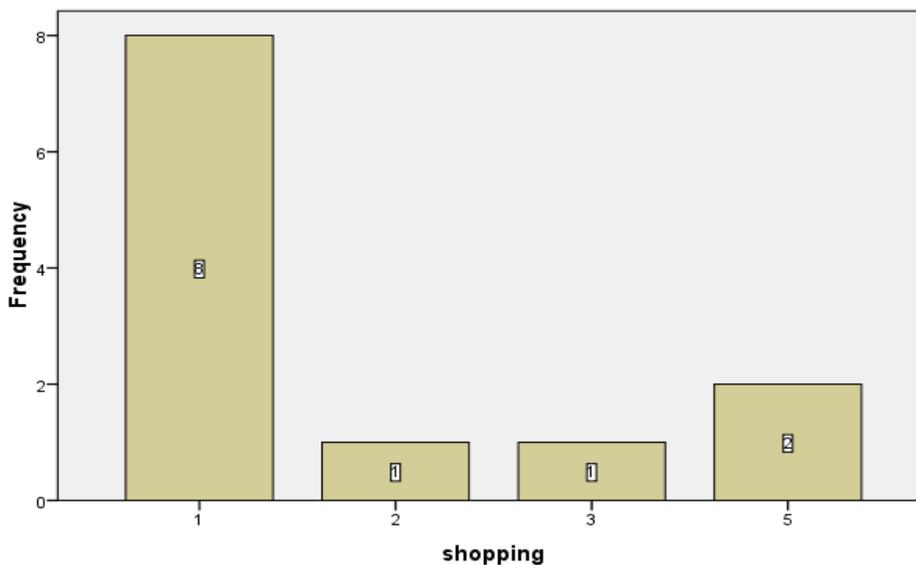
The use of the mobile banking facility for savings is not yet fully developed among the Zimbabwean customers. Only 35.71% of the respondents indicated that they use mobile banking for saving their money and the frequency of saving also varied from one respondent to the other. Of these respondents, 36% indicate that their use of mobile banking as a savings facility is below average, another 25% indicating that their use is moderate and the other 39% reflecting that their use of this facility for savings is quite frequent.

Figure 3: Payment of Utilities



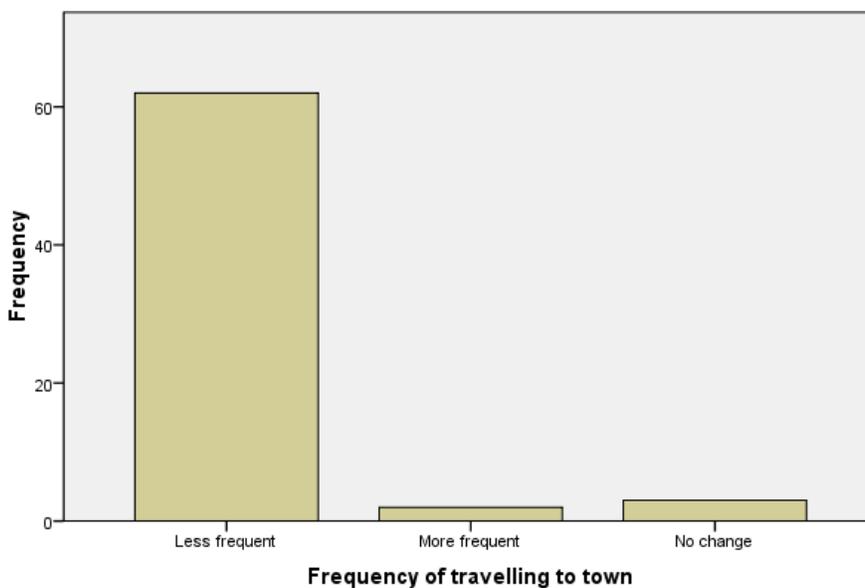
Very few customers use the mobile banking facility for the payment of utility bills as evidenced by the number of respondents, 10 (14.29%). 70% of these respondents actually have a very low frequency of using this facility for bill settlement, 10% being average users and the other 20% being frequent users.

Figure 4: Shopping



The use of mobile banking facilities for shopping is also not yet that much appreciated as only 12 users (17.14%) indicated that they make use of this facility. Out of these respondents, 75% are infrequent users, 8.33% are average users and the other 16.67% are frequent users of the mobile banking facility for shopping.

Figure 5: Frequency of travelling to town to access banking facilities



The introduction of mobile banking has significantly reduced the rural based customers' frequency of travelling to urban centres where they can alternatively access traditional banking services. This is evidenced by the fact that 91.43% of the respondents actually indicated that they have since reduced their frequency of travelling to town to access banking services.

Customer Recommendations

In light of the challenges highlighted, the customers made a number of recommendations to the service providers for improvement of service delivery. Below are some of the recommendations that came from the respondents: -

- Improve the efficiency of the mobile banking services network
- More promotions in marketing the mobile banking services
- Compliment the mobile banking services (phone-based) with point of sale (swiping machines)
- Increase the number of network boosters in rural areas
- Reduce the transaction charges
- Improve security as some customers feel that the pin code alone can easily be overridden or cracked
- Increase the number of service providers within a given locality so that accessibility/convenience is significantly improved
- Frequent system upgrade and improved responsiveness to customer queries
- Improve consistency of cash availability with the agents
- Increase transaction value maximum per day
- Consider stationing service providers/agents in schools and in villages, especially in the rural areas

CONCLUSIONS AND RECOMMENDATIONS

The introduction of mobile banking and its roll out to the rural communities is a noble development that has significantly changed the livelihoods in the rural communities. It has brought about convenience as accessing banking facilities has not become much easier than before. It has also eliminated the travelling costs and other challenges associated with frequently travelling to town to go and collect money from those that support their families in the rural communities. The research findings confirm that the lives of rural people have improved economically and socially through access to mobile banking services. Financial inclusion through access to mobile banking services has increased the level of security and minimized risks for the rural communities. Financial inclusion through access to mobile banking services has significantly increased the level of security and minimized risks associated with some of the

methods that those sending money to their families in the rural communities had now been using, for example giving money to bus crews, relatives travelling to their rural homes or using the postal services. The mobile banking facility is frequently used for sending and receiving money and other less frequently used functions include savings, bills payment and shopping.

While the introduction of mobile banking to the rural communities has been a noble development, it has not been without its own challenges. The consistent availability of network still proves to be a challenge, which makes transacting on this platform difficult sometimes. There is therefore need for the service providers to continuously work on upgrading and improving the network facilities, especially in the rural communities, where mobile banking has now become a more preferred means of sending and receiving money. The other challenge that has been observed through this research is that there are a limited number of service providers' agents in the rural communities, which means that customers have to travel relatively long distances to access services, defeating the convenience objective of this mobile banking facility. It is therefore recommended that the service providers increase the number of agent in the rural communities so that the customers experience the real convenience that this service is supposed to bring them. Lastly, there has been an observation that some of the service providers' agents do not consistently have funds available and this inconveniences customers when they want to transact. In light of this challenge it is also recommended that the service providers improve funds availability with all their agents so that customers are not inconvenienced.

REFERENCES

- Adams, C. & Lloyd, S. (2003). Understanding PKI: concepts, standards, and deployment considerations. Addison-Wesley Professional. pp. 11–15.
- Ahonen, T. T. and Barrett, J. (2004) Services for UMTS: Creating Killer Applications in 3G, [online] Available at www.tomiahonen.com/books.html (Accessed on 10 January 2014)
- Bales, S. 2013. 9 Strategies for Building Great Mobile Banking Applications. [online] Available at <http://scottebales.com/9keys-mobile-banking/> (Accessed on 18 March 2014)
- Bank Secrecy Act, Anti-Money Laundering, And Office Of Foreign Assets Control [online] Available at https://www.ffiec.gov/bsa_aml_infobase/documents/FDIC_DOCs/BSA_Manual.pdf (Accessed on 17 January 2014)
- Biometric-Security-For-Mobile-Banking-2008 [online] Available at <http://www.scribd.com/doc/14332398/> (Accessed on 23 January 2014)
- Clarke, N. L. & Furnell, S. M. (2005). Authentication of Users on Mobile Telephones: A Survey of Attitudes and Practices. *Computers & Security*, 24(7), 519-527.
- Clarke, N. L., & Furnell, S. M. (2007b). Authenticating mobile phone users using keystroke analysis. *International Journal of Information Security*, 6(1), 1.
- Crosman, P. (2013). Mobile Banking Seen Needing Improved Authentication, ID Verification [online] Available at http://www.americanbanker.com/issues/178_108/mobile-banking-seen-needing-improved-authentication-id-verification-1059631-1.html (Accessed 19 March 2014)

Examining the History Of Mobile Banking Information Technology [online] Available at <http://www.ukessays.com/essays/information-technology/examining-the-history-of-mobile-banking-information-technology-essay.php> (Accessed on 18 March 2014)

Gilani, S. (2010) Mobile Banking: Why VeriFone Systems Inc. (NYSE: PAY) is Positioned to Win. [online] Available at <http://moneymorning.com/2010/12/17/mobile-banking-why-verifone-systems-inc-nyse-pay-is-positioned-to-win/> (Accessed 19 March 2014)

Goodwin, B. (2005, September). PDAs and Mobiles left open to 'Bluesnarfing'. Computer Weekly, 8. ABI/INFORM Trade & Industry database. (Document ID: 911956941).

Lin, P. P., & Brown, K. F. (2007). "Smartphones Provide New Capabilities for Mobile Professionals." The CPA Journal, 77(5), 66-71.

Mobile Banking [online] Available at <http://money.howstuffworks.com/personal-finance/online-banking/mobile-banking2.htm> (Accessed 19 March 2014)

Mobile-phone Virus Attack. [online] Available at <http://www.wmskins.com/blog/mobile-phone-virus-attack/> (Accessed on 19 March 2014)

Nie, J. and Hu, X. (2008) Mobile Banking Information Security and Protection Methods. The Center For The Studies Of Information Resource Management; Wuhan University, International Conference On Computer Science And Software Engineering

Nokia launches mobile banking services in India [online] Available at <http://www.indiatelecomonline.com/tag/mobile-banking/> (Accessed on 18 March 2014)

O'Farrell, M. J et al. (2008) Mobile Internet for Dummies, New Jersey; John Wiley & Sons.

Online Banking Challenges and Opportunities. [online] Available at <http://www.managementparadise.com/10drashti92/documents/3803/online-banking-challenges-and-oppourtunities/> (Accessed on 21 February 2014)

Project Report on Internet Banking [online] Available at <http://www.managementparadise.com/Aditi707/documents/13498/project-report-on-internet-banking/> (Accessed on 18 March 2014)

Secure Wireless Payment Protocol. Proceedings of International Conference on Wireless Network (ICWN), Las Vegas, Nevada, 2003. Hong Wang, Evangelos Kranakis.

Tang, J., Terziyan, V and Veijalainen, J. Distributed PIN Verification Scheme For Improving Security Of Mobile Devices. Mobile Networks and Applications. Volume 8, Number 2, 159-175.

The International Business Publications in the Banking and Financial Handbook (Malaysia) Volume 1(2011)

US Banks Expands Mobile Capabilities with Innovative New Visa Payment Solution [online] Available at <http://www.marketwatch.com/story/us-bank-expands-mobile-capabilities-with-innovative-new-visa-payment-solution-2010-11> (Accessed 19 March 2014)

Vandini, C. (2008, 10 March). Cell phone cloning stuns owners: Unsuspecting victims surprised by high bills, extra calls. McClatchy - Tribune Business News. ABI/INFORM Dateline database. (Document ID: 1442967861).