

# **Factors that impact consumer adoption of mobile banking within the m- commerce domain**

A research report submitted to the Faculty of Management, University of the Witwatersrand, in partial fulfillment of the requirements for the degree of Master of Management (in the field of ICT Policy and Regulation).

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## **ABSTRACT**

Banking services can be enhanced by the utilisation of cell phone banking to all banked customers even though it is a relatively new technology introduced in South Africa. This is particularly appropriate for those consumers who do not have access to computers and the Internet. However, the rate of cell phone banking adoption has not seen a rapid increase in comparison to internet banking adoption in the South Africa.

The aim of this research was to identify what factors enable or inhibit consumers from adopting mobile banking services in South Africa. The results of this highlighted what factors influence consumer adoption of mobile banking services. As many possibilities have arisen from the fact that business can now be conducted with mobile devices, this research was focused on understanding what motivates consumers in using mobile banking services as well as the deterrents that prevents such usage. This was done by conducting a survey and obtaining feedback from consumers with regard to their views and utilisation of mobile banking.

## **DECLARATION**

I declare that this report is my own, unaided work. It is submitted in partial fulfillment of the requirements of the degree of Master of Management (in the field of ICT Policy and regulation) in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

## **DEDICATION**

I dedicate this research report to my wife Joelene and to my daughters Tiffany and Caitlyn. Thank you for your patience, love and support given to me during this journey.

## **ACKNOWLEDGEMENTS**

I would like to express my gratitude to my supervisor, Luci Abrahams for her guidance and assistance provided during my research and to all those that participated in my survey, without them this research would not have been possible.

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# 1 CHAPTER 1

## 1.1 Background: Understanding Cell phone banking and consumer behaviour

### INTRODUCTION

This research seeks to understand the factors that influence consumer adoption of m-commerce services, specifically mobile banking in South Africa. Mobile commerce, or m-commerce, is a term that encompasses services and applications which can be accessed from Internet enabled mobile devices. The emergence of m-commerce can be traced to the conventional e-commerce model which involved using desktop computers and laptops. However with m-commerce consumers can now purchase items, make payments and transfer money utilising mobile phones, other mobile devices and mobile networks (Coursaris & Hassanein, 2002).

The main driver of m-commerce appears to be the convenience it offers in terms of mobility to consumers and being able to transact anywhere at any time. m-Commerce transactions are done electronically using a mobile device and a wireless network. Transactions can now be done electronically from almost any location with m-commerce technology. m-Commerce involves transacting goods and services, which is done by utilising mobile access via networks with the use of mobile devices (Techguide, 2012). Amongst others, m-commerce consists of mobile banking, mobile advertising and mobile entertainment. The focus of this research will be limited to mobile banking services. Mobile banking is also commonly referred to as cell phone banking and uses various technologies. This includes Subscriber Identity Module (SIM), Wireless Application Protocol (WAP), and Short Message Service (SMS) (Pavlou, 2003). Cell phone banking services are provided by all the major banks in South Africa using the technologies mentioned.

Cell phone banking is defined by Barnes and Corbitt (2003:275) 'a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone (cellphone) or personal digital assistant (PDA).' When compared to other electronic banking channels in South Africa, mobile banking is still relatively new. The first major

bank to launch mobile banking services in South Africa was Absa which was in August 2000 (Manson, 2002). Consumer adoption of mobile banking has been slow when compared to the rate of increased numbers of the cell phone subscriber base in South Africa. Research conducted by World Wide Worx, a technology research company, revealed that cell phone satisfaction levels regarding ease of use is still relatively low as shown in Figure 1. Consumers utilising mobile banking services are generally satisfied, however there are areas that require some improvement. The highest satisfaction level is around notifications followed by ease of use. The areas in which improvements could be made and where lower scores were noted included help and transactions costs.

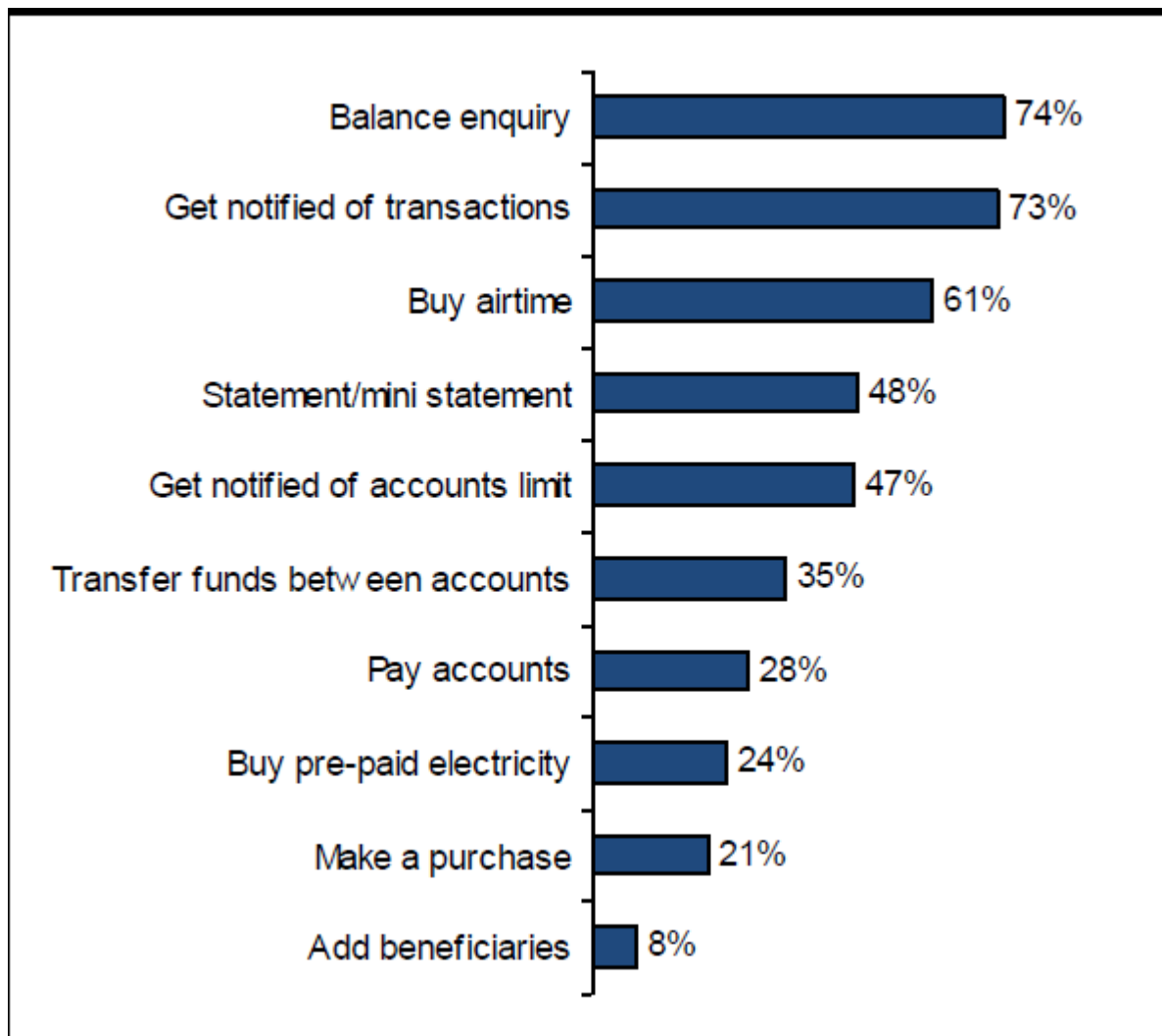
**Figure 1: Satisfaction with cell phone banking amongst cell phone banking customers**



Source: Goldstuck (2009)

The most common transactions utilised by customers are balance enquiry and transaction notifications. Furthermore one of the most popular items purchased among consumers is airtime, with 61% of customers making use of this service, as reflected in Figure 1 below. Other transactions include pre-paid electricity (24%) and pay accounts (28%). The full array of services are outlined below.

**Figure 2: Mobile banking services used by mobile banking customers**



Source: Goldstuck (2009)

The current and future adoption rate of mobile banking is dependent on how consumers view the technology and the type of services provided by financial institutions (Constantinides, 2004). m-Commerce services are especially important to the banking sector as banks can attract new customers and at the same time also increase their customer base by offering mobile banking services which are innovative and convenient

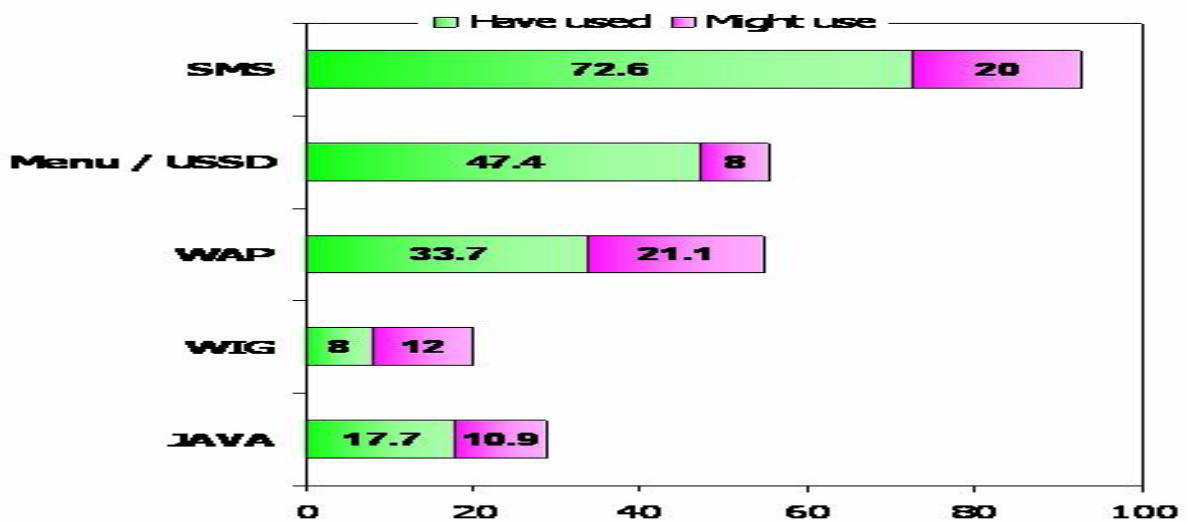
The factors that this research will focus is what motivates consumers in using mobile banking services as well as the deterrents that prevents such usage.

## **1.2 Cell phone banking in South Africa**

In South Africa the major banks; namely Absa, FNB, Standard Bank and Nedbank have all implemented the offering of Cell phone Banking. All of these banks have implemented the WAP technology Cell phone Banking application i.e. where a user accesses the Cell phone Banking application via their cell phone WAP browser (Goldstuck 2009). Absa, Nedbank and FNB have adopted another technology called Unstructured Supplementary Service Data (USSD). A critical difference between USSD and WAP is that USSD works on all cell phones because it is a mobile network standard whereas WAP is a feature that is not always available on all cell phones due to older cell phones not having the latest version of WAP when this protocol was in its infancy (Kumar, Parimi, Agrawal, Res, Centre, Instruments and Berlin, 2003).

In South Africa cell phone banking includes the following common basic transactions: account balance enquiries, account transaction history, transfers (between accounts), payments (for beneficiaries/recipients already set up on a customer profile) and prepaid purchases e.g. cell phone airtime recharge vouchers. Customers are able to register for this service (Cell phone Banking) via a bank branch, Internet Banking, Automated Teller Machine (ATM) and via a call centre at all the major banks (Absa, FNB, Standard Bank and Nedbank). The study conducted by Goldstuck (2009) shows that the most popular Cell phone Banking technology is SMS, followed by USSD and WAP respectively, shown in Figure 3 below.

**Figure 3: Technologies for Cell phone Banking**



Source: Goldstuck (2007)

Scrutiny of the above technologies in Figure 1 shows that there seems to be a pattern in terms of ease of technology. For example SMS and USSD do not require the user to set up their handset for usage. Whereas for WAP, WIG and JAVA, the user is required to setup their cell phone or download an application. Although this is not an empirical finding, observation of the above is interesting and will be investigated in the rest of the literature review.

### **1.3 History of cell phone banking in South Africa**

Towards the early parts of the year 2000 a successful service was introduced by First National Bank called InContact. This service notified clients about activity on their banking accounts via Short Message Service (SMS) notification. This offering has today flourished and FNB now sends InContact SMS messages to millions of clients every month notifying them of financial transactions on their bank accounts. In 2005, FNB launched their next cell phone banking service which allowed customers to transfer money and conduct payments via their cell phones (Techcentral, 2012). A major marketing initiative was undertaken by FNB to launch this new offering in order to increase its cell phone banking customer base. FNB was strategic in its approach

to ensure that its clients were made aware that the cell phone banking service it provided was both secure and user friendly.

Standard Bank also launched a new service offering in 2005 when they partnered with MTN. Their service was called MTN Money and it was the first time that a mobile operator partnered with a bank to offer a cell phone banking service (Techcentral, 2012). This service turned out to be extremely expensive for both MTN and Standard bank and the success achieved was limited. Standard bank and MTN eventually decided to discontinue this service as it never gained popularity with consumers. The next offering introduced by FNB was their e-wallet service which allows clients to transfer money to any person in South Africa using their cell phone number. The way in which this operated was that the person receiving the money transfer gets an SMS notification notifying them that money has been received in their FNB e-wallet (FNB, 2010).

The client also receives a unique number which can be used at any FNB ATM to withdraw the money in cash and without using an ATM card. This service was introduced in 2009 and is still one of the most convenient methods of transacting. A similar service was introduced by Standard bank and ABSA around the same time that FNB launched their e-wallet service. Standard Bank's offering was called Mimoney, however their initiatives did not gain much momentum and did not appear to be as successful as FNB's product (Standard Bank, 2011). ABSA's product was called Send Money and was similar in operation to the way FNB customers received notification and withdrew cash from ATM's. ABSA also launched a similar service to FNB called Notify Me in response to FNB's InContact service.

Nedbank's entry into the market began with the M-PESA money transfer service which was in partnership with Vodacom but this resulted in limited success. This service was introduced on the Unstructured Supplementary Service Data (USSD) technological platform and required no monthly fees or minimum balance to be maintained. Nedbank's cell phone banking initiatives were introduced in 2007, however it is not known how successful their products were as this information is not in the public domain (Nedbank, 2010).

The early days of banking was associated with customers having to visit their nearest branch to conduct their banking, however the services that banks now provide has evolved globally. This can be seen from the days when the Automatic Teller Machine (ATM) was the most popular method of banking with consumers withdrawing and depositing cash using this facility. This started in the 1980's with ATM's being commonly located near a bank branch to allow for the bank to conveniently replenish the ATM with money (Techcentral, 2012). Customers could access ATM's anytime and this proved convenient and efficient rather than visiting a branch during business hours and standing in long queues. ATM's were probably considered to be revolutionary but this was yet to come with the introduction of the Internet which would allow the evolution of Internet banking and ultimately cell phone banking.

The Internet began in the 1990's with the World Wide Web in its infancy but advancement occurred at an astonishing rate. Consumers and the general public took notice and the possibilities of the Internet seemed endless (Mobile Computing, 2002). This was definitely the case for commercial enterprises and specifically banks. The Internet opened up a whole new dimension for how banks could offer their services and products to their clients. The major South African banks introduced their services for Internet banking in the late 1990's to market and promote their services. ABSA took the lead during this time and began to offer internet services together with their Internet banking products. Initially their Internet service was provided free of charge and allowed them to increase their internet banking customers to a million by July 2008. ABSA was the first major bank to reach a million Internet banking clients in South Africa (Techcentral, 2012).

In 1993 Vodacom was granted a network licence to conduct commercial mobile operations in South Africa. Rollout of services began in June 1994 with initial projections for 250 000 subscribers over a 10 year period. During the first month Vodacom had a customer base of 50 000 clients and this increased to 100 000 clients by October 1994. Rivals, MTN obtained also obtained their network licence in 1993 and began their services in 1994. The MTN subscriber base also grew at an exceptional rate beating initial forecasts. The cell phone penetration level in South Africa today is nearly 100% (BusinessTech, 2011).

In the early parts of the year 2000, the major banks in South Africa were seen to be partnering with both MTN and Vodacom with the intent of promoting their cell phone banking products. These services included money transfers, balance enquiries and statements in the initial stages. The main limitation for banks and mobile operators was that the sim cards in used were limited in terms of memory and therefore impacted on more advanced services being offered. In 2002 both MTN and Vodacom launched GPRS data services in South Africa. This paved the way for banks to explore new cell phone banking services which also included internet browser capabilities on cell phones (MoneyWeb, 2012).

### Money laundering activity

Financial regulators are the key players in anti-money laundering (AML) activities and combating the financing of terrorism (CFT) efforts.

The introduction of cell phone banking services, while having the beneficial effect of expanding banking services to the unbanked, also provide new avenues for criminal or terrorist actors to move money in service of less desirable goals. Financial regulators bear responsibility for implementing appropriate anti-money laundering and financing of terrorism mechanisms, often through the use of Know Your Customer (KYC) requirements imposed on financial institutions. In the case of cell phone banking and mobile payments, financial sector regulators need to determine the appropriate balance between stringent know your customer requirements which may limit access to banking services and more relaxed requirements that will make it easy for more people to sign up, but that may be less effective for combating money laundering and terrorism.

In South Africa the government established a tiered know your customer (KYC), under which the existing anti-money laundering and financing of terrorism mechanisms law was amended to allow the poor and unbanked greater access to banking services by allowing less-demanding registration requirements for certain types of accounts. The supposed exemption accounts may be opened by South Africans who cannot provide proof of their address, but have daily and monthly restrictions on the amount of money that can be transferred out of the account, as well as maximum balance restrictions. A

further change noted that cell phone banking falls under Exemption, but that if the consumer wishes to open a banking account without submitting to an in-person identity verification process, even lower limits on transfers and maximum balances apply.

#### **1.4 Cell phone banking in other countries**

One of the most successful cell phone banking initiatives was introduced in the Philippines in the year 2000 (FinScope, 2012). The most popular service introduced was similar to that of the e-wallet concept launched by FNB in South Africa. In the Philippines this service was known as G-Cash and allowed consumers to shop at their local stores and make payments to merchants using their cell phones. Interestingly the success of this banking service was driven by the mobile operators and not the banks, however cell phone banking was successfully adopted by the population of the Philippines. The use of cell phone banking was a clear alternative to using cash and bank ATM's.

Another success story is that of Kenya, their service being marketed as M-Pesa via the local mobile operator, Safaricom (FinScope, 2012). A similar service to that offered in the Philippines but also allowing customers to withdraw cash at any participating store. A similar service has been offered in South Africa, also named M-Pesa but to date this has had limited success in comparison to both Kenya and the Philippines. In Tanzania, NMB bank was growing at an exceptional rate and introduced cell phone banking as they could not meet the demands of customers via their conventional methods which included branch banking. One of the major problems experienced by NMB bank was that their customers spent excessive amounts of time standing in queues in order to perform basic banking services such as money transfers and balance enquiries. NMB launched their cell phone banking service in 2009 and in the first few months experience phenomenal growth in transaction volumes. Customers could now transact in minutes compared to the hours they had spent waiting to perform banking services in the branches nearest to them (FinScope, 2012).

The evolution of cell phone banking has meant that the cell phone has gone from simple voice communication to a daily device that can be used for multiple functions. In South Africa today all the major banks offer cell phone banking applications allowing customers new ways of transacting. The most significant impact has been on the poor and the unbanked. Conventional banking meant that consumers had to visit a bank branch to transact without many other viable alternatives. Today the model of extending banking services means that banks can now go the unbanked and offer various products and services with cell phone banking. The main factor in the growth of cell phone banking is its accessibility and the convenience in which customers can transact which has resulted in exponential growth in this banking channel over the last few years.

### **1.5 Cell phone banking and the developed world**

Approximately 2.7 billion people are considered financially excluded in the developed world, that is they do not have an account opened at a bank or do not have the privilege of utilising financial services (Mobile Computing, 2012). From this group of people, more than two billion reside in the African continent, Middle East and America. Research indicates that within developing countries, on average, one bank branch and one automated teller machine (ATM) exists for every 10,000 people (Mobile Computing, 2012). This lack of, or limited access to, banking and financial services constrains growth and prosperity for consumers and the economy. For these unbanked individuals, lack of access to banking services leaves them trapped in an oftentimes poor, cash only society. For a country's economy, limiting banking activity to traditional approaches can stifle entrepreneurship, stunt development and even stall economic growth through the effective exclusion of large numbers of potential banking customers.

However, for those unbanked individuals, obtaining services in the financial sector is now accessible via their cell phones. This accessibility changes the landscape for these unbanked individuals since there are over four billion people among developing countries which are mobile phone subscribers (Techguide, 2012). Individuals can engage in a variety of financial services, including mobile transactions and payments, by means of their cell phone and with no need to physically go to a bank branch.

Given the large penetration of mobile services in many countries, including in developing countries, cell phone banking offers a potentially important way to bring banking and financial services to the unbanked. Cell phone banking services can thus be both transformative in targeting the unbanked, and innovative by targeting those who already have a bank account providing an alternative means of accessing the services available with that account.

Among the advantages of cell phone banking are that the costs of such services are typically lower than branch-based services; transactions can be made instantly and customers do not need to be reliant on cash or visiting a physical location that may be a great distance away. This, in turn, means that banking services will not only be accessible, but can be conducted in real time offering customers greater efficiencies and providing a swift and reliable means to engage in these services. A large proportion of cell phone banking services began by offering customers the opportunity to transfer airtime credits to other users as a proxy for sending electronic money, and then introduced more robust money transfer services (including bill payments, deposits to bank accounts and other common transactions) as users became more comfortable with the concept. The vendor of prepaid airtime has been transformed into a provider or enabler of banking services, accepting and disbursing cash transferred via mobile networks.

A large portion of services conducted may be viewed as mobile payment type transactions where the mobile handset plays a key role in the initiation and authorization for payment. The mobile phone can thus be transformed into a virtual wallet to make payments between parties with compatible accounts, fund transfers, and obtaining cash in exchange for virtual money (Mallat, 2007). As cell phone banking services have become more widely accepted in a given market, there has often been increasing acceptance of the use of such services to transfer payment from consumers to businesses, from businesses to employees, and from governments to citizens. Beyond payments, cell phone banking services also serve as a secure store of value, allowing customers to store their funds electronically, making them less prone to theft or loss.

Cell phone banking services can also be leveraged to authenticate financial transactions. There are a variety of models, which have often been depicted as part of two distinct domains and these are a non-bank model and a bank based model (Dewan & Chen, 2005). These models each have distinct means of operating, especially with respect to the relationship with the end customer in terms of establishing accounts, deposit taking, and lending services. Although the universe of cell phone banking services now encompasses a wide range of service models that cannot always be neatly described as following one or the other model, or sometimes even being easily placed on a continuum between the two models, these two primary models will be used as discussion points and looks at several approaches in how the setup of cell phone banking has been conducted globally.

The most significant issues with regard to regulatory issues which have come to light with relating to cell phone banking will be addressed. In addition an analysis will also be done focusing on how cell phone banking can be improved and promoted by government, specifically financial and telecommunications and regulators.

Because cell phone banking technologies and services are still in an early stage of development, it is difficult to generalize their impact on banking activity or revenue generation. According to a 2011 World Economic Forum report (GSMA, 2011), only four countries Ghana, Kenya, Philippines and Tanzania demonstrate mobile financial service adoption rates above 10 percent. Nevertheless, the Central Bank of Kenya had increases of nearly 150 percent in the number of formal bank accounts in Kenya from 2005 until 2008. (GSMA, 2011).

A significant portion of the increase was attributed by the Central Bank of Kenya to be consumers who were previously unbanked customers and who were getting familiar with banking services via mobile operator, Safaricom. These consumers were also found to be more inclined to open a formal bank account. The growth, sustainability, and expansion of cell phone banking services have been characterized by the use of several different models to support the delivery of a variety of banking products and solutions. The approach or model that is implemented by a corporate company to rollout cell phone banking is frequently impacted by the regulations and laws in the specific country and the extent to which the regulators permit the way in which cell

phone banking is made available (Sadeh, 2002). In some cases, almost any model or approach may be used and the decision on how to advance cell phone banking will be more flexible based on what policymakers and service providers think will work best. In other cases, countries may have detailed or strict regulations that will limit the ability of prospective financial service providers to offer cell phone banking services.

Consequently, cell phone banking services may be required to adopt a particular model, or the countries' legislators and/or regulators will have to make changes in order for a wider set of cell phone banking services to be offered. Often, the constraints that may exist in a given market preventing development of any cell phone banking type application largely are attributed to restrictions posed by existing financial regulations (Regan, 2007). However, it may also be the case that the primary operator within a market may not have an interest in providing the applications necessary to support mobile banking. Although the sections below describe two primary models, several others are in existence. The different approaches are mostly due to the prevailing conditions in a specific country and will determine how the services within cell phone banking are set up (Stroborn, Heitmann, Leibold and Frank, 2004). As a result, it is perhaps better to consider these models as two ends on a scale, with multiple possibilities for cell phone banking.

The most conventional form of cell phone banking is the bank based model. In this model, a number of services are made available by the banks via the use of a cell phone, in which agreements are in place with the mobile company to provide the service using applications or text messages. Consumers are then able to conduct their banking with no need to visit a bank branch. In this model the relationship is created between the consumer and the specific financial organisation. The use of this model offers banks the potential to substantially increase these of their services, both by extending new mobile services to their existing customers and by extending services to mobile telephony customers who do not currently have a bank account. In either case, the customer can access their bank accounts and other financial services through their mobile device. The cell phone banking customer's relationship with his or her bank may also be carried out through the utilization of agents as a means to provide services. In simplest terms, an agent is an extension of the bank, they are able to provide commercial or transactional services (Mukherjee & Nath, 2003). These

services include handling cash, retaining information, and providing customer service. Agents have an important responsibility in providing their services which encompass opening new accounts, cash handling services and loan applications.

Bank based cell phone banking models are generally considered additive, meaning that these are usually directed towards currently banked consumers (Mitchell, 1999). These consumers are generally at ease with using technology and require convenience as part of their banking experience. This type of banking service will supplement their use of ATM's and Internet banking with minimal need for cash. The most frequent services utilised by customers are fund transfers, payments and transaction enquiries. Nevertheless, once a cell phone banking program is put in place, a financial institution may find that it can attract new customers based on the advantages that such services offer in terms of security, stability, and customer base. For example, people who previously have not had a bank account may feel more secure dealing with an established and regulated financial institution rather than a non-bank alternative, and maybe more comfortable using services via their phone rather than by going to a physical bank.

In addition, some cell phone banking services are targeted to the unbanked but have structured as bank-based models due to existing legal and regulatory constraints that related to the provision of financial services. This was the case in Pakistan. In 2008, the State Bank of Pakistan (SBP), which acts as the regulatory authority over Pakistan's banks, issued its branchless banking regulations (Needle, 2009). These regulations only allowed cell phone banking to be provided through a bank-based model on the basis that this provided greater reliability because the existing banking institutions could be made fully liable for the provisioning of service. However, it would allow joint ventures between a bank and an operator or non-bank, whereby the operator can be used as a channel to provide the bank's services.

An official bank will act as a custodian of customer deposits in a nonbank based model. This primary entity or operating unit managing the customer relationship is a non-banking entity. Most often this is a mobile operator. This model seeks to overcome the barriers that prevent the establishment of official banking institutions in developed countries including accessibility, excessive costs for banking, and

inadequate knowledge about banking services by separating financial services from the traditional banking providers (Littler & Melanthiou, (2006)). A non-bank based model has certain distinct characteristics. First, there is no relationship directly between consumers and a bank. Customers, however, can however convert cash into virtual money at a retail agent. The customer conducts transactions (e.g., making transfers, depositing money) at a retail outlet which facilitates transactions as part of the service of a non-bank based model. A record of the customer's money is then retained and recorded by the agent. The models which are non-bank entities are transformational as these are mainly directed to people who do not have access to banking services and include poor and often inaccessible areas.

Transformational banking focuses largely on areas where there is higher prevalence of cell phone usage together with a lower use of traditional banking institutions. Under this approach, a mobile phone can be transformed into an electronic wallet and utilized for payments, fund transfers, and to obtain cash without needing a bank. Globe Telecom operating in the provides a GCASH service in the Phillipines, which provides cashless and cardless way to transform a mobile phone into an electronic wallet meaning that the phone can be utilized to send and receive money from and to other GCASH users (Reuters, 2010).

A similar approach is used in Brazil, where mobile operator Oi offers its Oi Paggo service, through which payments can be made to retailers as long as both customer and retail have Oi Paggo accounts and handsets capable of text messaging (Reuters, 2010). The direct links to customers under a non-bank based model are the authorized agents. A variety of functions can be performed at Globe Telecom retail agents including converting virtual money into cash, making payments and transferring funds. Agents can include other local retail establishments such as grocery stores and gas stations. Cell phone banking customers under a non-bank based model are able to make a payment to another person who may be utilising the same system and would also be able to receive funds from them. In this scenario, customers may also use cell phone banking as a means to pay accounts and conduct money transfers to other accounts. In order to complete a transaction there are two methods that are frequently used. One is a network point of sale device and the other

is dependant on using a phone. If a point of sale device is used, consumers are required to physically go to the agent in order to complete a transaction.

In order to obtain cash or make deposits with a phone system, it will be essential for customers to go to an agent. MPESA is one of the most successful operations offering this type of cell phone banking service. A pilot system was set up in 2005 by Vodafone and Safaricom and a commercial version commenced in Kenya in 2007 (Safaricom, 2008). The MPESA venture has been ingeniously arranged in a manner that is not considered to be a method of banking in accordance with the Banking Act in Kenya. However, the deposits of customers are safe and Safaricom ensures this by making an investment provision which is equal to the value of customer deposits in a commercial bank. This is an exceptional circumstance in terms of MPESA not requiring a banking license to offer such services.

It is worth noting that as MPESA was one of the first entries into the market in terms of cell phone banking services there was ample opportunity to make the most of the regulation in place at the time. However, other countries require licenses for such banking services that are provided by non-banks. For example, the Central Bank in the Phillipines allows non-bank companies to provide cell phone banking services. However, companies must first obtain prior approval from the central bank in the Phillipines before offering such services.

## **1.6 Advantages and Disadvantages of the different banking models**

### Bank-based

The bank-based model of cell phone banking most closely mimics the traditional banking relationship and serves as an extension of that formal arrangement. There is a formal relationship and agreement between a customer and an official bank. An advantage of the new technology enabled banking distribution model permits an unbundling of activities traditionally conducted at a bank branch office. Since existing regulation has not been structured taking into account the close nature of financial services and telecommunication, there are many uncertainties by which innovative applications may not be fully considered, including those offered by bank-based cell phone banking service providers.

A disadvantage of the bank-based model is that it may not be able to innovate as easily or respond as rapidly to market needs. In addition, a bank-based model that is closely tied to existing services offered by a formal bank may have a more limited reach than a non-bank service, depending on the level of interaction the client is required to have with a bank branch. By contrast, an advantage of the bank-based model is that requirements to mitigate risks and address data security and customer privacy are already established as banks are already required to comply with such requirements and regulations (Donner & Telleza, 2008). Although banks still need to modify or add additional requirements to address the delivery of its products through a mobile device, customers may find greater comfort that the traditional brick and mortar bank is standing behind the service.

#### Non-bank based

This model of cell phone banking is generally viewed being more transformative because it often targets providing banking and financial services to underserved or rural regions without access to banks or the formal financial system. In this model, mobile operators are generally key to providing the service and managing the customer relationship. Since there are different models of a non-bank based approach, the advantages and disadvantages of this model may vary. In general terms, one of the greatest advantages to the non-bank model is that it can more easily increase access to financial services for those in low-income and rural areas because the customer does not need to engage in a direct contractual relationship with the bank (Choudri & Dwivedi, 2006). An additional potential advantage may be that the company offering the service may not be subject to the more restrictive regulations imposed on a traditional bank because it does not fall under the traditional definition of a financial institution or its services may not fall under the definition of a banking activity. The non-bank based model is also often more flexible in providing support through its expansive agent network. While a bank based model often utilizes a similar network, it is generally more limited in scope to existing ATM facilities, branch offices, or mobile operator outlets.

In the case of a non-bank approach, with a mobile operator taking a leading role, there is typically greater flexibility in how it approaches the establishment of an

agent network, often expanding to include other local retail establishments. Finally, because in a non-bank model, a relationship exists primarily between the customer and the mobile operator, it can be perceived as a more familiar relationship and less daunting or overwhelming for some consumers. From the perspective of the non-bank player, usually mobile network operator, four main advantages have been identified which include reduced loss in customer numbers, an improved brand status and appeal focusing on service, reducing costs and additional revenues from mobile transactions.

A disadvantage to a non-bank based model is ensuring that sufficient capital is in place to mitigate any financial risk due to a lack of funds within the system (Tiwari & Buse, 2007). This in turn could affect the liquidity of the system and the availability to provide cash to customers. A further risk associated with the non-bank based model is providing adequate consumer information and protection; particularly since many of these non-bank based customers may be new to banking and may not fully understand how these services operate through mobile phone. In this instance, user education plays a key role, with the non-bank entity, usually the mobile operator, supporting this function.

The greatest potential for problems in a non-bank model is the risk of utilizing agents to serve as points of contact for transactions. While agents are utilized in a bank-based model, the distinction here is that those agents are subject to banking regulations and requirements. Under the non-bank based model, agents are not necessarily subject to the same types of policies and regulations. The potential for operational risk is thus heightened in this model. For example, customers or retail agents could commit fraud, or property could be stolen from a retail agent's premises. An additional disadvantage to the non-bank model is that it often necessitates the need for further review and re-evaluation of banking and telecommunications regulations in order to provide the service, as well as to provide adequate protection for consumers, ensure economic stability, and guarantee reasonable network interoperability.

As noted, the non-bank model can have several variations. In considering both the advantages and disadvantages to the two primary cell phone banking models, it is important to note, that while the terms address what are bank-based or non-bank

based approaches, the reality in both cases is that a banking institution is likely involved in the operation of both models. While in the case of the bank-based model, the bank stands front and centre as the entity with which customers establish a business relationship, a bank may also be key to the operation of the non-bank model as well. The distinction may be that in the non-bank based approach, it is a mobile operator or other entity with which customers establish a business relationship and the bank may operate in supporting the back office component of the service or simply in holding the aggregated deposits collected by the mobile operator.

The development of a suitable cell phone banking model for a given market appears to largely be driven by the legal and regulatory regimes. Thus, perhaps it is not simply bank versus non-bank models, but the determination of a suitable cell phone banking model evolves as a result of the policy environment present in the country.

### **1.7 Application security in cell phone banking**

The main purpose of a cell phone banking application is to provide customers with access to their bank accounts through their cellular phones. In order to comply with acceptable industry standards for access into a bank account, the first item to consider is the successful authentication of the customer. Once authentication is done, the information that is transported between the bank and the customer's cellular phone needs to be encrypted to eliminate interception by non-authenticated parties. The security approach in a cell phone banking application is crucial, because the customer will use the cell phone to access his bank account remotely by utilising the network reach of his mobile network operator.

The cell phone banking application will allow the customer to view balances in accounts and to transfer money from his account to any other bank account, it is of the utmost importance that the cell phone banking application enforce that each transaction can only be executed by the owner of the bank account. Application security in a cell phone banking application must assure non-repudiation of transactions (Laforet and Li, 2005). This implies that there must always be proof that the originator of the transaction was uniquely authenticated before the transaction was processed on the bank account. To assist with proper authentication it is

recommended that the approved technology always uses a two-factor authentication mechanism of "something you have" (your cell phone) and "something you know" (your cell phone banking Personal Identification Number)(Manson, 2002).

To comply with the first factor of authentication which is "something you have", it is recommended that the application is designed to ensure that the mobile handset or unique SIM card is always linked to the customer profile during the registration process in the cell phone banking platform. This approach will limit the customer to only access the cell phone banking application from his own handset and it will eliminate fraudulent transaction attempts from any available handset making it more difficult for fraudsters to compromise the security of the application.

The second portion of the two factor authentication mechanism is a unique PIN that is selected by the customer during the registration process. PIN selection is important to assure that the customer's identity is not comprised. It is recommended that customers select unique cell phone banking PIN codes, while the application must be designed to not allow weak PIN combinations that follow patterns like 1111, 1234, or 9876. According to security audit best practices regarding a PIN code, the customer must be forced to change his cell phone banking PIN on a regular basis. This is embraced from a security perspective but experience has shown that people tend to have one PIN for multiple applications. For example customers select the same PIN for their bank card as well as for the cell phone banking PIN.

User experiences in various countries have indicated that if you continuously force customers to select a new PIN after a certain period of time has elapsed, customers will become resistant and negative about the product and could even stop using both the card and cell phone banking product(Constantinides, 2004). To assure security even further, it is recommended that all transactions with a financial impact is notified to the customer through an alert service. The advantage of a cell phone banking application is the fact that the bank will always have the Mobile Station Integrated Services Digital Network or cell phone number (MSISDN) of the customer and it allows the sending of transaction notifications immediately to the customers at the time of the transaction through an SMS alert service (Young, 2000).

To support the security of a cell phone banking solution, it is good practice to introduce associated daily limits for the transaction types that will be delivered by the solution. The introduction of daily limits combined with transaction notifications that will notify the customer of fraudulent activity will make cell phone banking less vulnerable for attacks and mitigate the potential fraud risk. It is in the discretion of the bank to determine the value of these limits but the rule of thumb is that it needs to be small enough amounts that discourage fraudsters in attempting to bridge the security of the solution.

### **1.8 Economic Benefits of Cell phone banking**

With respect to cell phone banking and economic development, an analysis should focus on the means by which cell phone banking can transform, or at a minimum, enhance economic growth. The hope is that cell phone banking can contribute greatly to economic development through its ability to create income generation, enabling more people to access needed financial services in a cost efficient and relevant way. Overall, the rise of cell phone banking is expected to result in substantial macroeconomic benefit resulting from a five to twenty percent reduction of financial exclusion by 2020 across several developing economies (Techcentral, 2012). On a microeconomic level, cell phone banking has the power to create opportunities for the rural poor, through access to financial services, by increasing not just financial security, but by bringing a significant developmental impact to individuals across a range of areas. Indeed the developmental impact of mobile financial services can be significant when it intersects with other sectors such as health.

In this instance cell phone banking services can have a significant impact in areas such as the health sector whether dealing directly with health workers as supporting salary payments, performance based funding, supply chain settlements, or directly to patients enabling payments and cash transfers, health insurance, and payments for transportation to hospitals and clinics. Cell phone banking may also support education and further educational opportunities by enabling families to better manage their money and provide them the security to keep their children in school rather than needing to send them to work to help the family's financial situation. Cell phone banking and m-payment systems can also be leveraged to ensure secure and less-

costly payments to individuals by government and includes transactions such as social grants and payment of pensions.

According to Gartner (2011), there were at least 170 million poor people worldwide that received government to person payments. By making such payments more secure and easier to receive and store, cell phone banking services could expand the developmental impact of government to person payment programs. The most appropriate method for a specific economy will be a dependency on the regulation environment and if the policies that exist favour development of one model over another. This is especially true in the case of a nonbank-based model. In order for this model to be utilized, a regulatory structure must be in place that will allow non-banks to engage in some subset of banking activities such as facilitating payment services.

### **1.9 Usability of cell phone banking applications**

Usability encompasses the focus on the ease of use of the cell phone banking application from the end users perspective. There are mainly 4 challenges to address with cell phone applications namely (Wolverton, 2002):

1. Small screens { small screens means fewer visible options at any given time},
2. Awkward input of information, especially for typing,
3. Download delays { getting the next screen takes forever},
4. Badly designed sites { Websites are typically optimised for desktop usability and don't follow guidelines available for usable mobile access}.

Usability of cell phone banking applications depends on the make and model of handheld phones used. Smartphone devices for example support a much more sophisticated user experience, but because of the limited spread of these devices it only supports a limited reach for a cell phone banking application (Mobile Computing, 2002). A cell phone banking transaction will be executed from the cell phone handset of a customer. The SIM card inside the cell phone determines the mobile network operator to whom the cell phone subscriber belongs too. Since the bank does not own the mobile handset of the customer, they need to work closely with participating mobile network operators to launch the cell phone banking application on their

network. Maintenance of the cell phone banking application is the effort that will be required to install a cell phone banking application onto the end user phone, but includes the later effort required to update and enhance the application on the user phone if new versions of the cell phone banking application becomes available.

As with any product in the current market, the more user friendly a product is presented the more likely it is to succeed in the modern high speed and simplistic driven economy. Usability of the cell phone banking solution is mainly defined by the user interface that will be used on the customer handset. The user interface was the main reason for cell phone banking implementations not originally being successful in different market segments (Bhatti, 2007).

The following important aspects not considered or neglect in earlier cell phone banking implementations:

1. Banks approached cell phone banking as an extension of their existing internet banking offering that was launched to the market during the nineties. It was difficult to complete a transaction on the cell phone because of the limited resources available on the cell phone handset compared to a computer.
2. The size of the cell phone screen display and small numeric key pad made it extremely difficult to use.
3. Internet connectivity on cell phones was very slow.
4. Different cell phone handsets on the market delivered different views and experiences and caused confusion to the end user, making customer support via a customer support centre difficult.

In conclusion, the solutions available at the time were not optimized enough for the end device (cell phone handset) that was used to process a cell phone banking transaction. Usability of a cell phone banking application is the ease of use with which customers can access the application and similarity in experience independent of the type of cell phone handset that will be used.

## **1.10 PROBLEM STATEMENT**

Telecommunication operators and banking institutions cannot increase their customer base in the mobile banking environment without knowing what factors enable or inhibit consumers from adopting such services in South Africa. As there are ever-increasing pressures on telecommunications operators and banking institutions to increase their revenue, it is important to understand what drives consumer adoption of mobile banking services. Failure to do so could result in a loss of market share and limited growth in the mobile banking sector for both financial institutions and network operators. In addition mobile banking could bring financial services to the country's poorest and would enable the unbanked to transact thus being a viable solution to the high cost of setting up retail branches in rural locations.

Previous research which was undertaken in Finland indicated that factors such as income, education and occupation did not make a distinction between mobile banking users and Internet users (Laukkanen and Pasanen, 2008). However, this may not be true for the South African context as highlighted in the research performed by Brown and Alemayehu (2005). Their research indicated that the adoption of internet and cell phone banking users can be distinguished by various age groups, level of education and economic setting. According to Brown and Alemayehu (2005), the perceptions of cell phone banking users are not as positive when compared to internet banking users and may provide an explanation as to the low rate of cell phone banking adoption in South Africa.

Therefore the problem that this research will investigate is what influences the adoption of cell phone banking in the South African economy. The study will provide guidance and learning to banks in South Africa. The major banks in South Africa have been grappling with the slow adoption rate of cell phone banking when compared to the number of users with cell phones in South Africa. This research will highlight the factors that influence adoption of mobile banking as well as provide insight for future policies and strategies to get customers on board for this service.

## **1.11 PURPOSE OF RESEARCH**

The aim of this research is to identify what factors enable or inhibit consumers from adopting mobile banking services in South Africa. The results of this research should indicate the factors that influence consumer adoption of mobile banking services. Many possibilities have arisen from the fact that business can now be conducted with mobile devices. This research will contribute to understanding what motivates consumers in using mobile banking services as well as the deterrents that prevents such usage. Arising from the analysis, it will be possible to consider what regulatory approaches may contribute to improving mobile banking services. These regulatory approaches may also be relevant to other m-commerce activities.

The objectives of this research will be to determine the level of awareness of consumers regarding mobile banking and m-commerce as well as to identify their concerns and expectations. In addition it would be possible to determine amongst the different age groups who is most inclined to adopt mobile banking services. This research will benefit network operators as well as financial institutions in understanding how consumers react to technology and how to increase their customer base by meeting consumer expectations. It may also assist consumers in increasing awareness of m-commerce and mobile banking services.

### **RESEARCH QUESTION**

#### **Main question**

1. What factors influence consumer adoption of mobile banking services?

#### **Sub question**

1. To what extent have banking institutions created consumer friendly mobile banking services?
2. How do consumers perceive mobile banking as a method of transacting?
3. How can regulation address particular factors to foster market development of mobile banking?

## **2 CHAPTER 2 - CELL PHONE BANKING AND THE TAM MODEL**

### Factors of mobile banking usage

Many discussions have focused on how businesses can benefit from m-commerce services. However, minimal attention has been given to consumer adoption factors that influence m-commerce, especially within in the South Africa context. There are various theories that propose the possible factors which inhibit the adoption of mobile commerce. Kumar, Shailaja, Kavitha, & Saxena (2006) suggests that it can be attributed to a low data transfer speed and other arguments are in favour of business models which are outdated (Coursaris, Hassanein, & Head, 2006; Gratton, 2002). Others suggest that the quality of service is inferior and needs to be improved (McIvor & Huang, 2000).

While a considerable amount of research has been published internationally on the adoption factors that influence mobile commerce and cell phone banking (Laforet & Li, 2005; Suoranta, 2003; Bhatti, 2007; Anckar, Carlsson & Walden, 2003; Wu & Wang, 2005), very little information was found on adoption factors that impact cell phone banking within South Africa. The primary focus of these studies were on the adoption factors of innovation and information technology that affected consumer decisions. Some of the issues included the need for banking services as well as innovative products and levels of risk inherent with mobile banking services.

### Consumer behaviour

The adoption of innovative products can be illustrated as a practice in which an innovative approach 'is communicated through certain channels over time among members of a social system' (Rogers, 1995:5). Several attributes of innovation were highlighted by Rogers (1995) as factors that could influence adoption behaviour. These include relative advantage, compatibility, complexity, observability and trialability. These attributes were found to be the key factors that affect consumer behaviour. Research conducted by Brown and Alemayehu (2005) compared Internet and cell phone banking users and found that the most significant factor between internet and cell phone banking was that of trialability.

This meant that lower awareness and possibly a lack of understanding of cell phone banking was relevant during the time of the study. In line with this theory research conducted by Sathye (1999) analysing the factors that affected internet banking in Australia indicated that awareness played a key role in influencing adoption of these services. The conclusion made was that the greater the awareness of consumers the more likely they were to adopt internet banking services. Furthermore research conducted by Suoranta (2003) highlighted that trialability played a major role for consumers in Finland and determined when this influenced the adoption of cell phone banking services. It therefore appears that potential adopters of technology who can experiment with an innovation are more inclined to adopt the innovation, as argued by Rogers (1995).

When comparing user perceptions of internet banking to cell phone banking, Laukkanen's (2007) research conducted in Finland found that convenience and efficiency were the most important factors that influence the adoption of these banking channels. Similar conclusions were reached Carlsson and Walden (2002) from their research in Finland which found that slow speed of service was a barrier to m-commerce.

#### Attributes of mobile banking users

Laukkanen and Pasanen (2008) suggest that education, occupation and income levels are factors that affect adoption of electronic banking services. In addition research conducted by Suoranta (2003) discovered that the typical customer who utilises cell phone banking services would be educated, middle aged (between 25 and 34) and earns an average income. The study indicated that age and education were important variables when considering the use of cell phone banking. Their research also found that there is a distinction between consumers who have never used internet banking and begin to use cell phone banking as their first electronic banking experience.

This is a key point to note in this research due to the fact that a large proportion of South Africans do not have access to internet facilities. Many consumers first interaction with banking services will therefore be via cell phone banking and they would probably not be familiar with internet banking. Therefore these users would perceive adoption factors differently from those who have had access to the internet.

It can be argued that the perceptions that surround internet banking and cell phone banking affect consumer adoption. It could also be argued that the similarities outlined by the Brown, Cajee, Davies & Stroebel (2003) research between internet and cell phone banking are skewed as the assumption made is that similar factors are likely to affect cell phone and internet banking. Age and gender were the main factors found to differentiate cell phone and internet banking users in the study conducted by Laukkanen and Pasanen (2005). Goldstuck (2009) also distinguishes cell phone banking users by age and race, however the main factor differentiating users here appears to be income levels.

Research conducted by Laforet and Li (2005) in China revealed that consumers in the 35 – 44 year age group were more inclined to use cell phone banking services and had positive user attitudes. This could be attributed to the fact that mature banking customers understand better their requirements in terms of convenience and affordability. This is important to consider in the South African context as demographic factors would be key to understanding the adoption of cell phone banking services and would play a significant role in how consumers make their decisions in adopting mobile technology. An important piece of research undertaken by (Brown et al. 2003; Brown & Alemayehu 2005) identified some factors that influence cell phone banking adoption within South Africa, however these were not exhaustive.

#### Internet and Cell phone banking

There has been a lot of research undertaken on the adoption of internet banking both locally and internationally. This reason for this can possibly be attributed to the fact that internet banking has been around much longer as an electronic banking option when compared to cell phone banking (Chau & Lai, 2003; Brown, Hoppe, Mugera & Newman, 2004; Tan & Teo, 2000; Bradley & Stewart, 2002; Wang, Wang, Lin & Tang, 2003).

A model was developed for Internet banking adoption by Brown et al. (2003) to understand consumer adoption of cell phone banking and to identify possible similarities to cell phone banking. However, for the South African environment no specific model was developed. This research therefore seeks to narrow this gap by

identifying possible factors that influence cell phone banking adoption within South Africa.

## **2.1 Technology Acceptance Model (TAM)**

Many studies have utilised the TAM which has been tried and tested (Davis 1989; Mathieson 1991; Taylor and Todd 1995) and it has been established that TAM is a better model when it comes to explaining the attitudes regarding technology and systems (Mathieson 1991). The TAM clearly defines the difference in terms of behaviour and usage and does so in a consistent manner. Research conducted by Mathieson (1991) indicates that a major distinction between the TAM and Theory of Planned Behaviour (TPB) is that social variables are not definitively included.

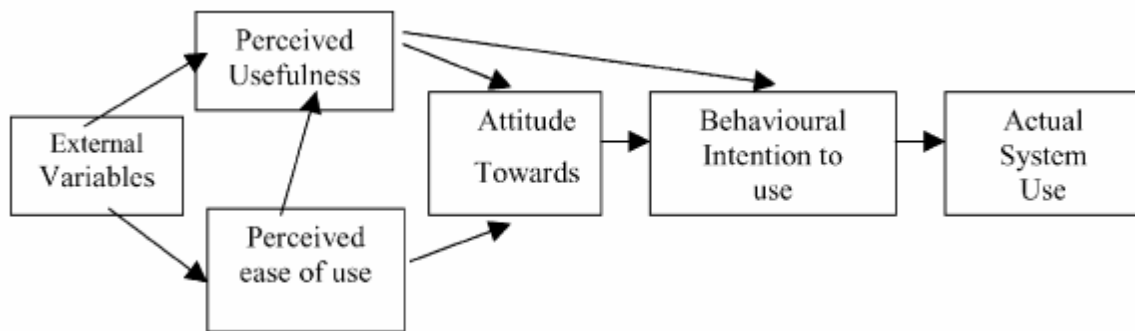
As banking is considered to be a confidential and private routine conducted by individuals it is not easily influenced by the opinions and perceptions of friends or family. Social variables may therefore not be a major factor in affecting how users choose or utilise electronic banking options. In addition privacy is considered to be crucial when banking channels are considered and therefore social variables will probably not have a major influence in how individuals conduct their banking activities.

It has been suggested by Anckar et al. (2003) that TAM may be a model with some uncertainty and questionable in terms of how well it sheds light on the decisions by users to adopt m-commerce options. Cell phone banking falls within the domain of m-commerce and can also be classified within the electronic banking channel. It has been argued by Anckar et al. (2003) that a customer's decision to adopt m-commerce is not based on factors surrounding technology but instead it is about new m-commerce options and advantages on offer.

It has also been suggested that TAM is utilised as though only one technology is available for users. In this research cell phone banking is another option when compared to internet banking, ATM and other banking options. Predictions of user acceptance have been explained by the TAM model together with the perceptions of users. The characteristics that cause user perceptions with regard to the usefulness and ease of use are, however, not explained by TAM (Mathieson 1991). In terms of

models utilised and proposed, the TAM by Davis (1989) has been extensively referenced and used by researchers in the information systems field. The two variables highlighted by TAM which include perceived ease of use (PEOU) and perceived usefulness (PU) are the distinguishing factors that determine user attitudes and how technology is adopted as well as user intent to utilise technology as shown in Figure 4 below.

**Figure 4: The original TAM**

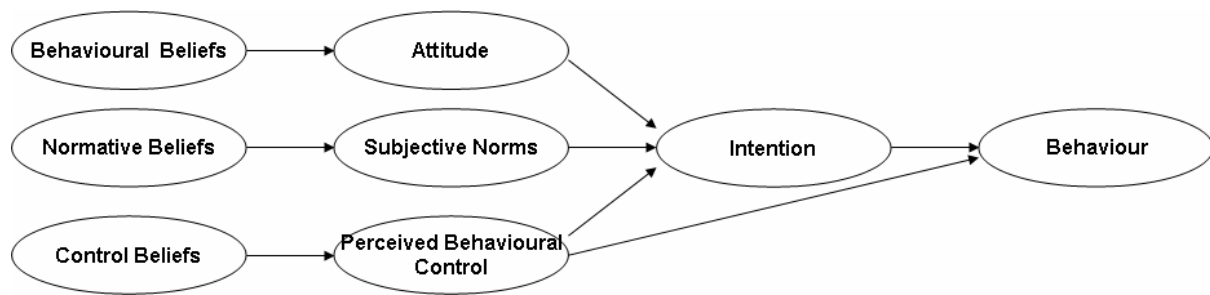


Source: Legris et al. 2003

The model constructed by (Davis 1989) was completed as part of a study in software programs and how they are accepted by users. This justified the reasons for adopting the model into various corporate spaces and technology environments by means of numerous recent studies (Mathieson1991; Taylor and Todd 1995; Venkatesh and Davis 1996; Agarwal and Prasad1999; Chau and Lai 2003; Wang et al. 2003).

A comparison was done between TAM and the TPB to understand which model was better at understanding how information technology is used (Taylor and Todd 1995).The concept of behavioural intention proved to be explained in a clearer manner when the TPB belief structures were decomposed. The results of the comparison and analysis revealed an improved understanding of behaviour and intention. This was achieved by looking at the factors which could most likely influence the use of systems via both implementation strategy and design, TPB as shown in Figure 5 below.

**Figure 5: Theory of planned behaviour**



Source: Armitage and Conner 2001

The most important characteristics of TAM are the attributes related to perceived ease of use as well as perceived usefulness and are the distinguishing factors when compared to the innovation theory. The TAM suggests that attitude is the result of perceived ease of use and perceived usefulness and that intent as well as behaviour to adopt is influenced by perceived usefulness. A number of studies have focused on the factors that influence mobile commerce and the adoption of cell phone banking to date adoption (Anckar et al. 2003; Suoranta 2003; Wu and Wang 2005; Bhatti 2007; Poon 2008). These studies have mostly concentrated on the decisions to adopt information technology (IT) in fixed and mobile surroundings utilising the TAM framework (Davis 1989) as well as the innovation diffusion theory constructed by Rogers (1995).

The characteristics that influenced Internet banking adoption was highlighted in a framework by Tan and Teo (2000). This was used in the research by Brown et al. (2003) which concluded on the factors that would most likely to influence adoption. These factors include trialability, relative advantage, the needs of customers in terms of banking services from cell phones as well how risks are perceived (Brown et al. 2003). Innovation characteristics were identified as factors that affected acceptance behaviour from research conducted by Agarwal and Prasad (1999). In addition, external pressure was also found to be a factor on adoption acceptance and were characterised as crucial elements in the study conducted by Brown et al. (2003). The theory of planned behaviour was also used to derive some of the factors of behaviour (Taylor and Todd 1995).

The study conducted by Brown et al. (2003), was based on the premise that cell phone banking could be seen as an expansion of internet banking but with its own defining character in that a cell phone is utilised in contrast to using a computer and a web browser. Research undertaken in Finland by Laukkanen (2007) compared the value perceptions of customers regarding cell phone and internet banking. The results indicated that convenience, safety and efficiency are the most critical factors when completing a fund transfer utilising the different banking options. This study also found that the most negative factors when using cell phone banking were the display and keypad.

Another study conducted by Carlsson and Walden (2002) in Finland supported this view. They concluded that the factors impacting on using m-commerce facilities was the limitation of screen size and slow network speed which impacted the service. The user friendly aspect of banking applications needs to be given a reasonable amount of consideration to ensure that customers would be able to navigate with minimal difficulty. However, these attributes could be considered as inhibiting factors rather than adoption factors for using cell phone banking and the customer's decision to use this banking option. The cell phone banking applications in South Africa vary considerably among the four major banks in terms of different technology, usability and speed of the services on offer.

In terms of WAP, customers will need to understand how to browse on their cell phones and internet browsing knowledge would therefore be essential. The applications for SMS and USSD cell phone banking is simple and user friendly enough in order for customers to complete transactions as this would be a function or task that is commonly used on a frequent basis.

As customers in South Africa need to register for cell phone banking services for performing any banking transactions via this channel, this research will look at the factors that impact consumer adoption. These adoption factors will be based on the characteristics discussed in the TAM and diffusion of innovation theory. It can therefore be argued that there are inherent perceptions between performing transactions on the internet versus performing transactions on the cell phone. And consideration should be given to the adoption criteria during this analysis.

Furthermore, it can be argued that the research conducted by Brown et al. (2003) on differences between cell phone and internet banking is inaccurate as the factors that affect adoption have been assumed to be similar. An assumption is also made that South African users utilise cell phone banking mainly through WAP (internet on mobile handsets) and are able to perform this setup if it were not already an enabled function on their cell phone.

However, as stated above the major banks in South Africa using different technologies and WAP requires a good understanding of the internet as well as the process of setting it up on a cell phone. Research conducted by Brown and Alemayehu(2005) found that the characteristics which influence the use of Internet and cell phone banking adoption were completely different. There were also differences between user perceptions and the intent to adopt between the two channels of banking.

This therefore illustrates that careful consideration should be given to the similarities drawn between cell phone and internet banking in certain environments where people have more than one option to access cell phone banking as is the case within South Africa. WAP is not the only means of utilising cell phone banking as there are other options available such as menu based functionality and SMS.

### **2.1.1 Proposition**

Based on the literature review the following proposition was proposed:

The lower the perceived complexity (C) of using Cell phone Banking, the more likely that Cell phone Banking will be adopted.

### Theoretical Background

Cell phone banking is a service that is provided using mobile technology and is an innovative banking channel. With this view it is appropriate that we look at the factors that lead towards adoption of innovation and specifically electronic banking channels. In order to get to a framework relating to this research problem, it is essential to gain an understanding of the innovation adoption concept, the TAM concept, electronic

banking channel adoption and other research which may be an extension of the TAM. Specific attention will be given to frameworks that predict the adoption factors of cell phone banking.

## 2.2 Innovation diffusion and adoption

A conventional definition of innovation diffusion could be explained as a concept which 'is communicated through certain channels over time among members of a social system' (Rogers 1995:5). One of the most mentioned studies in this research area is the work conducted by Everett M. Rogers (Moore and Benbasat 1991; Tan and Teo 2000). Key elements of innovation which influence adoption behaviour were identified by the research conducted by Rogers (1995). The following attributes or characteristics were highlighted which influence adoption consistently:

- Relative Advantage** - the extent of an innovation which seems as superior than its predecessor;
- Compatibility** - the extent of an innovation appearing as constant with previous instances of possible adopters, existing needs, and values;
- Complexity** - the extent of an innovation being perceived as complex to utilise;
- Observability**- the extent in which the result of an innovative concept can be observed by others; and
- Trialability**- the extent to which an innovation may be tried and tested with before adoption.

A further three factors were introduced from research conducted by Moore and Benbasat (1991) regarding the development of a tool to calculate the perceptions surrounding adoption of information technology. Their research was based on the theory of innovation outlined by Rogers (1995) which was adapted in producing other additional factors. Relative advantage and complexity were replaced with ease of use, a factor which has been highlighted as a major prediction of adoption behaviour (Davis 1989; Venkatesh and Davis 1996), as this was considered to be a measure of similar traits or characteristics. The following factors were identified by Moore and Benbasat (1991) in addition to what Rogers (1995) had proposed:

- **Image** – focuses on what an innovation will contribute to enhancing the social status of a potential adopter by looking at the perception of using an innovation;
  - **Result Demonstrability** – the material results from utilising an innovation;
- and
- **Visibility** – the degree to which an innovation is seen as being visible by potential adopters.

The studies surrounding innovation characteristics indicate that the manner in which an individual perceives these traits has a significant influence on acceptance behaviour. The diffusion of innovation framework proposed by Rogers (1995) was used in the study conducted by Brown and Alemayehu (2005) to identify the factors influencing cell phone and internet banking adoption in South Africa. A comparison between cell phone and internet banking users was also included. The most salient factor highlighted by this study with regard to internet banking versus cell phone banking was trialability.

This shows that a low level of understanding and low awareness of what cell phone banking is about occurred during the period of the study. In another study conducted by Sathye (1999) in Australia regarding internet adoption factors, it was proposed that a key factor that influenced adoption was awareness. The research eventually confirmed this and it was suggested that the higher the level of awareness, the greater internet adoption would be. Furthermore, trialability was found to be a major factor by Suoranta's (2003) study regarding cell phone banking in Finland and how it influenced adoption.

It would appear that there is a greater chance of adopting an innovation where individuals have the opportunity to experiment with it, as argued by Rogers (1995)

### **2.2.1 Proposition**

Based on the literature review in section 2.5 the following proposition was proposed:  
Cell phone banking is more likely to be adopted the greater the trialability factor.

### **2.3 Electronic Banking**

Electronic banking technology represents a myriad of different services ranging from Internet Banking, Cell phone Banking, ATM services and electronic funds transfers (EFT) (Kolodinsky, Hogarth and Hilgert 2004). An examination of current literature relating to electronic banking shows younger people (Laukkanen and Pasanen 2008) with a high level of education, occupation and higher income are variables that differentiate users from non-users of electronic banking (Al-Ashban and Burney 2001). Suoranta's (2003) research highlighted that the typical Cell phone banking customer would be between 25 years and 34 years of age, is educated as well as earns an income which is average. The study showed that education and age had a significant impact on the utilisation of Cell phone Banking.

It also showed that a distinction exists for users who have never used Internet Banking and start to use Cell phone Banking first as their first electronic channel experience. This observation would be a critical point to note in this research as due to the large gap that exists in terms of South Africans having access to Internet facilities, there will be instances where users' first interaction with an electronic channel is via Cell phone Banking i.e. they will probably not know what Internet Banking is hence, they will perceive adoption factors differently to those who have had exposure to the Internet. Laukkanen and Pasanen's (2005) study of characterising the users of Cell phone Banking versus online (Internet) customers concluded that age and gender are the main variables that differentiate this group. In their study, they used regression analysis which provided a view in which the results suggested the main traits were gender and age which are most critical in distinguishing between users of Cell phone Banking and other internet banking services. They concluded that the odds of a middle aged (30-39, 40-49) person using Cell phone Banking facilities were nearly two times greater than the odds of 18-24 year old using Cell phone Banking services.

Laforet and Li (2005) research on users' attitudes towards online and Cell phone Banking in China showed that 35-44 year old group seem to be using Cell phone Banking services more. Although these results are in contradiction with Suoranta's (2003) study, the main reason for this mature age range adoption could be that seasoned banked customers understand their needs better than a younger person,

who is new to banking, and Cell phone Banking could appeal to their needs e.g. convenience, cheap, etc. The demographic variables are all potentially critical to our understanding of cell phone banking adoption in South Africa, since they could play an important role in how consumers make their decisions on adopting an innovative technology service i.e. Cell phone Banking. As the review of the literature on previous studies, described above, does not correspond to each other but would be pertinent to banks, an analysis to see who has adopted this service will create some insight into which segments are aware of Cell phone Banking.

## **2.4 Value based adoption**

Review of studies of electronic banking yields that a lot of studies have focused on the adoption factors for Internet Banking. Prior studies developed have predominantly focused on adoption factors for Internet Banking using the TAM, variants of this model and other models (Daniel 1999; Tan and Teo 2000; Bradley and Stewart 2002; Chau and Lai 2003; Wang et al. 2003; Kim, Chan and Gupta 2007; Kuisma, Laukkanen and Hiltunen 2007; Poon 2008). Common factors that arise from this literature are that PEOU and PU are significant factors that contribute the likely adoption of Internet Banking.

Prior research has empirically found that between PEOU and PU, a positive relationship exists which equate to critical factors for the adoption of electronic banking (Venkatesh and Davis 1996; Pikkarainen, Pikkarainen, Karjaluoto and Pahnla 2004). However, these basic factors are not a full reflection of the influences relating to usage properties and technological factors which may alter user adoption. TAM explains the adoption of traditional technologies by users in an organisational setting and has limitations in explaining adoption of new technologies e.g. mobile commerce (Kim et al. 2007), arguing that customer choice and behaviour are predominantly determined by the value of object. In other words, they believe that perceived value (PV) is an important factor that leads to adoption and that other beliefs are mediated through perceived value. Since PEOU and PE may not fully reflect the user's intention to adopt Cell phone Banking, searches for other attributes which predict the acceptance of Cell phone Banking better are required. Contrary to research by Davis (1989), the effect of PU on adoption intention is not direct but works indirectly through

PV. Kim et al. (2007) research noted that modelling perceived value solely on price would be insufficient as users would probably consider other attributes other than price e.g. perceived quality. The research also noted the number of typologies of value as prescribed by Ram and Sheth (1989) i.e. functional value, social value, emotional value and conditional value which would need to be taken into account.

According to Ram and Sheth (1989), resistance is a normal user response to an innovation and adoption may begin only after initial resistance has been overcome. With particular reference to the value barrier, they define this as an innovation without a strong performance to price value will be resisted and a substitute will be chosen. From the Brown et al. (2003) study, the factor of relative advantage indicated that this factor was significant towards the adoption of Cell Phone Banking. The questions used in the questionnaire for that factor leaned towards whether Cell phone Banking was perceived to be of more functional value compared to other traditional banking channels. It is useful to re-examine this factor but to change the focus on perceived value rather than advantage as adapted by Kim et al. (2007) Value Adoption Model (VAM). Using this approach will eliminate respondents comparing Internet Banking to Cell phone Banking and focus on the perceived value they would get by using a cell phone.

#### **2.4.1 Proposition**

Based on the literature review in section 2.4 the following proposition was proposed:  
The higher the perceived value (PV) in utilising Cell phone banking the more probable it is that cell phone banking adoption will occur.

### **2.5 Confidence, Risk and Perceived Credibility in using new Technologies**

The study of adoption factors towards electronic banking and m-commerce services have been explored by some researchers, predominantly overseas though (Suoranta 2003; Luarn and Lin 2005; Wu and Wang 2005; Poon 2008). Luarn and Lin (2005) extended the TAM and TPB theory by adding one trust based factor, 'perceived credibility (PC)', and one resource based factor 'perceived self-efficacy' (PSE) to the model.

Venkatesh and Davis (1996) also showed that in their research that users base their EOU perceptions on computer self-efficacy before using a technology system. Computer self-efficacy was significant in determining EOU perceptions without direct experience with systems and this was enhanced with direct system exposure. However, research by Brown et al. (2003) showed that this factor was not significant, hence it was concluded that this was not a factor that had an influence on Cell phone Banking.

In Suoranta's (2003) and Brown et al. (2003) studies, the factor of risk was investigated with the results showing that the result was not significant and significant respectively. A possible reason for the result not being significant in Suoranta's (2003) study could be attributed to the fact that Finland's population is a technologically advanced group and more open to new technologies. Whereas in South Africa, the Brown et al. (2003) study reveals that South Africans are more risk averse and adoption of new technologies are approached with caution.

Mitchell's (1999) research into consumer perceived risk highlights that when modelling risk, a researcher can design their own objective specific model which may have little use for other researchers. Review of this concept, perceived risk, over a period of 38 years, results in that risk analysed from a perspective of probability and consequence is the most competent model. The main problem with this is whether these are applied multiplicatively and additively (Mitchell1999). The perception of risk can be explained as an individual expecting to experience loss as a result of trying to achieve a specific outcome. For the purpose of this research, users likely to adopt Cell phone Banking could perceive risk on the following categories:

- The probability of performing a transaction incorrectly which results in a loss;
- The perception that transacting via the cell phone could place their banking details at risk if their phone is stolen; or
- The trust of the Cell phone Banking technology is unknown and hence a risk in the adopter's mind.

As can be seen, the risk factor is difficult to capture objectively which is further substantiated by Pavlou's (2003) research. However, one of the major influencing factors around the establishment and use of new technologies for financial transactions is that of security (McKnight, Choudhury and Kacmar 2003). Trust is defined as a feature of most economic and social interactions in which uncertainty is present (Pavlou 2003). He also mentions that practically all transactions, especially e-commerce, require an element of trust. Trust can also be defined as the belief that the other party will behave in a socially responsible manner, and, by so doing, will fulfil the trusting party's expectations without taking advantage of its vulnerabilities (Gefen, 2000). This aspect can be linked with the security component where a user trusts the bank where they believe that the bank will not develop a Cell phone Banking application which can lead them to lose their money by making a mistake on the application.

Wang et al. (2003) study on characteristics of acceptance by consumers regarding Internet Banking, modelled the factor of PC as factor that results in behavioural intention. They chose this model and aligned it to the TAM (Davis 1989) which concluded that the new TAM variable, perceived credibility, to have a stronger influence on behavioural intention than the traditional TAM variable, PU. In order to reflect the appropriate trust and security issues PC should be used as a new factor in the adoption criteria for Cell phone Banking.

### **2.5.1 Proposition**

Based on the literature review in section 2.5 the following proposition was proposed:

The higher the perceived credibility (PC) of utilising cell phone banking, the greater the likelihood that cell phone banking will be adoption will occur.

### **2.5.2 Proposition**

Based on the literature review in section 2.5 the following proposition was proposed:

The lesser the perceived risk (PR) of using Cell phone Banking, the more likely that Cell phone Banking will be adopted.

## **2.6 Conclusion**

There have been numerous studies around the adoption of Information Systems and more recently the studies have begun to move towards the innovative technologies such as Internet Banking and Cell phone Banking. A multitude of models have been proposed to better predict the adoption factors for these services however, it has highlighted that there is still a lot to be studied in this space as this space is new and more attributes could be discovered once these technologies move into a mainstream cycle where adoption factors change towards the actual technology application. To date, Internet Banking has received a lot of research attention internationally and locally (Nielsen 2002; Teo and Pok2003; Wang et al. 2003; Brown and Alemayehu 2005; Okazaki 2006; Poon 2008). The propositions highlighted below will provide more knowledge to a limited knowledge base, from a Cell phone Banking adoption framework, and highlight the areas that the major banks in South Africa should concentrate on to improve adoption of users to this cost effective electronic channel. As previous research have developed their frameworks using the TAM theory (Davis 1989) specifically or Innovation Diffusion theory (Rogers 1995) specifically, it has not been the intention of this study to focus on a specific methodology but rather to highlight the key adoption factors that are pertinent from a South African context by identifying key factors that will address the research problem from a broad perspective.

### **2.6.1 Proposition 1**

The greater the trialability (T) of cell phone banking, the more likely that cell phone banking will be adopted.

### **2.6.2 Proposition 2**

The lower the perceived complexity (C) of using cell phone banking, the more likely that cell phone banking will be adopted.

### **2.6.3 Proposition 3**

The higher the perceived value (PV) of utilising cell phone banking, the greater the likelihood that cell phone banking adoption will occur.

### **2.6.4 Proposition 4**

The higher the perceived credibility (PC) of utilising cell phone banking, the greater the likelihood that cell phone banking adoption will occur.

### **2.6.5 Proposition 5**

The lesser the perceived risk (PR) of using cell phone banking, the more likely that cell phone banking will be adopted.

## **2.7 Mobile banking and perceived risk**

Many studies have focused on consumer risk perception and were done in relation to banking online (Tan & Teo, 2000; Wu & Wang, 2005), however the risk perception attribute is structured in terms of being a solitary trait and therefore does not highlight an accurate reflection of the perceived risk characteristics (Lee, 2009).

A study was conducted by Lee (2009) regarding perceived risk which related to online or internet banking. The perceived risk attribute was split into five areas which included time risk, security risk, financial risk, performance risk, and social risk. This break down illustrated a detailed view of the traits relating to internet banking and provided a better understanding of the concepts (Lee, 2009).

Mobile banking may be considered an extension of Internet banking, but with its own unique characteristics given that a cell phone is used rather than a web browser on a personal computer (Brown, Cajee, Davies & Stroebel, 2003). Thus, the same risk factor set could be derived for cell phone banking by using the risk facets as used by Lee (2009) as a basis. The following risk factors as suggested by Lee (2009) can be utilised for cell phone banking:

- Risks for performance: this is related to a loss which is caused by inadequate controls or errors by banking technology of (Lee, 2009). An error emanating from banking technology could impact a customer's behaviour and cause them to be reluctant to utilise bank services and this would apply to cell phone banking as well (Littler & Melanthiou, 2006)
- Risks relating to security and privacy: this could be a result of fraudulent actions or hacking into computer systems which may compromise the security of a cell phone banking user. The perceive credibility attribute was used by Luarn and Lin (2005) to outlines the manner in which consumers view the security and privacy of mobile banking threats. In terms of this research the risks relating to security and privacy will be considered as being the same as having no credibility.
- Risk relating to convenience and time: this could be a result of lost time and problems experienced by waiting for payments to be effected and setbacks relating to finding specific functions (searching for relevant commands and services.) (Lee, 2009).
- Risk relating to social behaviour: this could be a result of dissatisfaction by a person's family or friends regarding the use of cell phone banking (Lee, 2009).
- Risk relating to finance: this refers to possible financial loss as a result of erroneous account usage or errors.(Lee, 2009).

It was established that performance risk, security risk, social risk, financial risk and time did not have a positive impact on online banking adoption (Lee, 2009, Lee, Lee and Kim, 2007). The risk that did not have a major impact on the intent to utilise online banking was social risk (Lee, 2009). It was further found that the ease of use needs to be highlighted when a new technology is deployed and is seen to be a high risk by users (Imet *al.* 2008). In contrast it was found that the usefulness of technology needs to be emphasised when technology deployment is seen as low risk by users (Imet *al.*, 2008).

Research conducted on mobile by Wu and Wang (2005) commerce, where more than half (60%) of the respondents had online transaction experience, indicated that risk

perception has a positive influence around behavioural intention regarding the utilisation of products. The study by Wu and Wang (2005) fails to clearly explain the reason for these results; it rather assumes that the respondents might have been aware of the existing risk of mobile commerce.

It was identified from research conducted by Tan and Teo (2000) that perceived risk is a major factor that impacts internet banking adoption. These results were applied in the cell phone banking environment by Brown *et al.* (2003) and it was established that perceived risk is indeed a critical factor that affects the adoption of cell phone banking, even though perceived risk was used a single attribute. In terms of this research all risk factors will be focused on as preceding occurrences of perceived risk. The proposition as indicated in the literature review is that social risk, financial risk, security risk, performance risk and time risk would probably result in a negative impact on cell phone banking adoption.

## **2.8 Perceived cost**

The degree to which an individual views that utilising cell phone banking will incur cost is defined as perceived cost (Luarn& Lin 2005). These costs could typically include the cost of the mobile device, network charges, transaction charges for bank costs as well as costs for data sent via the network infrastructure. The factor that had the least impact on cell phone banking acceptance in comparison to other attributes which included perceived usefulness, perceived risk and compatibility, was perceived cost (Wu and Wang, 2005).

A qualitative study was performed on the same attributes which suggested that perceived cost is usually a significant factor when there is an initial introduction of technology (Wu & Wang, 2005). However, this could be explained by the fact that the respondents in the analysis by Wu and Wang (2005) was done with people who had earning levels that was relatively high and not at the lower end of the income scale. This income value was estimated to be around US\$650 per month. This level of income can be seen as having a reasonable financial status and imply that people could obtain adequate money to utilise cell phone banking (Wu & Wang, 2005).

In contrast to this, lower income groups are more price sensitive and have a lower income at their disposal (Wolverton, 2002). In developing economies the main focus of the poor is on basic necessities such as household items and food. Expenses on other items are considered a luxury and therefore spending on information technology goods will be much lower. In this context of lower income groups it should be noted that perceived costs would be a major factor that influences cell phone banking adoption. As perceived cost is one of the attributes used in this research it is likely that the perceptions of cost around cell phone banking would not have a positive impact on adoption.

## **2.9 Trust in mobile banking**

A major factor that would impact the success of cell phone banking is customer trust. When considering the increase in mobile commerce (m-commerce) and electronic commerce (e-commerce), many research studies have been done on the theory and concepts around these initiatives. This has also included the approach towards trust and consumer perception of how new technologies and services operate (Bhattacharjee, 2002; Kim, Shin & Lee, 2009; Luo, Zhang and Shim, 2010). It was found in a study done by Kim *et al.* (2009) that issues regarding trust can be seen as an emotional trait that when looking at the adoption of cell phone banking and analysing the effects of trust. In addition trust was illustrated as having a sense of willingness and security and depending on something or someone (Luo, Zhang and Shim, 2010).

Furthermore a comparison was made between experience and trust by Kim *et al.* (2009) and their study looked at the initial level of trust when consumers would have less probability of have experience and dealing with services regarding cell phone banking utilisation. Two primary domains were determined from the Siau and Shen (2003) study and this included trust of cell phone banking service providers and trust of technology.

A study by Lee and Kim (2007) supported this with their focal point on specific categories of trust. This included infrastructure, the cell phone service provider and banks. Research conducted by Bhattacharjee (2002) indicated the three aspects of

trust relating to how consumers viewed dealing with a service provider in the e-commerce sector. These three elements entailed benevolence, ability and integrity and was defined as follows:

- Benevolence is related to the way in which a service provider demonstrates how they appeal to a consumer and how they would see the customers view. The actions by the service provider would therefore be sincere in resolving consumer issues and their intentions would be customer satisfaction over profit margins.
- Integrity would include having fair practices, being honest and complying with sale conditions.
- Ability would relate to how consumers perceived the competence and know how of the service provider in delivering the services and meeting customer needs.

The three categories of trust from Bhattacharjee (2002) will be used for this research. These include integrity, trust and ability and will be used in conjunction with elements of trust in wireless infrastructure, trust in the mobile service provider and trust in the bank (Siau & Shen, 2003; Lee *et al.*, 2007). The trust element is extremely important and in the cell phone banking environment indicates the willingness of a user to conduct transactions with a service provider (Bhattacharjee, 2002). An increase in the trust level between consumers and service providers will result in definitive intent on the consumer side to start conducting transactions via cell phone banking.

The trust effect was confirmed by a study conducted by Gu, Lee and Suh (2009) and looked at behaviour and intent relating to cell phone banking viewing trust in light of how it is perceived by banks. The outcome of the study reflected that potential risk and fraudulent activity is reduced by the behaviour of opportunists and provides an incentive for consumers for obtaining dependable and trustworthy services from banks (Guet *al.*, 2009).

In order to gain a better perspective on customer trust on cell phone banking adoption, concepts of customer and brand loyalty is also introduced in this study. Brand loyalty can be explained as recurring acquisition of a specific product, service or brand Lin and Wang (2006). It can further be illustrated as positive attitude displayed for a

particular mobile service provider which could result in repetitive buying patterns and actions (Lin & Wang, 2006). Loyalty demonstrated by consumers will be used for this study and it is imperative to note that customer trust should first be earned before trying to achieve customer loyalty (Siau & Shen, 2003).

It was indicated that trust is directly and completely linked with a customer's loyalty in terms on online banking services (Harris and Goode, 2004). As mobile banking can be seen as an extension of internet banking it is seen as part of online services (Brown *et al.*, 2003). Therefore the trust displayed by a customer in cell phone banking would probably have a positive influence on cell phone banking adoption.

## **3 CHAPTER 3: RESEARCH METHODOLOGY**

The primary purpose of this research was to identify the factors that influenced the adoption of cell phone banking in South Africa. In this chapter, the chosen research methodology to address the research problem is described. This section of the document describes the approach and process for this study.

### **3.1 METHODOLOGY**

A mixed methods approach will be utilised for this research project. Mixed methods is a combination of qualitative and quantitative research techniques. During this research both qualitative and quantitative research methods are required at different phases of the research. The benefit for this research is that the quantitative analysis can be followed up with a qualitative view in order to obtain a more comprehensive perspective on the research question.

A quantitative approach is where a researcher utilises “postpositivist claims” for developing knowledge. This includes reduction of information about the research question to specific variables as well as investigating cause and effect (Creswell, 2003). This approach also consists of inquiry methods such as surveys and data collection performed using predetermined techniques. A quantitative approach is best suited for a scenario where a problem involves identifying factors that impact an outcome (Creswell, 2003). Therefore a quantitative approach will be used for this research since it involves identifying factors that influence the adoption of mobile banking in South Africa.

Qualitative research is commonly referred to as research which extensively utilises description, concepts and/or theories to investigate the nature of and the relationship between variables (Rusli & Ali, 2003). This research method is utilised when there is a need to understand how issues or factors are related and to obtain in depth details to answer research objectives (Catterall, 1998). Qualitative research is suitable for this research in order to shed light on the responses from the survey participants and from the regulator, in order to provide an understanding of the research area which explains the reasons for a particular trend (survey participants) or approach

(regulator). Feedback will be obtained from the financial regulator (South African Reserve Bank) to understand what possible factors would foster development of mobile banking which would also offer a guide to future regulatory recommendations.

The quantitative component of the research is defined as descriptive as the hypotheses were developed from the literature review with the objective that this would clarify the adoption factors for cell phone banking in South Africa (Leedy & Ormrod, 2005). This kind of research entails describing the traits of a specific group or individual and is utilized when trying to understand the form, size or existence of a characteristic (Cooper & Schindler, 1998).

Using a survey as a research method consists of data collection from a population sample by using a questionnaire (Zikmund, 1987). Taking into account the context of this study, this method is applicable to assist in understanding the factors in the present environment when information needs to be obtained from respondents in various locations (Leedy & Ormrod, 2005). In order to obtain a representative sample of the population that uses walk-in retail banking services, surveys will be used by means of self-administered questionnaires at a selection of banks in the Pretoria area. The main advantage of using questionnaires is the fact that respondents can be certain of their confidentiality and therefore are more likely to answer questions truthfully (Leedy & Ormrod, 2005). In addition the use of surveys are also accurate, inexpensive and efficient (Zikmund, 1987).

For this study, 150 self-administered questionnaires will be distributed to four bank branches in Pretoria, Gauteng. Due to the restricted time available and cost implications this survey will be limited to the Pretoria region only. Discussions will be held with the respective branch managers to outline the purpose of this research and how the questionnaires will need to be completed. Approval will be obtained from the bank manager to ensure confidentiality is maintained during the process. In addition personnel at the chosen bank branches will be informed and prepared on what is required to complete the questionnaires. A cover letter will be drafted indicating the purpose of the study and assuring management of the bank about the confidentiality of the information that will be obtained. It should be noted that the profile of the respondents from the targeted banks may vary from customers at smaller banks due

to income levels and the type of banking services utilised. Stratified sampling will be used, however it is not a simple task due to the variances in sample data, according to Zikmund (1987). Therefore, an approximate sample size of 150 will be adopted in accordance with previous studies conducted in the area of technology adoption (Al-Ashban& Burney 2001; Brown et al. 2003; Chau& Lai 2003). The survey population will include any person who holds at least one bank account. A pilot test will be conducted before the questionnaires are distributed to ensure that the questions are clear.

In this research the Technology Acceptance Model (TAM) developed by Davis (1989) will be incorporated to examine the adoption factors that affect cell phone banking usage. This model outlines the factors that affect a user's intention and attitude in adopting technology. Many studies have utilised the TAM (Davis, 1989; Mathieson, 1991; Taylor & Todd, 1995) and it has been established that this model better explains user attitudes regarding technology than other models. The main advantage highlighted by these studies have indicated that the TAM clearly and consistently outlines the difference in user behaviour and intention. In addition the most significant difference between the TAM and other models is that social variables, which could influence user behaviour, are excluded.

The following hypotheses will be used to gain an understanding of the research problem:

1. Cell phone banking is more likely to be adopted the lower the perceived complexity of using cell phone banking services.
2. Cell phone banking is more likely to be adopted the higher the perceived value of using cell phone banking services.
3. Cell phone banking is more likely to be adopted the lower the perceived risk of using cell phone banking services.
4. Cell phone banking is more likely to be adopted the greater the trialability.
5. Cell phone banking is more likely to be adopted the greater the credibility of cell phone banking services.

## 3.2 Research Design

Zikmund (1987) defines a survey as a research technique that is used to collect data from a sample population by means of a questionnaire. Given the context of this study, this instrument is apt as it assists in understanding the phenomena that is occurring in the present situation and is useful when a researcher is trying to obtain information from respondents from various geographic locations (Leedy and Ormrod 2005). The reason for using a survey is to obtain a representative sample of the South African population which are located in different physical locations. The chosen method for the survey was self-administered.

Self-administered can comprise of the different ways the questionnaire is completed i.e. via postage, email, web, etc (Zikmund 1987). For this study, the questionnaire was distributed via bank branches. The banks chosen for this study were briefed on the purpose of the study and they were provided with a defined number of questionnaires. Most of the questionnaires were completed by those customers entering and leaving banks branches. The reason for not using postage of surveys was due to the high non-response rate and long time to receive the results (Zikmund 1987). To improve the response rate, incentives could have been offered, but this would have been costly and does not guarantee responses (Zikmund 1987).

Conducting the survey over the web, would exclude a large segment i.e. users who do not have access to the Internet. For the purpose of this study, it was intended to capture the opinions of respondents who have no access to the Internet as their adoption criteria for Cell phone Banking could be different as noted in the Brown and Alemayehu (2005) study where the perception between these groups of users were markedly different. An advantage of using questionnaires is that respondents can be assured of confidentiality and thus are more likely to be truthful in their responses (Leedy and Ormrod 2005). Surveys are also efficient, inexpensive, accurate and quick (Zikmund 1987).

According to Leedy and Ormrod (2005), a disadvantage of survey questionnaires is that the response rate is usually poor and the data can be biased based on the participants' levels of comprehension and understanding. Another disadvantage is

that surveys are not able to provide a deeper understanding of respondents' opinions which cannot be clarified (Cooper and Schindler 1998).

### **3.3 The research instrument**

The research instrument chosen for this study was a questionnaire with four sections, namely:

Section A (Cell phone Usage and Technology)

This section was aimed at gathering information about cell phone usage and to assess the respondents' understanding of cell phone technologies such as WAP, SMS, and USSD. It also measures the cell phone experience by aggregating the uses that the respondents utilise a cell phone for;

Section B (General Banking)

This section was aimed at gauging what banking electronic channels the respondent used and if they had used cell phone banking or not. It also tried to understand if the respondent would be keen on using cell phone banking to perform a transaction;

Section C (Cell phone Banking Adoption Factors)

This section addressed the factors proposed from the literature review that influenced the adoption of cell phone banking. The questions were used to gauge whether the identified factor was an influencing factor that led to adoption of Cell phone Banking or not. A five-point Likert scale was used to measure the response of the respondent. A Likert scale is used for respondents to indicate their attitudes towards a constructed statement (Zikmund 1987). An option of 'Don't know' was added to ensure that if the question was not understood, then this option would be chosen.

Sections D (Demographic Profile)

Information about the respondents were collected including the following: age group, gender, education and income.

The advantage of using a survey questionnaire for this context of study is that the researcher can ask close-ended questions which are related to the underlying factors under investigation (Zikmund 1987). The questions are structured such that personal questions e.g. age, income, etc are asked towards the end of the questionnaire and a brief description of the study is provided noting the confidentiality of the survey and purpose of the survey (Kalof, Dan and Dietz2007).

### **3.4 Procedure for data collection**

The data collection occurred via a survey questionnaire shown in Appendix A. Survey collection can occur via mail, over the telephone, in person and on the Internet (Zikmund 1987). For this study, the questionnaire was self-administered i.e. the questionnaire was handed out at the identified bank branches and identified work places. Prior to handing out the questionnaires, permission was sought from the chosen banks and work places to ensure that the people handing out the questionnaire at these areas were informed and prepared on what was required. A cover letter was drafted stating the purpose of the research and assurance of the confidentiality of the survey, as suggested by Kalof et al. (2007). Kalof et al..(2007) suggest that a pilot test be performed before the questionnaire is distributed to the sample. This was performed using two people and the respondents indicated that the questionnaire was clear. The pilot results were included in the sample group.

#### Data Analysis and interpretation

For section A, B and D in the questionnaire, descriptive pie charts and cumulative graphs will be used to describe, analyse and interpret the data collected. The structure of the questionnaire is shown in Appendix A.

#### Limitations of the study

- One of the major limitations of this research was the lack of previous studies in South Africa around the adoption factors for cell phone banking,
- A further limitation was that the opinion of un-banked people was not factored into this study and the factors identified would be predominantly from users who had existing bank accounts.

### **3.5 Population and sample**

#### ***Population***

For the purpose of this study, the population was defined as any person who held at least one bank account within the borders of South Africa. The possible respondents could be any person who holds a bank account.

#### **Analysis**

For this research, a factor analysis will be adopted (Kim and Mueller 1978), as the literature review identified certain key factors that could possibly affect the adoption of Cell phone Banking. Previous studies on adoption of electronic banking channels have adopted a factor analysis approach, (Chau and Lai 2003; Suoranta 2003), which suggests that for this study, this method would be applicable. For the context of this research, previous factors identified from studies conducted on technology adoption, suggested that this method was applicable and would provide a context for the South African environment.

#### ***Sample and sampling method***

For the purposes of this study, an estimated sampled of 150 was required. The self-administered questionnaire was distributed to customers at bank branches located in near branches where the income of respondents was likely to be high and low. The profile of the respondents is shown below:

FNB	38
ABSA	38
Standard Bank	38
Nedbank	38

## 4 CHAPTER 4: PRESENTATION OF RESULTS

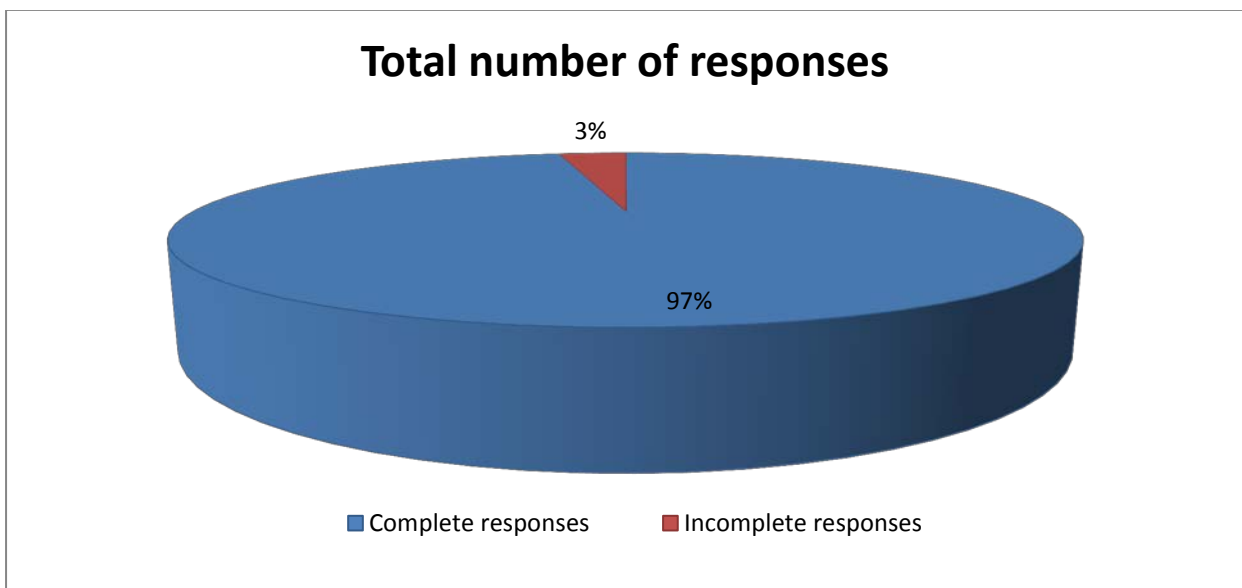
### 4.1 Introduction

The purpose of this chapter is to present the results obtained from the survey questionnaires that were administered. The first part of the chapter discusses the number of respondents obtained as compared to the required sample, as indicated in Chapter 3. The second part is the presentation of the data obtained in part A, B and D of the survey questionnaire. Finally, the output of the factor analysis via Number Cruncher Statistical System (NCSS) is described and some important data outputs are shown.

### 4.2 Sample Size

The sample size as discussed in Chapter 3 was estimated at 150 respondents. A total of 152 responses were completed during the survey that was administered. The survey questionnaire resulted with 147 (97%) complete responses being received and 5 (3%) incomplete responses which were discarded as they had missing information. The percentage (%) distribution is shown in Figure 6 below. Thus, 147 complete responses were used in the data analysis which was approximately what sample size was required.

**Figure 6: Survey Response Output**

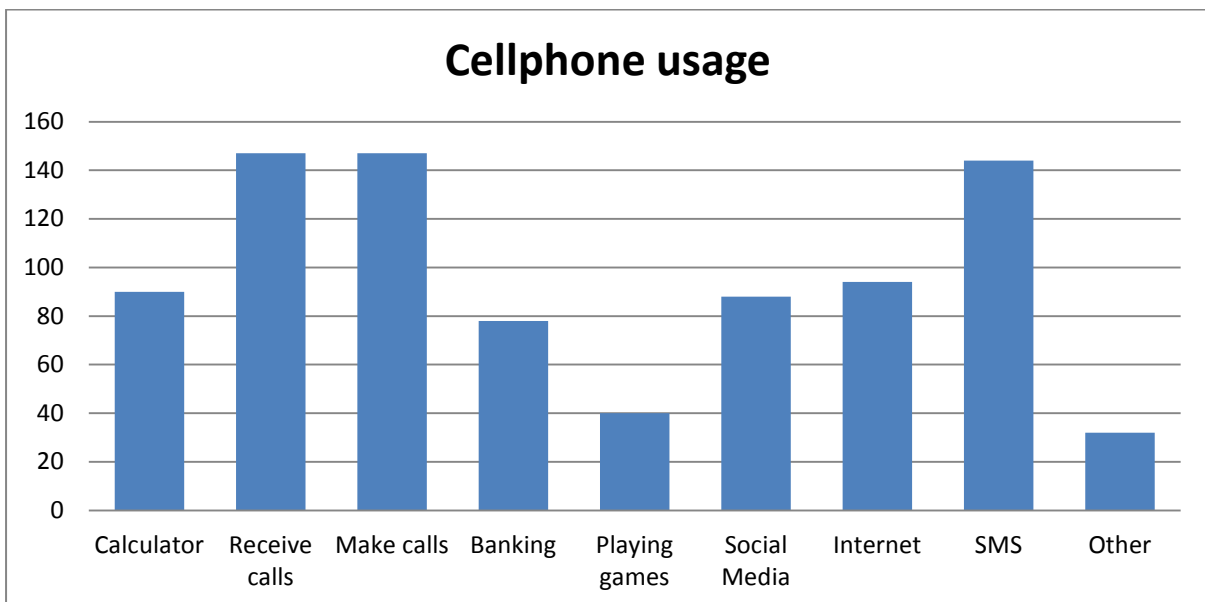


## 4.3 Cell phone Usage and Technology Understanding

### 4.3.1 Cell phone Usage

From the surveyed sample of 147, all respondents used their cell phones for making and receiving calls as depicted in figure 7 below. Accessing the Internet, send short text messages (sms) and using a calculator on the cell phone was also popular amongst the sample. Banking, playing games and other uses were less popular functions.

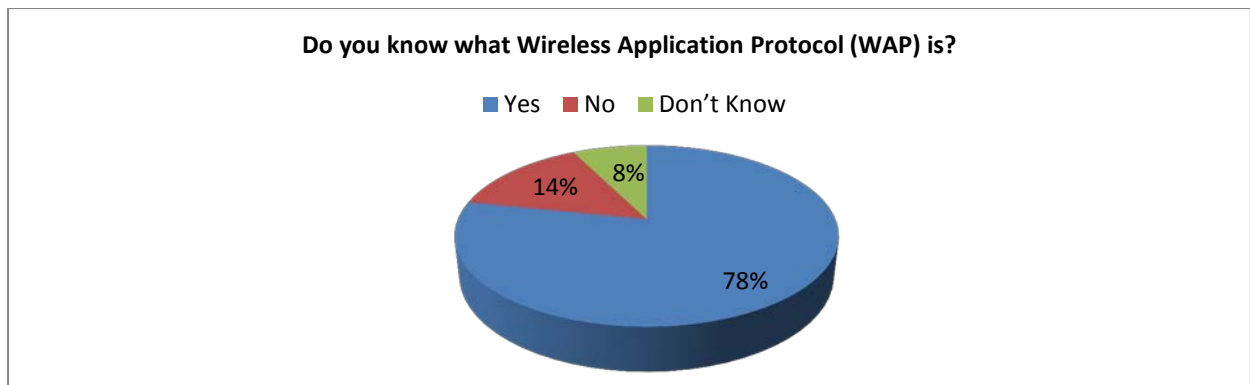
Figure 7: Cell phone usage



### 4.3.2 Wireless Application Protocol (WAP) knowledge

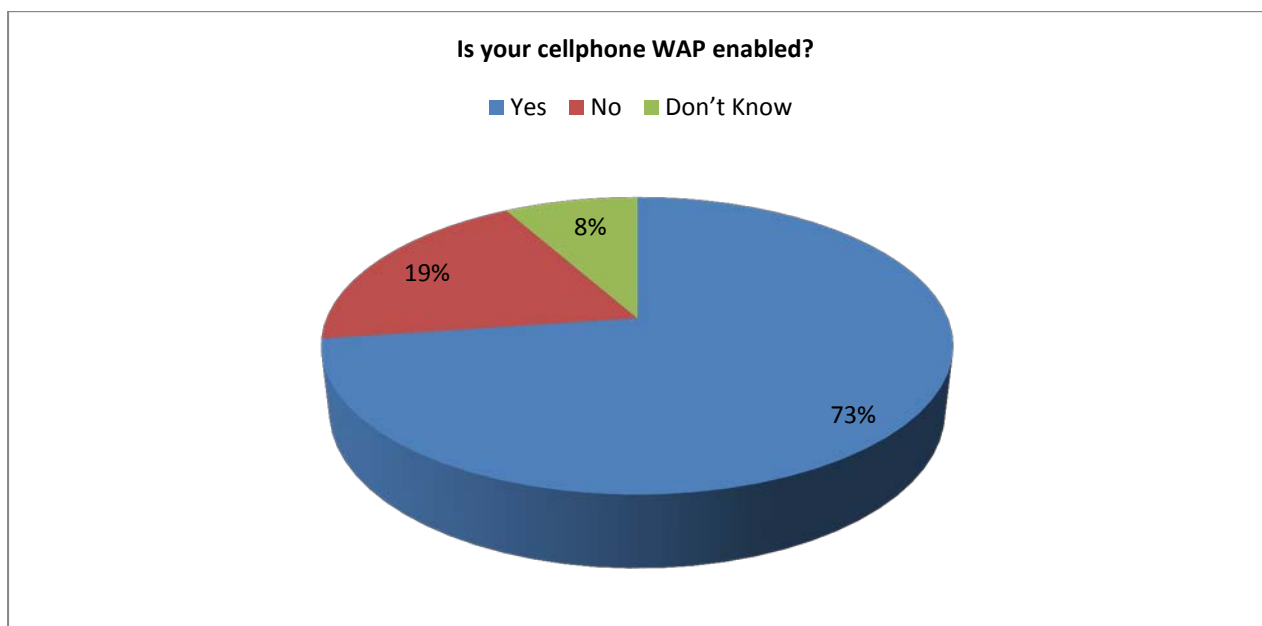
From the 147 respondents, 115 (78%) indicated they knew what WAP was, 21 (14%) said no and 11 (8%) said they don't know, shown in Figure 8 below.

**Figure 8: WAP knowledge**



From the 147 respondents, 107 (74%) indicated that their cell phone was WAP enabled. This corresponds to the previous question, where the majority of the sample knew what WAP was. 12 (8%) respondents did not know whether their cell phone was WAP-enabled and 28 (19%) indicated that their cell phone was not WAP-enabled, as shown in Figure 9.

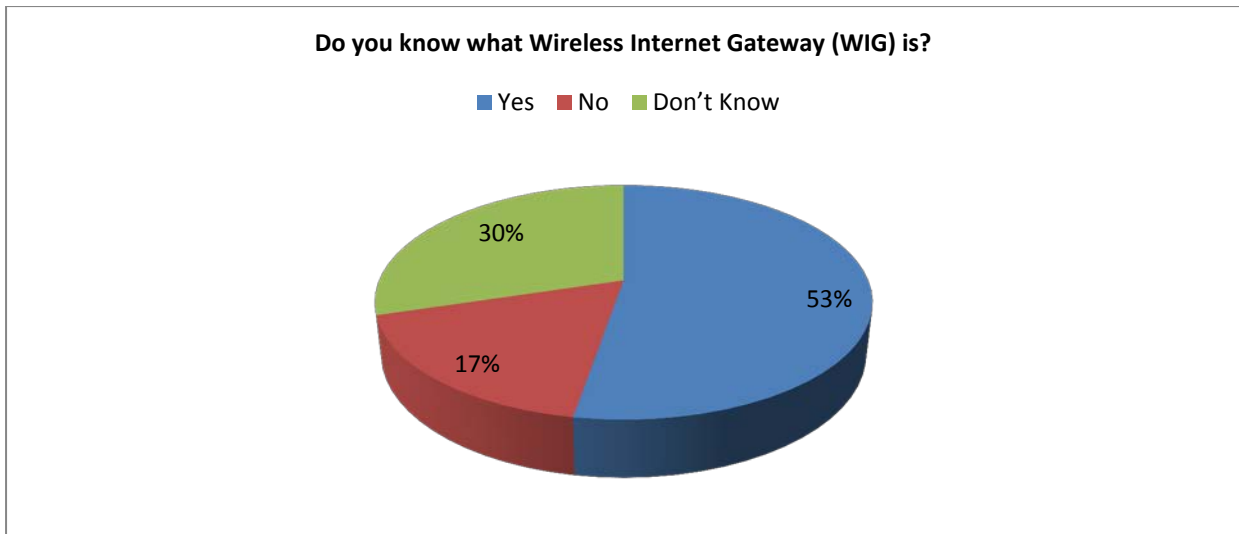
**Figure 9: WAP enabled cell phones**



#### **4.3.3 Wireless Internet Gateway (WIG) knowledge**

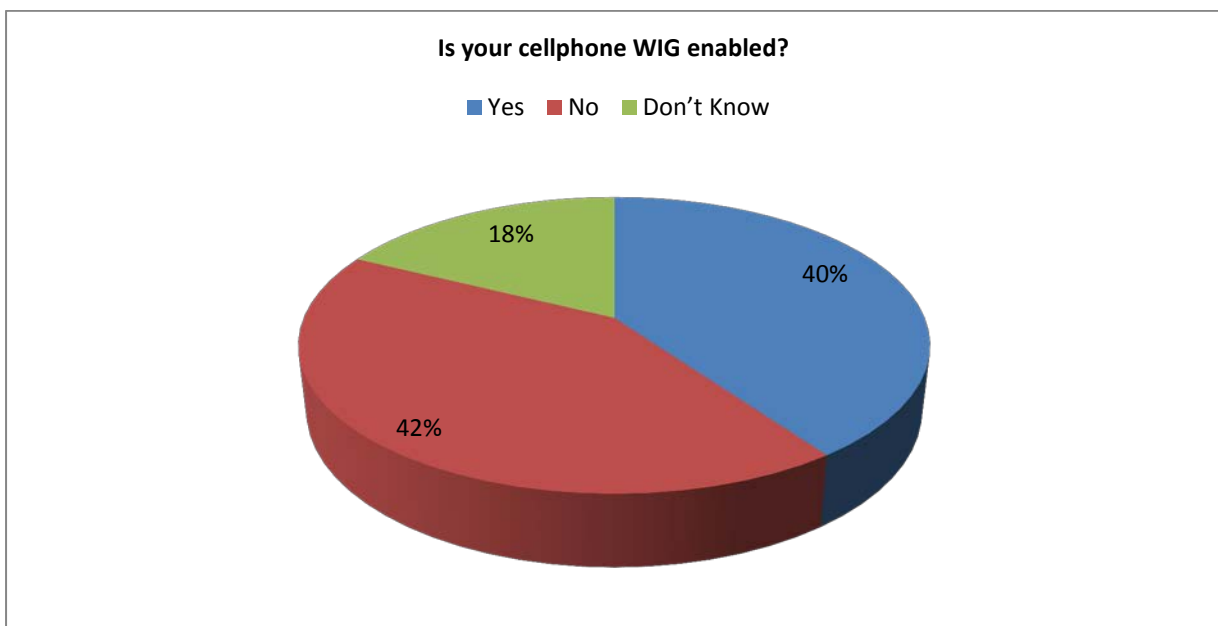
From the 147 respondents, 78 (53%) indicated they knew what WIG was, 25 (17%) said no and 44 (30%) said they don't know, as shown in Figure 10.

**Figure 10: WIG knowledge**



From the 147 respondents, 59 (40%) indicated that their cell phone was WIG-enabled, 26 (18%) did not know whether their cell phone was WIG-enabled and 62(42%) indicated that their cell phone was not WIG-enabled, as shown in Figure 11.

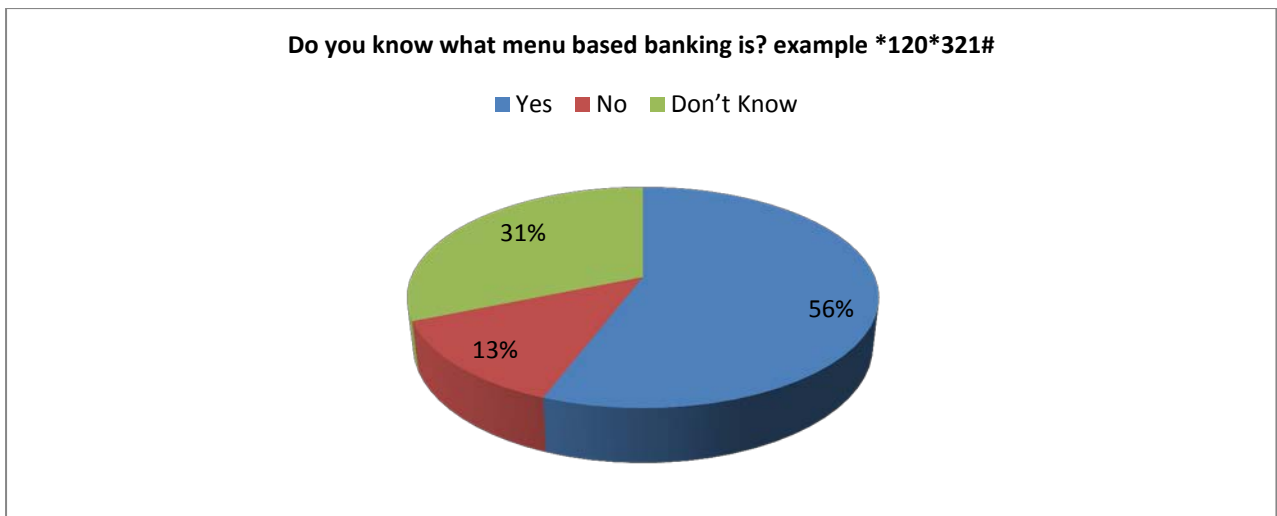
**Figure 11: WIG-enabled Cell phones**



#### **4.3.4 Menu Based Banking knowledge**

From the 147 respondents, 82 (56%) indicated they knew what Menu Based Banking was, 19(13%) said no and 46 (31%) said they don't know, as shown in Figure 12.

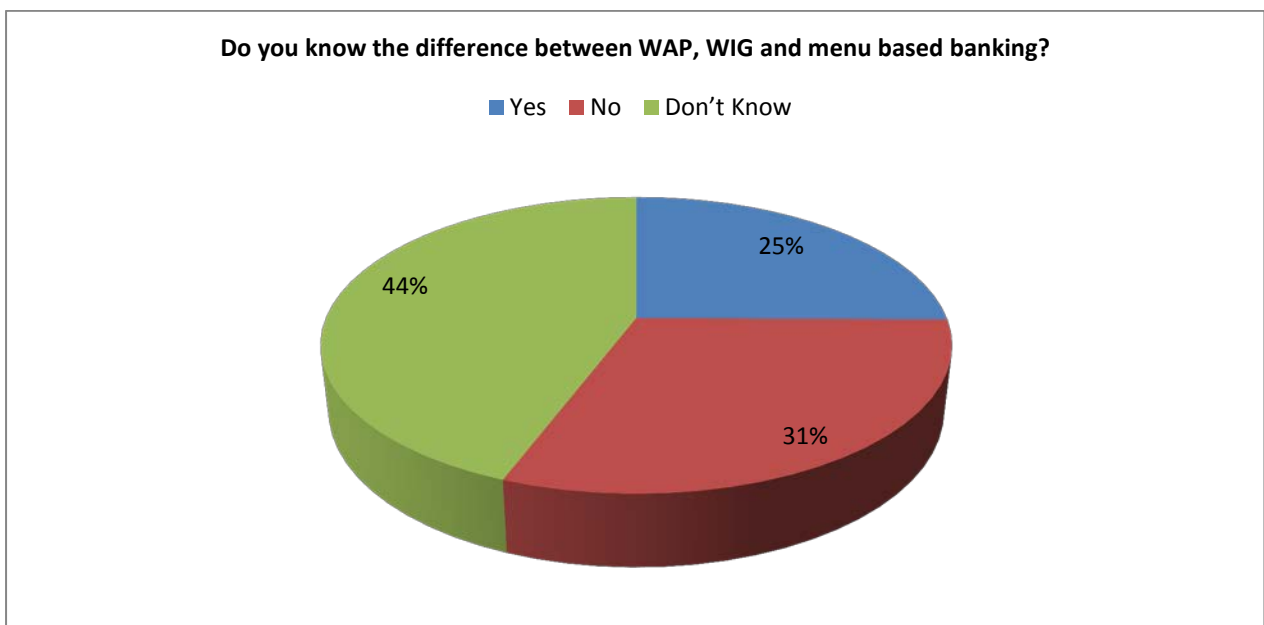
**Figure 12: Menu Based Banking knowledge**



#### **4.3.5 Cell phone Banking Technology**

Comparing the respondents' knowledge amongst the different technologies used for Cell phone Banking showed that a quarter of respondents, which adds up to 37 (25%) knew what the difference was between the three types of cell phone banking technologies. 65 (44%) indicated they did not know the difference and 45 (31%) said no, as shown in Figure 13 below.

**Figure 13: Technology knowledge**



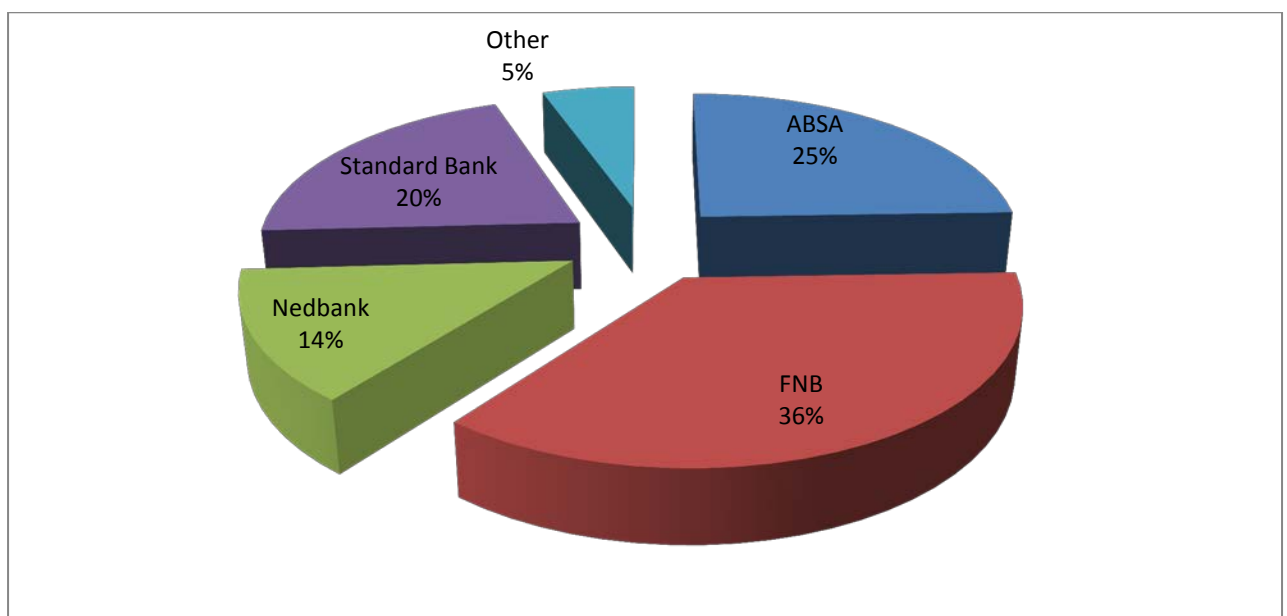
The results of this section suggest that the South African person used their cell phone for basic needs e.g. calling, receiving calls and sending SMSs. Accessing the Internet and using the calculator was also prominent while banking was not yet fully adopted i.e. of the 147 respondents approximately 78 (53%) said they used their cell phone for banking. In terms of technology understanding, WAP was the best known technology followed by Menu Based Banking and WIG. The results also indicated that the difference between these technologies was not known well amongst the sample. Overall the cell phone was not adopted full in terms of cell phone banking but in terms of the uses it was designed for e.g. making call, receiving calls, sending SMS's, it was fully utilised.

## 4.4 General Banking

### 4.4.1 Respondents' Banking Profile

From the 147 respondents, 20% (29) of them indicated they had a Standard Bank account, followed by FNB at 36% (53), Absa at 25% (37), Nedbank at 14% (21) and 5% (7) indicated they banked elsewhere, as shown in Figure 14.

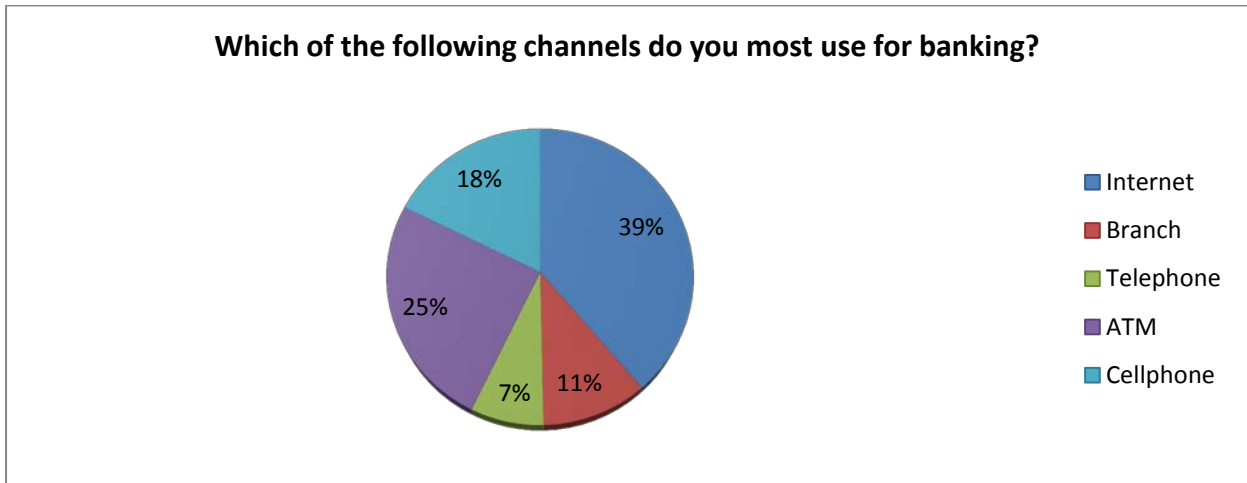
**Figure 14: Bank profile of sample group**



#### 4.4.2 Banking Channel Preferences

The sample group of 147 indicated which banking channels they frequently used, shown in Figure 15 below.

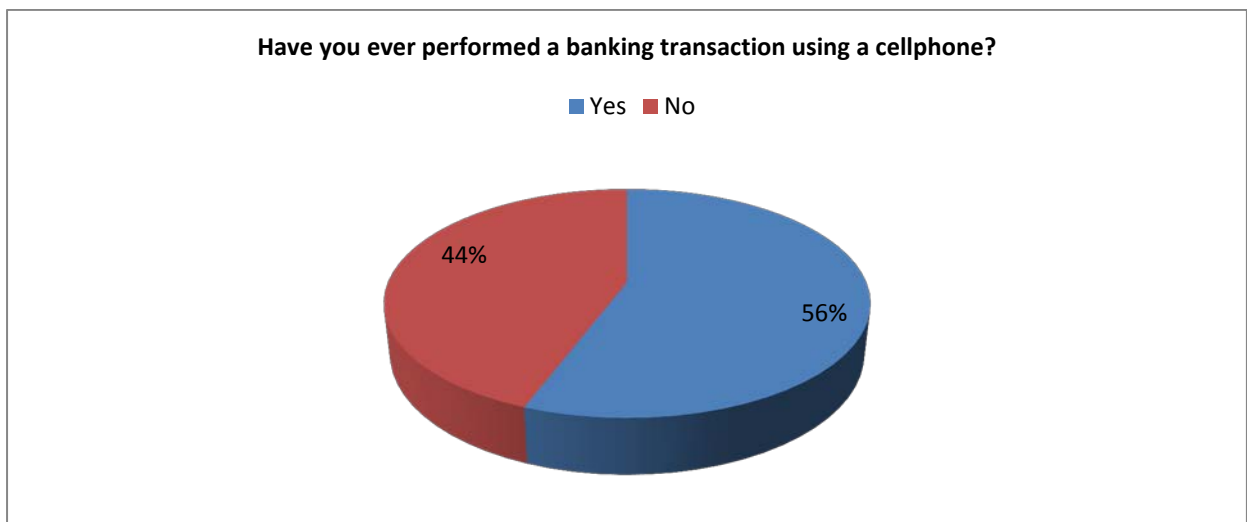
**Figure 15: Banking channel usage of sample group**



#### 4.4.3 Cell phone Banking channel usage

The Internet and ATM channel were the most frequent channels used for banking at 39% and 25% respectively. Cell phone banking had an 18% usage frequency followed by branch banking at 11%. Telephone Banking was the least utilised banking channel at 7% usage.

**Figure 16: Cell phone Banking usage of sample group**



From the 147 respondents, 82 (56%) indicated they had used a cell phone to perform a banking transaction, 65 (44%) indicated no.

**Figure 17: Response distribution to whether a respondent would use Cell Phone Banking**

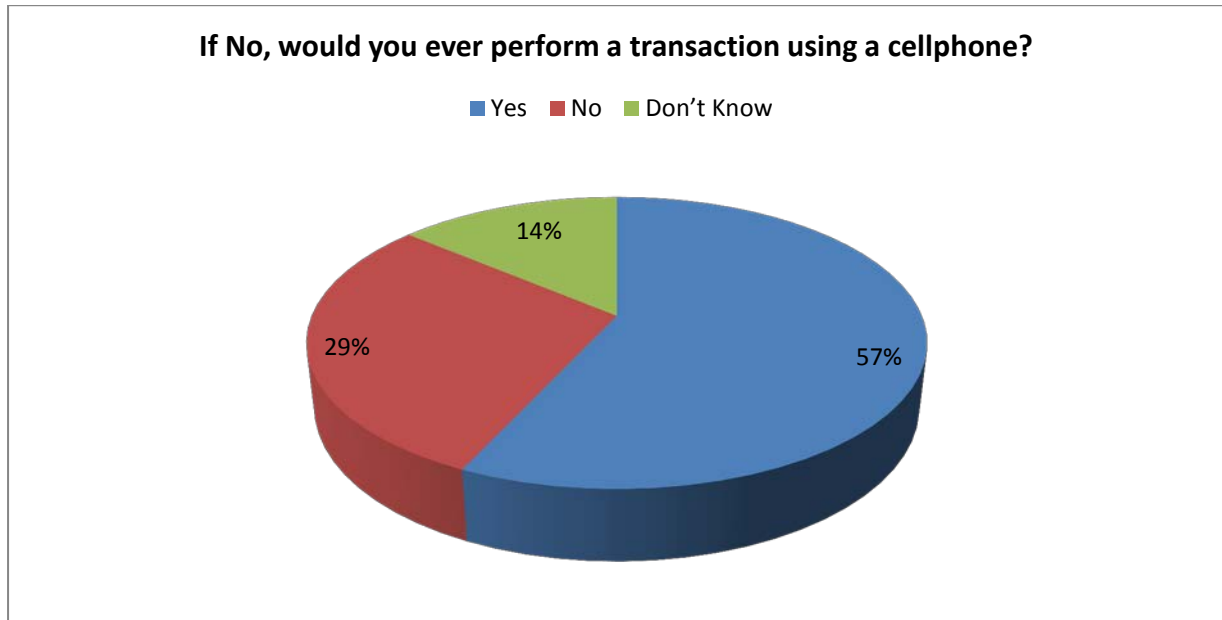


Figure 17 above shows the responses for those people of the sample (65 people) who indicated no to whether they have used cell phone banking to perform a banking transaction. Of this sample, 37 (57%) indicated that they would use cell phone banking to perform a transaction, 19 (29%) said no and 9 (14%) said they don't know.

#### **4.4.4 Conclusion of General Banking characteristics and preference towards Cell phone Banking**

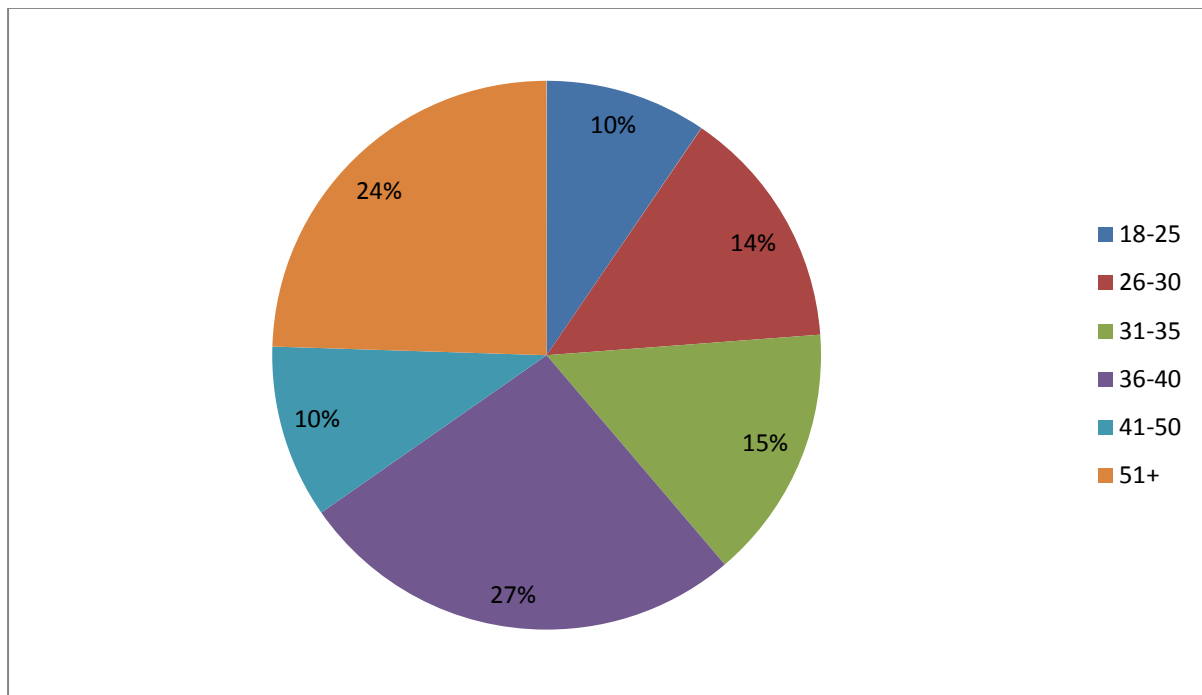
The distribution of banks used by the sample group are consistent with the market share of the big four banks, with the exception of Absa, which is the largest retail banking group in South Africa. This could be due to people from the sample who held more than one account with the different banks.

In terms of channel usage, the expected channels of frequent usage were expected i.e. Internet and Automated Teller Machine (ATM) were the biggest channels followed by cell phone banking, Branch and Telephone Banking. Almost of the surveys were

administered via branches, one would have expected this channel to be the most frequent channel however, this channel is probably used when a customer cannot perform their desired transaction(s) via electronic banking.

Approximately 44% of the sample did not transact using cell phone banking and 57% of this group said that they would perform a banking transaction using their cell phone. This figure indicates that there are possible factors that are contributing to the slow adoption of cell phone banking in South Africa.

**Figure 18: Survey Age Group Range**



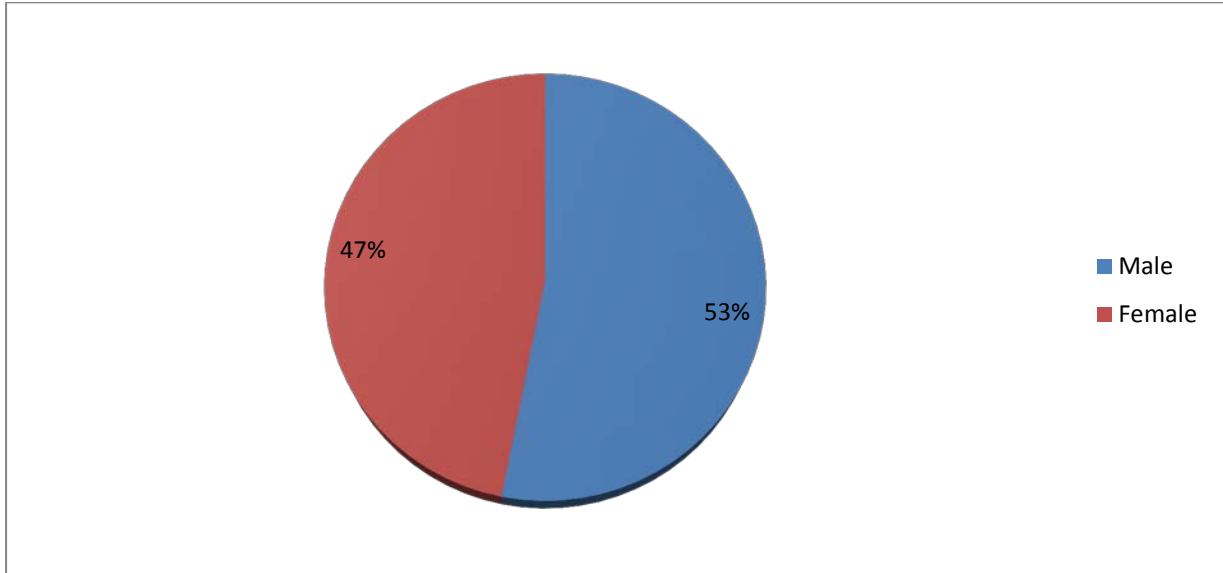
## 4.5 Demographic

### 4.5.1 Age profile

From the 147 respondents, 40(27%) respondents were in the age group 36 to 40, 35(24%) in the age greater than 51, 22 (15%) between 31-35, 20(14%) between the age of 26-30, 15 (10%) between the age of 41 to 50 and 15(10%) between the age 18-25.

#### 4.5.2 Gender Profile

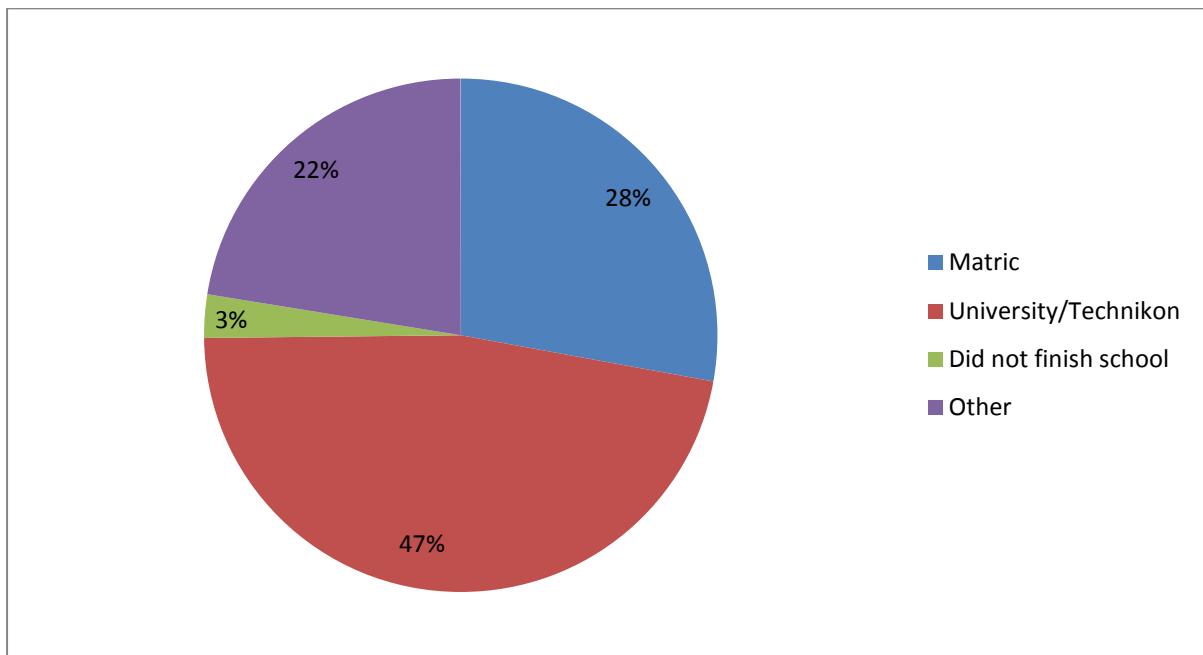
Figure 19: Gender distribution of sample group



The sample of 147 comprised of 78(53%) males and 69(47%) females.

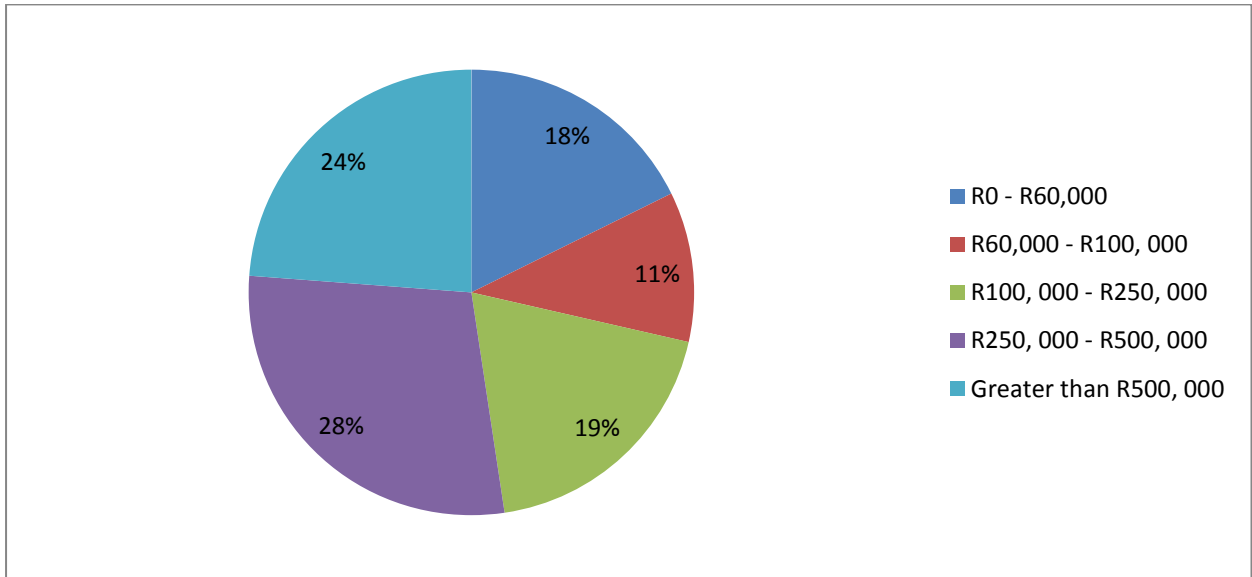
#### 4.5.3 Educational Profile

Figure 20: Education profile of sample group



From the 147 respondents, 69 (47%) had a University or Technikon. This was followed by 41 (28%) who only had a Matric qualification, 4 (3%) who did not finish school and 33 (22%) who specified other.

**Figure 21: Income Range**



#### **4.5.4 Income profile**

From the 147 respondents, 35 (24%) earned an income per annum greater than R500,000. 41 (28%) of the respondents earned between R250,000 and R500,000, 28 (19%) earned an income between R100,000 – R250,000, 16 (11%) people earned between R60,000 and R100,000 and 27 (18%) between R0 and R60,000 per annum.

#### **4.5.5 Conclusion of Demographic Profiling**

The results of the sample demographics suggest that the South African person that is more likely to adopt cell phone banking has the following demographic characteristics (shown in Table 1 below):

**Table 1: Cell phone user demographics**

Respondents who indicated that they would perform a transaction using cell phone banking	
Male	48
Female	34
R0 – R60,000	10
R60,000 – R100,000	9
R100,000 – R250,000	11
R250,000 – R500,000	24
Greater than R500,000	28
18-25	14
26-30	12
31-35	18
36-40	24
41-50	8
51+	6
Did not finish school	1
Matric	23
University or Technikon	52
Other	6

- Is either male or female,
- earns an income greater than R100,000 per annum,
- would be between the ages of 18 to 35 and
- would have at least a Matric qualification.

## 4.6 Factors that affect the adoption of Cell phone Banking

### 4.6.1 Item Analysis for each factor

The results of the item analysis was conducted for each factor using the software package NCSS 2007, output shown in Table 2 below. Four out of the five factors had an alpha value greater than 0.82 with trialability, complexity, perceived value and perceived risk having values of 0.91, 0.95, 0.84 and 0.92 respectively. The perceived credibility factor had an alpha value of 0.56 which was the lowest result observed.

**Table 2: Item analysis output**

Reliability Section							
	Item Values	If This Item is Omitted			R2		
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
T1	3.738562	1.128409	7.633987	2.089295	0.8559	0.8605	0.7613
T2	3.79085	1.127722	7.581699	2.09201	0.8582	0.8578	0.7584
T3	3.843137	1.106902	7.529412	2.173582	0.9226	0.7785	0.6061
Total			11.37255	3.113811	0.9167		
<b>Cronbach's Alpha 0.916713      Std. Cronbachs Alpha 0.916552</b>							
Reliability Section							
	Item Values	If This Item is Omitted			R2		
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
C1	2.738562	1.3415	5.601307	2.686075	0.9223	0.9367	0.8775
C2	2.620915	1.418888	5.718954	2.641913	0.9472	0.9033	0.8283
C3	2.980392	1.369165	5.359477	2.694083	0.9493	0.8991	0.8194
Total			8.339869	3.970555	0.9589		
<b>Cronbach's Alpha 0.958861      Std. Cronbachs Alpha 0.959283</b>							
Reliability Section							
	Item Values	If This Item is Omitted			R2		
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
PV1	3.921569	1.20049	12.66013	2.803108	0.8253	0.6372	0.4155
PV2	4.06536	1.228356	12.51634	2.80766	0.8404	0.6082	0.3917
PV3	4.281046	0.9831309	12.30065	2.842546	0.7558	0.8124	0.7522
PV4	4.313725	1.028991	12.26797	2.886006	0.7947	0.707	0.6885
Total			16.5817	3.686059	0.8451		
<b>Cronbach's Alpha 0.845083      Std. Cronbachs Alpha 0.853987</b>							
Reliability Section							
	Item Values	If This Item is Omitted			R2		
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
PC1	4.098039	1.024468	8.594771	1.737504	0.784	0.1592	0.0456
PC2	4.352941	0.8619942	8.339869	1.531096	0.1726	0.5864	0.4524
PC3	4.24183	1.045203	8.45098	1.468714	0.338	0.4513	0.4331
Total			12.69281	2.152969	0.5664		
<b>Cronbach's Alpha 0.566393      Std. Cronbachs Alpha 0.584481</b>							
Reliability Section							
	Item Values	If This Item is Omitted			R2		
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
PR1	3.48366	1.298301	7.535948	2.359266	0.8729	0.8771	0.777
PR2	3.692811	1.226254	7.326797	2.443655	0.8885	0.8592	0.7534
PR3	3.843137	1.277939	7.176471	2.430934	0.9206	0.8179	0.6705
Total			11.01961	3.553113	0.927		
<b>Cronbach's Alpha 0.927023      Std. Cronbachs Alpha 0.927310</b>							

#### 4.6.2 Factor analysis

The confirmatory analysis was conducted using the data obtained from the survey questionnaire and importing this into NCSS 2007. The parameters used for the factor analysis are shown in Appendix B. The number of factors chosen was five, as this was the number of factors that were proposed that could affect the adoption of Cell phone Banking in South Africa. Varimax rotation was used as this was the most popular orthogonal rotation technique. The axes were rotated to maximize the sum of the variances of the squared loadings within each column of the loadings matrix which simplified the interpretation of the factors.

#### 4.6.3 Scree Plot and Eigen values

Table 3 below contains the scree plot and eigen value for the 5 factors obtained after Varimax rotation for the factor analysis. The results showed that the five factors proposed are the only factors that need to be considered for this study i.e. the eigen value > 1.0. The cumulative percentage for the eigen values indicated that these factors explained the analysis by 99.72%.

**Table 3: Scree Plot with Eigenvalues**

<b>Eigenvalues after Varimax Rotation</b>				
<b>No.</b>	<b>Eigenvalue</b>	<b>Individual Percent</b>	<b>Cumulative Percent</b>	<b>Scree Plot</b>
1	2.992744	22.22	22.22	
2	2.989597	22.2	44.42	
3	2.839469	21.09	65.51	
4	1.756443	13.04	78.55	
5	2.849995	21.16	99.72	
6	0.246543	1.83	101.55	
7	0.071393	0.53	102.08	
8	0.044806	0.33	102.41	
9	0.034416	0.26	102.67	
10	0.002911	0.02	102.69	
11	-0.008566	-0.06	102.62	
12	-0.01396	-0.1	102.52	
13	-0.030707	-0.23	102.29	
14	-0.045289	-0.34	101.96	
15	-0.07193	-0.53	101.42	
16	-0.191373	-1.42	100	

#### 4.6.4 Factor Loadings

Table 4: bar chart of factor loadings after Varimax rotation.

Bar Chart of Absolute Factor Loadings after Varimax Rotation					
Variables	Factors				
	Factor1	Factor2	Factor3	Factor4	Factor5
T1					
T2					
T3					
C1					
C2					
C3					
PV1					
PV2					
PV3					
PV4					
PC1					
PC2					
PC3					
PR1					
PR2					
PR3					

#### Factor Loadings after Varimax rotation

Table 4 shows the bar chart of factor loadings after Varimax rotation. The factor loadings were obtained from the correlation structure which NCSS calculated. The greater the number of bars an item has in common with one and only one factor, the more probable the item is a valid measure of the factor. Item perceived credibility 1 (PC1) was the only item that was not a reliable item. It was spread out across factors 1 to 4. All the other factor items had a valid measure for the respective factor as shown in Table 4 above.

#### 4.6.5 Factor Communalities

The communalities bar chart and factor loadings shown below in Table 5 and Table 6 respectively shows which items are related to which factors. Basically if the factor loading for each item is greater than 0.4 (the minimum loading set on NCSS – see Appendix B), then it can be concluded that the specific item contributes to that factor.

**Table 5: Communalities after Varimax rotation**

Communalities after Varimax Rotation		Bar Chart of Communalities after Varimax Rotation					
Variables	Factors Communality	Variables	Factor1	Factor2	Factor3	Factor4	Factor5
T1	0.899802	T1					
T2	0.946669	T2					
T3	0.820861	T3					
C1	0.979031	C1					
C2	0.958484	C2					
C3	0.916982	C3					
PV1	0.607315	PV1					
PV2	0.553208	PV2					
PV3	0.909482	PV3					
PV4	0.894979	PV4					
PC1	0.542998	PC1					
PC2	0.859802	PC2					
PC3	0.834223	PC3					
PR1	0.872979	PR1					
PR2	0.94934	PR2					
PR3	0.882093	PR3					

The number of bars on a specific item indicates the level of match or agreement that was obtained from the surveyed data, as shown in Table 5 above.

**Table 6: Factor Loadings**

Factor Loadings after Varimax Rotation					
Variables	Factor1	Factor2	Factor3	Factor4	Factor5
T1	-0.232676	-0.048157	-0.890861	0.013526	0.222551
T2	-0.222482	-0.024928	-0.923792	0.056207	0.199998
T3	-0.196734	0.057106	-0.851092	0.050142	0.228089
C1	-0.118119	0.246018	-0.217522	0.003488	0.925865
C2	-0.079375	0.237473	-0.242346	-0.018977	0.914712
C3	-0.108438	0.2408	-0.235887	-0.020176	0.889488
PV1	-0.708925	0.1855	-0.149024	0.12576	0.179739
PV2	-0.632637	0.220043	-0.288134	0.048937	0.138364
PV3	-0.905962	0.079413	-0.164482	0.232749	0.034382
PV4	-0.895205	0.083574	-0.171474	0.239155	-0.001777
PC1	-0.353609	0.475268	-0.362473	<b>0.229281</b>	0.090122
PC2	-0.216369	0.079066	-0.049594	<b>0.895512</b>	0.048309
PC3	-0.249447	0.063515	-0.045136	<b>0.870641</b>	-0.088948
PR1	-0.160638	0.876838	0.087923	0.037119	0.2631
PR2	-0.140242	0.945977	-0.032024	0.077111	0.166814
PR3	-0.117801	0.901382	0.008444	0.019418	0.235112

For factor 1, which was based on the factor of perceived value, all the 4 items from PV1 to PV4 contributed to explaining this factor. For factors 2, 3 and 5 which were based on the factors of perceived risk, trialability and complexity respectively, items PR1, PR2, PR3, T1, T2, T3, C1, C2 and C3 contributed to explaining these factors, as shown in Table 6 above. Factor 4, perceived credibility, had two items which were valid measures of the factor.

**Table 7: Factor Structure Summary**

Factor Structure Summary after Varimax Rotation				
Factor1	Factor2	Factor3	Factor4	Factor5
PV3	PR2	T2	PC2	C1
PV4	PR3	T1	PC3	C2
PV1	PR1	T3		C3
PV2	PC1			
Perceived Value	Perceived Risk	Trialability	Perceived Credibility	Complexity

The factor summary showed that PC1 explained factor 2, perceived risk. All other factors were fully explained by their respective items.

**4.6.6 Item ranking against factors**

In order to understand the items against each factor more clearly, the items were ranked to understand which item best explained the factor under study, shown in Table 9. The questions shown in Table 8 below were used as triggers to address the items shown in Table 9.

**Table 8: Leading Questions per factor**

I would be more likely to use Cell Phone Banking if:
I am less likely to use Cell Phone Banking because:
I would be more likely to use Cell Phone Banking if:
I would be more likely to use Cell Phone Banking if:
I am less likely to use Cell Phone Banking because

**Table 9: Ranking of items against factors**

	Variable Name	Survey Question	Loading	Rank
Perceived Value	PV1	Cell Phone Banking offered me the same transaction capability as other banking electronic channels		3
	PV2	Cell Phone Banking was free		4
	PV3	Cell Phone Banking is a convenient way of doing my banking		1
	PV4	Cell Phone Banking will save me time when performing my banking		2
Perceived Risk	PR1	Cell Phone Banking is a risky mode of doing my banking		3
	PR2	I am concerned about the security aspects of Cell Phone Banking		1
	PR3	Information concerning my cell phone banking transactions can be tampered with by others		2
	PC1	I know that if I made a mistake using Cell Phone Banking, that my bank would refund me for the mistake		4
Triability	T1	I could test Cell Phone Banking first		2
	T2	I could use it on a trial basis first to see what it offers		1
	T3	I could see a trial demonstration first		3
Perceived Credibility	PC1	I know that if I made a mistake using Cell Phone Banking, that my bank would refund me for the mistake		-
	PC2	I know I can trust the technology used for Cell Phone Banking		1
	PC3	I know that my banking details are safe if my phone is stolen or lost		2
Complexity	C1	Cell Phone Banking is complex to use		1
	C2	Cell Phone Banking requires a lot of mental effort		2
	C3	Cell Phone Banking requires a complex setup/registration process		3

For factor 1, perceived value, the items were ranked as PV3, PV4, PV1 and PV2(highest to lowest).

For factor 2, perceived risk, the items were ranked as PR2, PR3, PR1 and PC1 (highest to lowest). PC1 was grouped under this factor based on the factor analysis output.

For factor 3, trialability, the items were ranked as T2, T1 and T3 (highest to lowest).

For factor 4, perceived credibility, the items were ranked as PC2 and PC3 (highest to lowest).

For factor 5, perceived complexity, the items were ranked as C1, C2 and C3 (highest to lowest).

#### **4.6.7 Conclusion of factors that influence the adoption of Cell phone Banking in South Africa**

The results of the confirmatory factor analysis indicated that there were only five factors likely to affect or influence the adoption of Cell phone Banking in South Africa. However, one of the items placed under the factor of perceived credibility showed that this item was more suitable under the factor of perceived risk. It had a low factor

loading which indicated that this item was not a major item that explained the factor perceived credibility, as shown in Table 9.

The eigen values obtained conclude that the five factors are 99.72% explained. The item analysis showed that 4 out of the 5 factors were very good measures of validity. The perceived credibility factor had an alpha value of 0.56 which was low however, according to Cortina (1993), an alpha value of at least 0.5 should be considered for accepting items within a dimension, provided they are within a small instrument of between 10 – 15 items which this study had. For a greater number of items, an alpha value of greater than 0.8 should be used (Cortina 1993).

The factor loading for all factors identified had a value greater than 0.4 except item PC1. PC1 had a value less than 0.4 which leads to the conclusion that this item was not a valid item for factor 4. However, factor 2 had this item at 0.47 which explained the factor structure shown in Table 7. In conclusion, using the survey questionnaire to collect the data, and applying a confirmatory factor analysis it was confirmed that the proposed five factors would indeed influence the adoption of Cell phone Banking in South Africa:

- Perceived value,
- perceived risk,
- trialability,
- perceived credibility and
- perceived complexity.

#### **4.7 Summary of the results**

The results of the cell phone usage and technology understanding suggest that the South African person uses their cell phone for the basic needs e.g. making and receiving calls. The use of the cell phone to access the Internet is high but for banking is approximately 40% for the sample group which suggests that there are still factors inhibiting adoption.

Understanding the technology showed that the South African person was still not clear about technology used for Cell phone Banking however, WAP was the most popular technology that was known. General Banking characteristics showed that Internet Banking and ATM's are the most frequent channels of usage. This was followed by Branch Banking, Cell phone Banking and Telephone Banking.

The results of the demographic profiling suggest that the South African person that was more likely to adopt Cell phone Banking was between the ages of 18 and 35, could be either a male or female and would have at least a formal secondary education. In addition, such a person would earn an annual income of greater than R100,000.

The confirmatory factor analysis with regards to the factors that influence Cell Phone Banking in South Africa clearly showed that there were five factors which correspond to the factors proposed namely, Perceived Value, Perceived Risk, Perceived Credibility, Trialability and Perceived Complexity.

## **5 CHAPTER 5: DISCUSSION OF THE RESULTS**

### **5.1 Introduction**

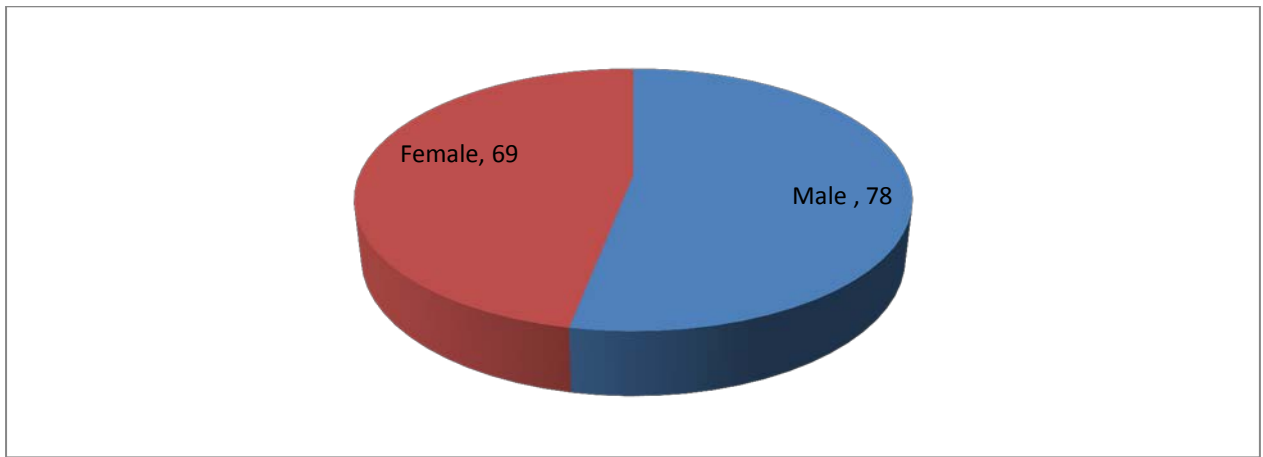
The purpose of this chapter is to discuss, explain and interpret the findings of the analysis that was presented in Chapter 4 in relation to the literature that was discussed in Chapter 2. In addition feedback obtained from the financial regulator (South African Reserve Bank) will be discussed and pertinent issues relating to how regulation can foster market development of mobile banking will be outlined.

The first part comprises of the comparison between the results obtained from the demographic profiling and the results obtained from previous studies as discussed in Chapter 2. The second part compares the adoption factors that were found to influence Cell phone Banking in previous studies against the data obtained from the data analysis that was performed in the surveyed data. The commonalities and possible explanations for such similarities or differences are discussed.

### **5.2 Demographic profile of respondents**

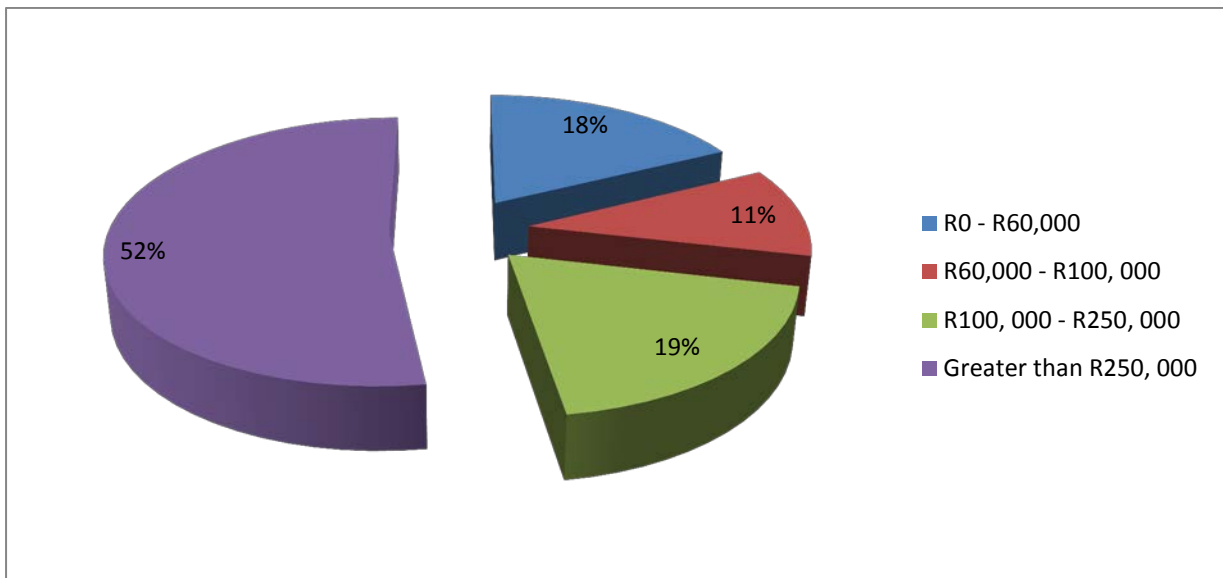
When the survey was conducted, a critical factor was to ensure that the sample was representative of the South African population. This was done to ensure that any inferences made, could apply to the general population. The demographic profile included gender, income, education and age. As can be seen below, there is an almost equal split between males and females present in the sample, thus providing sufficient gender representation to make inferences about the South African population.

**Figure 22: Gender Profile**



For the income levels in South Africa, the aim was to try and get a representative sample of income ranging from R60,000 to greater than R250,000 per annum. As can be seen below from Figure 23, there is almost an equal split between income levels of R250,000 and higher per annum as well as income levels lower than R250,000.

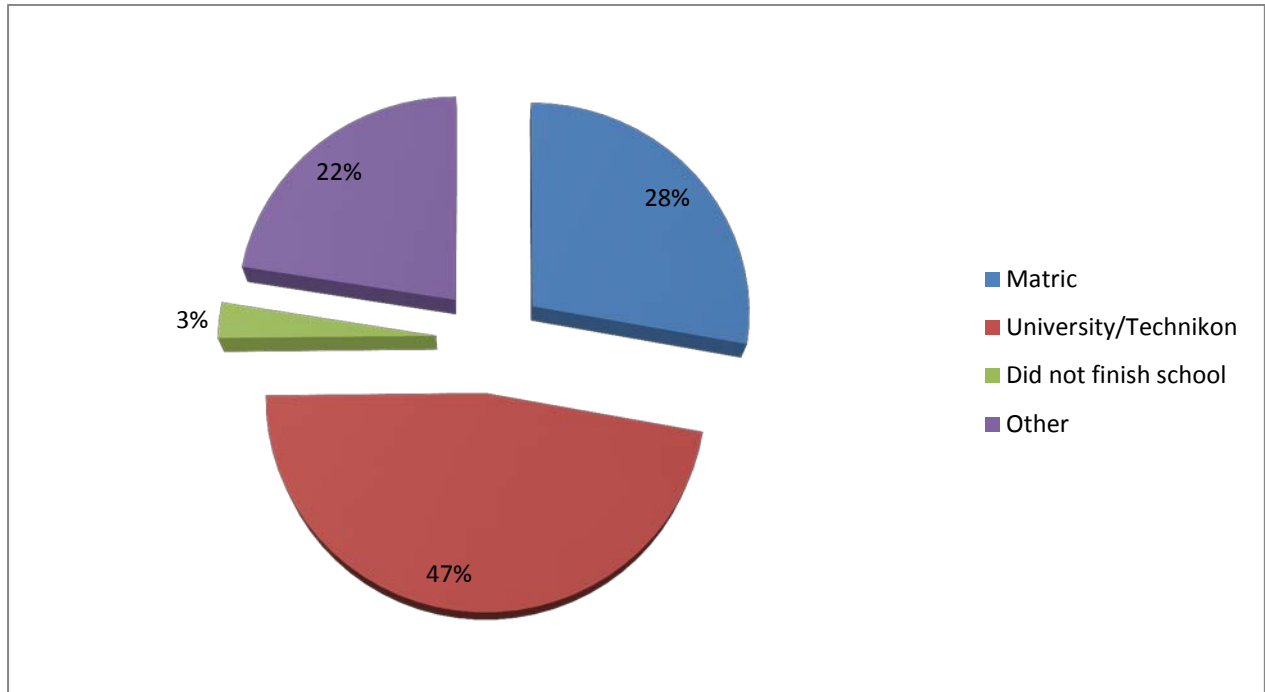
**Figure 23: Income profile of sample group**



The survey was distributed to customers at bank branches located in the eastern suburb of Menlyn, Pretoria. The questionnaires were distributed to customers entering and exiting bank branches. The results were expected to be skewed to higher income groups, however the results indicate a more evenly spread income range between individuals earning greater than R250,000 and those below R250,000.

From the sample of 147, most of the respondents had a minimum level of secondary education (i.e Matric and University) as shown in Figure 24 below.

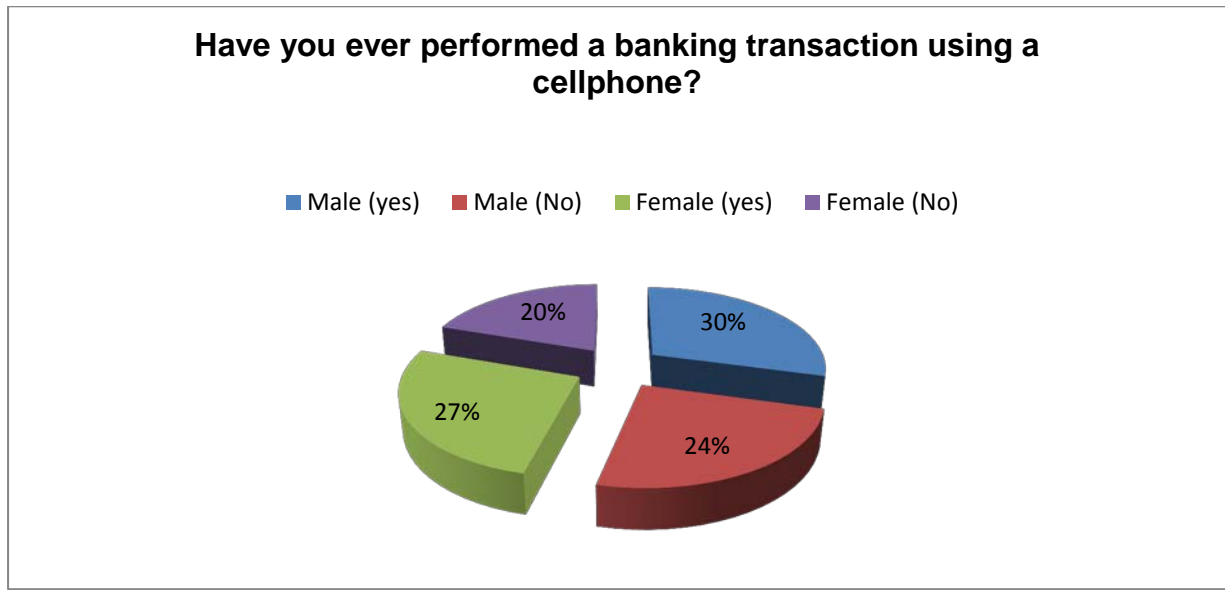
**Figure 24: Educational Profile**



Compared to the study conducted by Brown et al. (2003), the educational level in that study is similar to this study as approximately 70% of that sample had at least a secondary education. In this sample, the combined percentage of Matric and University qualifications is approximately 75%, as can be seen above in Figure 24.

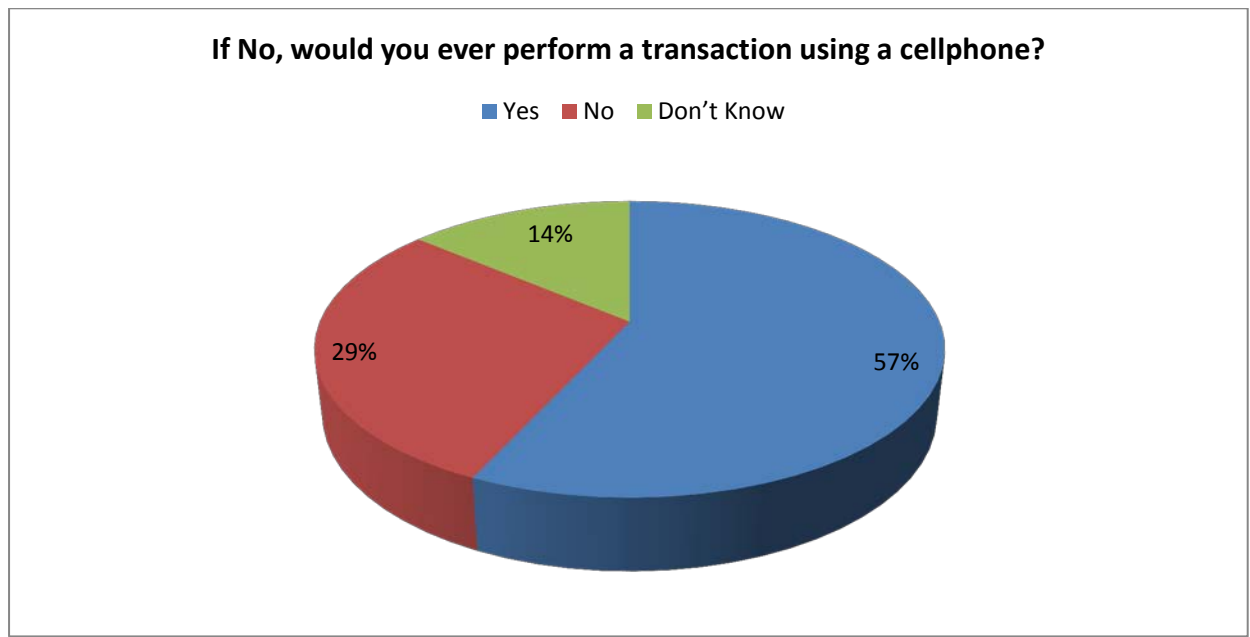
The number of people from the sample who indicated they have used Cell phone Banking is reflected in Figure 16 in Chapter 4. Analysing the data indicated that gender had no impact on cell phone banking adoption in South Africa as shown below in the number of responses by males and females in the sample group. However, all the respondents who indicated yes have a higher education level (at least a Matric qualification), higher income (> R100,000 per annum) and age range between 18 and 35 were more likely to use Cell phone Banking.

**Figure 25: Cell phone banking utilisation**



From the sample, more than half of the sample said they had used Cell phone Banking, shown in Figure 25 above. Of the 44% who responded 'no', 57% of them indicated they would use Cell phone Banking to perform a banking transaction. Compared the study conducted by Brown et al. (2003), approximately 35.3% of that sample indicated they would use Cell phone Banking. The difference for this increase is probably due to the increased awareness of Cell phone Banking in the South African market today. Several years ago, doing banking via a cell phone was probably in an infancy stage and not well known as today.

**Figure 26: Transacting using a cell phone**



### **5.3 Conclusion**

The demographic profiling of the typical South African that is likely to adopt Cell Phone Banking fits the profile of a male or female, earning greater R100,000 per annum, has a formal education and is between 18 and 35 years of age. This finding confirms with Suoranta's (2003) findings where the average Cell phone Banking customer is between 25 to 34 years old, is educated and earns an average income. That study showed that age and education was a major influence on the use of Cell phone Banking. It also validates the findings of Laukkanen and Pasanen (2008) where they showed young people use electronic banking.

### **5.4 Discussion of adoption factors that influence Cell phone Banking**

#### **5.4.1 Introduction**

The results of the confirmatory factor analysis performed on the data collected via the survey questionnaire concluded that the 5 factors initially proposed are indeed critical factors that could influence or affect the cell phone banking adoption in South Africa. These factors are discussed and compared with the observations and conclusions that were obtained from previous studies that were conducted in South Africa and abroad.

### 5.4.2 Trialability

This proposition stated that the greater the trialability (T) of Cell phone Banking, the more likely that Cell phone Banking will be adopted. The factor analysis showed that the all questions related to this factor had strong factor loadings i.e. they all were valid measures in terms of explaining this factor that affects or influences the adoption of Cell phone Banking, shown in Table 5 below. This finding corresponds with the findings of Suoranta’s (2003) study, where she concluded that trialability was a significant factor in her study of adoption of Cell phone Banking in Finland. This finding also validates the study by Brown and Alemayehu(2005) where they found trialability to be a significant factor.

For the trialability factor, the sample group suggested overall that this would be an influential factor if they could experience the service of Cell phone Banking before actually being registered for the service. The questions or items in the survey developed for this study, that attempts to measure the validity of trialability factor are shown in Table 10 below.

**Table 10: Trialability Questions**

		I would be more likely to use Cell Phone Banking if:	Factor Loading	Rank
<b>Trialability</b>	T1	I could test Cell Phone Banking first		2
	T2	I could use it on a trial basis first to see what it offers		1
	T3	I could see a trial demonstration first		3

The results from the factor analysis confirmed that all of the items were valid measures of the trialability factor, thus implying that a South African person believes that the items mentioned in Table 10 are influential in leading to cell phone banking adoption in South Africa. Thus the proposed factor of trialability is a valid factor and is likely to affect or influence cell phone banking adoption in South Africa.

### 5.4.3 Perceived Complexity

This proposition stated that the lower the perceived complexity (C) of using Cell Phone Banking, the more likely that Cell phone Banking will be adopted. The factor analysis showed that the all questions related to this factor had strong factor loadings i.e. they all were valid measures in terms of explaining this factor that affects or influences the adoption of Cell phone Banking, shown in Table 11 below.

**Table 11: Perceived Complexity Questions**

		I am less likely to use Cell Phone Banking because	Factor Loading	Rank
Complexity	C1	Cell Phone Banking is complex to use		1
	C2	Cell Phone Banking requires a lot of mental effort		2
	C3	Cell Phone Banking requires a complex setup/registration process		3

The TAM has been used for predicting user acceptance based on user perceptions. However, as Mathieson (1991) concluded it does not go beyond explaining what characteristics actually cause the perception of ease of use and usefulness. The factor proposed was related to perception of ease of use and all the items against this factor related strongly to perceived complexity. Based on the factor loading shown in Table 11, Cell phone Banking is perceived to be complex. This result conflicts with the findings of the Brown et al. (2003) where the factor of complexity was found not to be significant as a factor that influences the adoption of Cell phone Banking. Brown et al. (2003) suggested a reason for this was that this factor could be relevant once initial usage and experimentation with the technology was performed.

In this study, a large percentage of the sample had experienced Cell phone Banking (approximately 56%, Figure 16), which could attribute towards this factor score i.e. they have used the service and applied their first experiences with Cell Phone Banking. Also, with the increased knowledge of the sample using WAP services, they probably have associated the use of this compared to getting access to Cell phone Banking i.e. that the service is difficult to setup. This reasoning is also substantiated by Brown and Alemayehu (2005), where they concluded that complexity was perceived to be relatively higher than Internet Banking which was possibly due to the lack of understanding of Cell phone Banking. Thus the proposed factor of perceived

complexity is a valid factor and is likely to affect or influence cell phone banking adoption in South Africa.

#### 5.4.4 Perceived Value

This proposition was stated that the greater the perceived value (PV) of using Cell Phone Banking, the more likely that Cell phone Banking will be adopted. The factor analysis showed that all the questions related to this factor had strong factor loadings i.e. they all were valid measures in terms of explaining this factor that affects or influences the adoption of Cell phone Banking, shown in Table 12 below.

**Table 12: Perceived value questions**

		I would be more likely to use Cell Phone Banking if:	Factor Loading	Rank
Perceived Value	PV1	Cell Phone Banking offered me the same transaction capability as other banking electronic channels		3
	PV2	Cell Phone Banking was free		4
	PV3	Cell Phone Banking is a convenient way of doing my banking		1
	PV4	Cell Phone Banking will save me time when performing my banking		2

The results from the factor analysis confirmed that all of the items were valid measures of the perceived value factor, thus implying that a South African person believes that the items mentioned in Table 12 are influential in leading to cell phone banking adoption in South Africa. However, the items of Cell phone Banking being free and an equivalent service offering compared to other electronic channels did not have high factor loadings as compared to the other two items (PV3 and PV4). The latter items clearly show that convenience and time savings are value propositions that are likely to influence or affect cell phone banking adoption in South Africa. Cost and functionality value proposition are also important items but are not the most influential items in terms of value. Kim et al. (2007) concluded that perceived value (PV) is an important factor that leads to adoption and that other beliefs are mediated through perceived value. This study further validates this as convenience and time savings are clearly seen as value items which affect or influence cell phone banking adoption in South Africa.

Although the item PV1 has a low factor loading, this item confirm with the findings of the study by Brown et al. (2003) where they found that the greater the perceived advantage that Cell phone Banking offers over other forms of banking, the more likely it is that Cell phone Banking will be adopted. Thus the proposed factor of perceived value is a valid factor and is likely to affect or influence cell phone banking adoption in South Africa

#### 5.4.5 Perceived Credibility

This proposition was stated that the greater the perceived credibility (PC) of using Cell phone Banking, the more likely that Cell phone Banking will be adopted. The factor analysis showed that two of the questions related to this factor had strong factor loadings (PC2 & PC3) i.e. they were valid measures in terms of explaining this factor that affects or influences the adoption of Cell phone Banking, shown in Table 13 below.

**Table 13: Perceived Credibility Questions**

		I would be more likely to use Cell Phone Banking if:	Factor Loading	Rank
Perceived Credibility	PC1	I know that if I made a mistake using Cell Phone Banking, that my bank would refund me for the mistake		3
	PC2	I know I can trust the technology used for Cell Phone Banking		1
	PC3	I know that my banking details are safe if my phone is stolen or lost		2

Item PC1 did not explain this factor at all and actually explained the factor perceived risk, as shown in Table 7 in Chapter 4. Items PC2 and PC3 indicated that the trust of the technology and organisation providing the Cell phoneBankingservice are important items which relate to the factor of perceived credibility. This study confirms Wang et al. (2003) study on determinants of user acceptance on Internet Banking where PC was modelled as a factor that results in behavioural intention. For the perceived credibility factor, the sample group suggested overall that trust was a major influential factor for the adoption of Cell phone Banking. The factor loadings for the items, PC2 and PC3, were approximately the same with trust being ranked first followed by knowing that their details are safe if their phone was stolen.

PC1 could have been construed to be a risk item when the sample group answered this question, hence it was placed as an item that explains the factor perceived risk. Gefen (2000) suggested that trust can also be defined as the belief that the other party will behave in a socially responsible manner, and, by so doing, will fulfil the trusting party's expectations without taking advantage of its vulnerabilities. This definition is clearly applied by the respondents as the item PC3 is about trusting the bank to keep details secure when a respondent's cell phone is stolen.

This factor albeit being confirmed as a factor, was found to be the factor that was least explained by its items. This was probably due to PC1 which was not a valid item measure for perceived credibility. However, PC2 and PC3 explained this factor satisfactorily. Thus the proposed factor of perceived credibility is a valid factor and is likely to affect or influence cell phone banking adoption in South Africa.

#### 5.4.6 Perceived Risk

This proposition was stated as the lesser the perceived risk (PR) of using Cell Phone Banking, the more likely that Cell phone Banking will be adopted. The factor analysis showed that the all questions related to this factor had strong factor loadings i.e. they all were valid measures in terms of explaining this factor that affects or influences the adoption of Cell phone Banking, shown in Table 14 below.

**Table 14: Perceived Risk Questions**

		I am less likely to use Cell Phone Banking because:	Factor Loading	Rank
Perceived Risk	PR1	Cell Phone Banking is a risky mode of doing my banking		3
	PR2	I am concerned about the security aspects of Cell Phone Banking		1
	PR3	Information concerning my cell phone banking transactions can be tampered with by others		2

The findings of this analysis validate the findings from the Brown et al. (2003) study where the perceived risk factor was significant i.e. the greater the perceived risk of Cell phone Banking, the less likely it would be adopted. In Suoranta's (2003) study she concludes that risk was not a significant factor in the adoption of Cell phone

Banking in Finland. A possible reason for this could be due to the fact that Finland's population is a technologically advanced nation and more open to new technologies. In this study the perceived risk is still an inhibiting factor as confirmed by the factor analysis.

For the perceived risk factor, the sample group suggested that security was the most influential factor, followed by information being unsecured on the cell phone and finally being viewed as a risky mode of banking. The other item that had a very small influential impact on this factor was perceived complexity, particularly around whether the bank would refund the customer if they made a mistake.

One of the major influencing factors around the establishment and use of new technologies for financial transactions is that of security (McKnight et al. 2003). This study confirms that security is still a concern amongst people in South Africa and given the lack of understanding of the technology used for Cell phone Banking (Figure 8), this is no surprise that this factor had been confirmed. Thus the proposed factor of perceived risk is a valid factor and is likely to affect or influence cell phone banking adoption in South Africa.

## **5.5 Conclusion**

It was proposed that there were five major factors that could possibly cell phone banking adoption in South Africa. The results of the confirmatory factor analysis confirmed that there were indeed five major factors which could influence cell phone banking adoption in South Africa. These factors were perceived value, perceived risk, trialability, perceived credibility and perceived complexity.

The perceived value factor was shown to be an important factor that influences cell phone banking adoption in South Africa. Convenience and time saving were the major influencers of the perceived value factor followed by relative advantage and cost. The perceived risk factor was found to be one that could severely hamper the cell phone banking adoption in South Africa. The underlying reasons for this were the perceived high risk of transacting via the cell phone, the security aspects of Cell phone Banking and fear of information being tampered with by others.

The trialability factor was found to be an important factor that could influence cell phone banking adoption in South Africa. Aspects such as a trial period, and demonstration before actual use were seen as dominant influencers of the trialability factor. There was clear evidence that people are more likely to adopt a service if they could first trial or experience the service.

The perceived credibility factor was found to be the least relatively important factor. It was concluded that trust in the technology and confidence with the service provider, in this case banks, are critical items in influencing cell phone banking adoption in South Africa.

The perceived complexity factor was found to be an important factor to influence cell phone banking adoption in South Africa. It was concluded that uncertainty of technology understanding leads to this perception that Cell phone Banking is complex, requires a lot of mental effort and is difficult to register for.

## **5.6 Discussion with Financial Regulator**

Many issues exist in the cell phone banking environment no matter which approach is used to implement such services. During discussions with key informant 1 within the regulation division at the South African Reserve Bank, a number of areas were highlighted which could possibly address particular factors in order to foster market development of cell phone banking and offer a guide to future regulatory requirements. These issues are discussed below.

There are common characteristics and issues to deal with when considering cell phone banking in the regulatory environment. These could include the competition commission, telecommunication and financial regulator. In order to adhere to the regulations and laws it may be necessary for the cell phone service provider to look at all three spheres of regulators to identify common attributes or compliance processes.

It was noted that as cell phone banking continues to attract new customers and service providers, telecommunications regulators find themselves in the position of determining what changes if any are necessary to their existing regulatory framework.

Traditionally, the key roles for the telecommunications regulator in an economy's financial system were indirect in order to guarantee the reliability and protection of a communications network that connected financial institutions to their customers as well as to each other. The same role was also played by the telecommunications regulator in most sectors outside of the information technology sector itself. Although the rise of cell phone banking services does not change this role, certain additional issues come into play with the development of cell phone banking services. Due to cell phone banking services, mobile service providers are playing a much more integral role in the transmission and storage of funds. According to key informant 1 in the regulation division, this is blurring the traditionally clear boundary between regulation of telecommunications services and regulation of financial services. Depending on the business model employed by the service providers, telecommunications regulators may face questions regarding their responsibility for overseeing or facilitating these emerging services.

Key informant1 suggested that telecommunications regulators should understand the type of cell phone banking systems already introduced in their markets, as well as to evaluate what other type of models may or may not be permitted under current telecommunications and financial regulation. This analysis should involve the coordination and participation of the financial regulator. While the financial regulator will be familiar with its own financial regulations, it is less likely to be familiar with the laws and regulations imposed on mobile operators, as well as the technical aspects of the service. In addition, in coordination with the financial regulator, the telecommunications regulator could then undertake a review of existing sector regulation to assess whether regulations need to be revised to account for cell phone banking activities, and any cases in which new regulation may be required.

Telecommunications regulators appear to have several existing responsibilities that may warrant reconsideration or revision in order to accommodate the wide range of services on offer. This part of accountability would include areas such as protection of consumers, exchange of information between systems, account information, responsibilities in terms of universal access, regulating costs structures, and registration of SIM cards.

Financial regulators also face many issues and concerns regarding their role in the regulation and oversight of cell phone banking services. Often, financial regulators are empowered to specify the scope of banking services carried out by a financial institution and to issue appropriate banking licenses. A key consideration is that, in general, only banks are authorized to take deposits, and thus the protection of deposits is a key component of banking regulation. On the other hand, credit can often be offered by non-bank institutions. The question of whether cell phone banking services and their providers are subject to banking regulation is therefore dependent upon the determination of what constitutes a banking activity as well as how a bank is defined.

Thus the financial sector regulator, depending on their enabling legislation, can play a significant role in essentially determining whether cell phone banking and mobile payment activities require separate licenses from a mobile operator license. If a separate license is required, what type of licenses needs to be obtained and more generally whether the cell phone banking provider will be otherwise subject to the same financial regulation as traditional banks. In considering their approach to regulation of cell phone banking services, financial regulators will need to aim for a regulatory regime that imposes suitable oversight and safeguards on all services identified as banking services, whether traditional or mobile, while permitting sufficient flexibility for providers to develop innovative financial products.

According to key informant 2 within the banking supervision area at the South African Reserve Bank, regulation should be defined to ensure the safety and liquidity of customer deposits to cell phone banking services and should be imposed on cell phone banking systems. With the bank-based cell phone banking model some level of protective regulation is in force, as deposits are held by banks already subject to regulation. Nevertheless, some non-bank based cell phone banking systems may currently fall outside of all financial regulation, and thus be free of such regulation. Between these two extremes may lay a number of complexities which relate to consumer confidence and may affect the safety of customer deposits.

Similarly, in Ecuador, Colombia, Mexico and Peru, the financial regulator has also authorized the creation of basic accounts with less stringent know your customer

requirements – as well as balance or transaction limitations that can be leveraged by cell phone banking providers as a means to improve financial inclusion by making banking services available to those who may not be able to satisfy the know your customer requirements of a traditional bank account.

Competition authorities, depending on their enabling legislation, are responsible for the enforcement of competition law, including addressing anti-competitive behaviour, reviewing and approving or denying merger requests and certain business partnerships, as well as promoting competition. In addition, some competition authorities are responsible for consumer protection regulations. According to key informant 2, cell phone banking brings about a market situation in which divergent roles with banks and mobile operators, for example, or even alliances between banks and mobile operators are offering substantially similar services.

It is important to consider that one of the most significant improvements can be made regarding improve better collaboration and harmonisation between the relevant regulators in terms of cell phone banking. It is likely that the greatest coordination will take place between the telecommunications and financial services authorities. But other agencies are likely to be integrally involved, such as competition regulator, as well as agencies responsible for consumer protection issues. For example, in bank-based cell phone banking models, as mobile network operators and banks enter into partnerships to deliver and promote cell phone banking services, it would be preferable for the regulators to co-ordinate their oversight or to clearly define responsibilities so that all parties the regulators, the companies and even consumers clearly understand relevant regulations and oversight mechanisms for such business arrangements.

Similarly, while competition issues in the telecommunications and financial sectors may currently be addressed by the relevant sector specific regulator and the competition authority, the close relationships between network operators and financial institutions may require at least some level of consultation regarding the nature and timing of decisions in one sector and how such decisions could affect the other. Co-operation between regulators will be a necessary tool for the development of a co-ordinated approach to the oversight of cell phone banking and mobile payment

systems. Each regulator will have unique competencies and capabilities that can be brought to bear in a coordinated approach to regulation and oversight of cell phone banking services. According to key informant 1 in the regulation division, the financial regulator may benefit from relying on the technical and technological expertise of the telecommunications regulator as both seek to understand the emerging options for cell phone banking and other financial transactions enabled by mobile technology.

Similarly, the telecommunications regulator will benefit from the specialized knowledge of the financial sector regulator with respect to, know your customer requirements that could be harmonised with similar registration requirements. The specific initiative for cooperation between regulators, as well as the form such competition should take, will necessarily vary by jurisdiction, taking into account government policies and priorities, existing legal and regulatory frameworks, and market conditions. However, options for promoting co-operation and co-ordination could include regular dialogue where the financial sector and telecommunications sector regulators periodically convenes to discuss and address current and emerging issues related to cell phone banking. In addition, the two regulators could cross train relevant staff members and leadership on issues related to cell phone banking.

One of the major issues that would contribute to effective collaboration between regulators is updating of obsolete policies. In many economies, the legal and regulatory environments in the banking, competition and to a somewhat lesser extent telecommunications sectors were developed or most recently revised well before the convergence of ICTs and financial services. In most developing countries, banking laws and regulations previously only allowed banking to be conducted by entities with physical locations, but this has recently been revised to enable branchless banking by allowing licensed financial institutions to make use of agents.

Policymakers, legislators and regulators need to review and revise frameworks to account for mobile financial services. According to key informant 1, in the absence of new policies or regulations, there may be preliminary evidence to indicate a difference in cell phone banking opportunities between economies with civil law traditions and common law traditions. Because the concept of banking through a mobile device may

not have considered when drafting a law or regulation in a common law country, this may allow the introduction of cell phone banking.

These kinds of legal frameworks have been introduced in other countries such as India, Mexico, and Philippines to allow for the provision of such services. Nevertheless, even in countries where cell phone banking services may be allowed to operate, the regulators may still find it necessary to modify existing laws and regulations to address others aspects of the service relating to the use of agents and provision of services.

The changes discussed are considered with respect to cell phone banking in general, rather than focusing on one particular cell phone banking model. Current regulatory frameworks are more likely to enable cell phone banking services closer to the bank based model end of the spectrum. However, regulatory frameworks can be amended to permit the establishment of non-bank based cell phone banking systems, which may help foster the spread of cell phone banking. According to key informant 1, many of the challenges faced by regulators include reconsidering their existing responsibilities with an eye to oversight of cell phone banking and potentially making appropriate adjustments in the following areas:

In an environment in which cell phone banking becomes a crucial means of storing value or transmitting payments, it is important to have accountability and responsibility when errors are factored into transactions. Consumers should have possible avenues to address their complaints and there should mechanisms in place to safeguard personal and financial data. These issues are relevant to all cell phone banking models, although the responsibility for addressing consumer protection would more likely fall within existing financial sector regulation. In addition addressing customer protection may require telecommunications regulators to look to financial sector regulators, as well as possibly consumer protection agencies for guidance, as well as to re-evaluate the tools at their disposal, such as quality of service guidelines and relevant reporting and monitoring procedures, to take into account new use cases, particularly those related to transactional errors within a non-bank based cell phone banking system.

Other issues to consider would include potential new reporting or monitoring requirements, such as tracking the number of customer queries or contacts related to cell phone banking concerns or errors.

According to key informant 2, as services continue to increase within the cell phone banking arena transferring money from one service provider to the next will become a vital issue. This discussion focuses on transfers between or involving non bank based systems, where value is not stored in a bank, as mechanisms and protocols for inter-bank transfers and thus between bank-based cell phone banking services are well-established. There are no widely reported arrangements for exchanging information among operators of cell phone services specifically for banking that allow a direct, electronic transfer of stored value from an account in one cell phone banking service to an account in another cell phone banking service when at least one of the services does not involve a traditional bank. Unfortunately, this may lead to a situation where a consumer can transfer money from non-bank cell phone providers to obtain cash and at the same time paying any applicable commissions or agent fees.

The issue of interoperability of cell phone banking systems is much more likely to require new reviews or actions as non-bank based service providers enter the market and may not have tight integration with a licensed bank. By comparison, licensed banks generally work with a clearing house which may or may not include the economy's central bank that facilitates interbank transfers, or rely upon internationally accepted standards and systems for cross-border transfers. As noted by the key informants, voluntary interconnection between cell phone banking account providers is feasible, but may not occur due to divergent business interests. Regulators have not yet taken steps to encourage or require interoperability of cell phone banking systems, though they could conceivably do so, such as setting standards for interconnection of cell phone banking platforms or attempting to mandate interconnection, although both approaches have notable drawbacks and may not achieve the regulator's desired result.

Interconnection standards would need to be sufficiently technology neutral to minimize the risk of being outdated soon after or perhaps before finalization and implementation. To date, there has been little analysis or examination of the use of

cell phone banking systems while roaming on a mobile network other than that which provides the customer's local cell phone banking service, whether within national borders or internationally. However, certain assumptions can be made regarding the use of cell phone banking services while roaming. The roaming agreement between operators will govern what types of services are available to roaming users. Thus, the ability to manage a cell phone banking account via SMS, smartphone applications or other means will be dependent upon the existence of a roaming agreement, the specifics of the roaming agreement and the customer's roaming profile. In cases where the mobile network operator is part of a multinational firm with subsidiaries in other markets, there is an increased likelihood of access to cell phone banking services.

Although not a universal practice, there has been increasing interest among policymakers in the idea of registration of prepaid SIM cards as a means to reduce the use of prepaid mobile handsets in criminal or terrorist activities. SIM registration schemes have been introduced or considered in countries including Australia, Brazil, Germany, Indonesia, Japan, Norway, Philippines, Singapore, Switzerland, and the United States. The rise of cell phone banking services could prompt telecommunications regulators to alter SIM registration programs in multiple ways. For example, SIM registration uses could be expanded to include anti-money laundering efforts, particularly in non-bank based cell phone banking systems where the financial regulator may have little to no oversight.

Telecommunications regulators may also seek to coordinate or integrate SIM registration schemes with the know your customer regulations that are more common in the financial sector, so as to facilitate coordination between telecommunications and financial regulators to combat fraud and financial crimes as well as to ease the registration burdens on customers of both telecommunications and financial services. The issue of cell phone banking service providers having detailed knowledge of their customers and/or requiring registration applies to all cell phone banking models as a means to comply with crime prevention requirements.

Cell phone services requires adequate mobile coverage, and thus the areas with weak mobile network coverage will face significant difficulty in leveraging cell phone banking

services. According to key informant 2, expanded access to mobile services could be facilitated through universal access service plans and would therefore expand the reach of banking services to more of the unbanked population. While high-income countries have almost universal mobile coverage, upper middle income countries such as the United States and Europe had a significant population coverage, lower middle income countries in Africa and the Middle East had above average population coverage, and low income countries had only average population coverage. Cell phone banking services led by banks and nonbanks would benefit from expanded mobile coverage and penetration driven by universal access service policies.

As network operators begin to store customers' value and to derive revenues from cell phone banking services, regulators will need to review accounting regulations and determine if any changes are necessary. Specifically, accounting separation requirements will likely come into play, both as a means to prevent cross subsidisation and to ensure the security of consumer value stored outside of financial institutions. This issue is more likely to be relevant to non-bank based cell phone banking services.

Tariff regulation, often employed to prevent the abuse of dominance, may become a tool for creating fair competition among cell phone banking services. In a market with competing cell phone banking service offerings, even the rate charged for a standard SMS message, currently a primary means by which cell phone banking transactions are executed could differentiate service offerings. According to key informant 1, the introduction of a cell phone banking service alongside existing mobile services could provide new opportunities for cross-subsidization or other distortions in tariff structures as operators compete for customers. The use of tariffs as a differentiating factor among cell phone banking services is more likely to be a competitive issue among non-bank based cell phone banking services, but may also be relevant to bank-based services.

The ability of subscribers to port their mobile number from one operator to another can present a barrier to adoption of cell phone banking services if, for example, a customer would like to change service providers in order to subscribe to a different operator's cell phone banking offering, but is unwilling to give up their existing mobile

number. Mobile number portability has been introduced in a growing number of jurisdictions, so the need for regulatory change globally continues to decline. However, in markets without Mobile number portability or plans to implement it, telecommunications regulators should consider the extent to which a lack of Mobile number portability prevents cell phone banking adoption. In addition to these telecommunications specific issues, there are regulatory changes outside the telecommunications sector that will affect if and how telecommunications service providers can offer cell phone banking systems.

While licensed banks are generally subject to reserve requirements to satisfy potential depositor claims, without legislative changes, funds held by nonbank institutions are not necessarily subject to any similar requirements. Without such protections, the security of customer funds held by a non-bank entity could be seen as significantly riskier than funds held by a prudentially regulated bank. According to key informant 1, regulations in economies including Afghanistan, Cambodia, India, Indonesia, Malaysia, the Philippines and the economies of the West African Economic and Monetary Union have been implemented requiring nonbank issuers of e-money to maintain liquid assets at a prudentially regulated bank or sometimes in safe assets such as government securities, in an amount equal to the total value of customer funds collected. In some cases, these liquidity requirements are bolstered by additional regulations that limit the use of deposited funds or require that deposited funds are split among multiple banks.

Most developing countries do not extend deposit insurance protection to the funds deposited in banks to support e-money deposits, and in cases where deposit insurance does exist, because service providers pool the accounts they service, resulting in bank-held accounts that exceed the deposit insurance coverage limits. According to key informant 2, regulatory changes to ensure the safety of customer deposits would reduce the potential risk of cell phone banking services offered by non-bank entities.

An advantage enjoyed by banks over non-bank providers of cell phone banking services is the ability to lend the customer deposits they hold, and in return to pay interest on those deposits. So far, regulations have prohibited the payment of interest

to customers and prevented nonbank operators from investing customer deposits. As suggested by key informant 1, the unavailability of interest-bearing accounts removes an incentive for take-up of cell phone banking services, as well as an incentive for using cell phone banking services as a vehicle for savings.

By allowing cell phone banking providers to offer interest, regulators would create additional incentives for the unbanked to join the banking system. Companies, such as Safaricom, are already teaming up with banks to offer their customers interest and saving insurance. But although these models are promising it is still necessary for regulators to see what alternatives can be developed for non-banks to provide interest, as well as insured savings, with their cell phone banking services.

Although there has been some discussion of the telecommunications regulator's role in requiring or encouraging the development of cell phone banking systems that are accessible to even the most basic mobile handsets and technologies, this may run the risk of stifling innovation or competition. As has been seen around the world over the past two decades, the telecommunications industry innovates at a rapid pace, such that regulatory frameworks are often characterized as regulating the last service, not the next service. Particularly in the current early stages of cell phone banking development, both telecommunications and financial sector regulators should be wary of imposing detailed technical requirements on cell phone banking services that could deter innovation or market entry.

Cell phone banking is critically reliant on the use of agents to provide services to customers. The parties to whom direct customer interaction is outsourced may or may not be agents of the bank or non-bank on whose behalf they interact with customers in the true legal sense. This can vary depending on the regulatory system and contractual arrangements that are made. Agents are indispensable for cell phone banking growth. An agent office can be outfitted with the necessary technology and operate at a fraction of the cost of opening and operating conventional bank branches. This also makes it possible to reach new groups of poorer customers in a more profitable manner. In addition, agents offer customers both convenience and a familiar environment for those who may not be as familiar with banking practices to feel comfortable transacting business. Agents will need to be educated and trained on the

products offered and the services they are providing. Perhaps more importantly, the use of agents has created heightened risks related to providing service.

These risks can include theft of an agent's cashbox or if an agent is robbed on their way to or from a bank branch. Efforts to prevent this type of theft from happening may require agents to keep smaller amounts of cash on hand or make more frequent trips to the bank to make smaller deposits. Agents present a variety of operational risks to the provider, as well as reputational risks given that the agent is the public face of the provider.

Cell phone banking, while offering tremendous benefits to customers, especially those in poor and remote regions, also presents significant risks and challenges to customers. Consumer education and outreach should focus on two areas. The first is ensuring that consumers understand what the service offers, how it operates, and the best ways to utilize the service. It will be critical to educate consumers on the suitable use of services offered and this, in turn, will enhance consumer protection. Consumers will also need to understand how to protect their personal information to minimize theft and enhance security. Depending on the region where the service is offered, consumers may need to be educated on enrolment, registration and customer access procedures. It may be a new experience for some consumers to see the mobile phone as an instrument of financial management. According to key informant 2 it is important to establish adequate consumer protection measures to ensure security of transactions and prevent fraud. Customer education may need to focus on how best customers can experience and utilize cell phone banking services. Retail agents may need to provide additional materials to customers outlining what services are offered and how they are used. Further information should be made available if there are customer complaints or a means for resolution of any concerns or problems customers encounter through agents.

While some observers have identified cell phone banking services as a means to begin developing credit histories among formerly unbanked users, there has been little published research in this area to date. As noted by key informant 1, a review conducted in Kenya drew several conclusions regarding the potential for building credit history via cell phone banking services in that country. Some of these

conclusions are likely applicable broadly across markets in which cell phone banking services are active, and others that are likely more relevant to developing countries. It may be that the market and regulations will need time to adjust to and enable the use of cell phone banking transactions to develop credit history for users, as has been the case with prepaid credit cards in developed markets such as the United States.

Ensuring transaction security in cell phone banking and systems has multiple aspects, overlapping considerably with existing measures to ensure security in electronic financial transactions. While these responsibilities are not unique to cell phone banking, they are arguably even more relevant in a mobile context, where handsets can be easily misplaced or stolen. With respect to telecommunications networks, the threats to cell phone banking are the same that apply to any other services delivered over the mobile network. Such security issues include attempts to disable or damage the network infrastructure, denial of service attacks, attempts to limit legitimate users' access to the network, such as through wireless interference, unauthorized access to the network; and interception, monitoring or alteration of transmissions.

Telecommunications operators and vendors have invested heavily in technologies and processes to minimize security issues on mobile networks, and such technologies can be applied to cell phone banking services as well.

## **5.7 Conclusion**

As policymakers, regulators and industry consider the utility of cell phone banking services and the business cases for their introduction, a number of considerations come into play regarding how to foster the utilisation of these products . It is crucial, for example, that both agents and consumers be educated regarding the utility and benefits of cell phone banking services, and agents are additionally responsible for understanding their roles and responsibilities. In addition, cell phone banking and electronic payment systems rely upon an ecosystem of technologies and services that enable easy, fast and secure financial transactions. As the popularity of cell phone banking grows and technologies continue to evolve, regulators and service providers will have to keep pace with technological change while preserving and improving the utility, efficiency, and security of cell phone banking services.

## **6 CHAPTER 6: CONCLUSIONS AND RECOMMENDATION**

### **6.1 Introduction**

The first part of this chapter summarises the research findings, presents the conclusions and provides recommendations with regards to cell phone banking adoption in South Africa. The second part will focus on suggestions for future research that could potentially add value to the thinking and insights into this body of knowledge.

### **6.2 Conclusions of the study**

The primary purpose of this study was twofold: firstly to identify and confirm the which factors could influence cell phone banking adoption in South Africa and secondly to identify what factors could foster market development of cell phone banking in South Africa from the financial regulator's perspective.

#### **6.2.1 *Demographics of a Cell phone Banking Customer***

In terms of demographic profile it was concluded that the person would be either a male or female, would earn an annual income greater R100,000, had a formal education and was between 18 and 35 years of age. In comparison to the studies that were conducted in other countries, the demographical profile was quite similar. In comparison to the studies that were conducted in South Africa, the demographical profile was similar in education and gender however, the income profile differed where previous studies concluded that people of lower income (<R38,000 per annum) would be likely to adopt Cell phone Banking compared to this study where higher income was more likely to adopt Cell phone Banking. The reason for this difference could be attributed that the common South Africa person now earns more income as the previous study was done over 7 years ago. The other reason is that the growth of cell phone usage in South Africa has resulted in more people using cell phones for emails,

Multimedia Messaging (MMS), etc. which has been adopted more by the upper income bracket of the market as they can afford the highly technical cell phones.

### **6.2.2 Factors affecting adoption – Propositions vs. Findings**

The following five factors were identified and proposed as factors that could influence cell phone banking adoption in South Africa.

#### **Proposition 1**

The greater the trialability (T) of cell phone banking, the more likely that cell phone banking will be adopted.

#### **Proposition 2**

The lower the perceived complexity (C) of using cell phone banking, the more likely that cell phone banking will be adopted.

#### **Proposition 3**

The greater the perceived value (PV) of using cell phone banking, the more likely that cell phone banking will be adopted.

#### **Proposition 4**

The greater the perceived credibility (PC) of using cell phone banking, the more likely that cell phone banking will be adopted.

#### **Proposition 5**

The lesser the perceived risk (PR) of using cell phone banking, the more likely that cell phone banking will be adopted.

All of the five factors proposed that were derived from prior studies namely, perceived value, perceived risk, trialability, perceived credibility and perceived complexity were found to influence cell phone banking adoption in South Africa.

Perceived value was found to be a critical factor that would influence a South African person to adopt Cell phone Banking. From the four items linked to this factor, convenience and time saving were the strongest influencers followed by relative advantage when compared to other electronic channels and lastly by cost. Thus they believed that all these items offered value propositions which would lead them to adopt Cell phone Banking. The cell phone with its unique mobility aspect is a device that is linked to convenience and time saving so it was not surprising to see that these items were strong influences. Generally the South African banking person tries to avoid having to visit bank branches and making calls to banks, and if a cell phone can offer the equivalence of services, people are likely to adopt the service.

The perceived risk factor was found to be a factor that could seriously affect the adoption of Cell phone Banking by South Africans. The underlying reasons that made this factor so important was primarily attributed to people not knowing how the technology worked and assuming it was a risky mode of transacting. It was also attributed to the security of the information on the cell phone. If the cell phone was stolen, the concern of information being compromised was prevalent. All items against this factor were strong influences towards this factor.

The trialability factor was also found to be a significant factor that impacted the adoption of Cell phone Banking by South Africans. The underlying reasons that made this factor important was primarily attributed to people wanting to experience the service first prior to actually being registered for it. This could have been either via a demonstration on how it worked or on a time limited trial basis.

The perceived credibility was the only factor that was not as influential when compared to the other factors however, it was a factor that was confirmed by the confirmatory factor analysis. The main attributes that influenced this factor were trust and confidence with their bank. Trust of the technology and the servicing bank which provided the Cell phone Banking offering commitment to keeping customers safe resulted in the factor of perceived credibility being important.

Lastly, the perceived complexity factor was found to be an important factor that could affect cell phone banking adoption in South Africa. The underlying reasons that made

this factor important was due to perceptions that Cell phone Banking required a complex setup process, and that Cell phone Banking itself was complex. This was probably due to the lack of the technology understanding by people and lack of awareness from banks on how to register forth service.

Since all the factors proposed could influence Cell phone banking adoption in South Africa it was found to be important and relevant, the propositions are all applicable and valid.

### **6.3 Recommendations**

As suggested in Chapter 1, the primary stakeholders that would be interested in the outcome of this study are banks in South Africa who have already, or are planning to enter the Cell phone Banking environment.

This research has found that the typical demographic characteristics of a potential South African cell phone banking user would include the following traits:

- Be either male or female,
- earn an income greater than R100,000 per annum,
- be between the ages of 18 to 35 and
- have at least a Matric qualification.

Demographical information would be useful to banks that want to increase the adoption of Cell phone banking users within their current environments by allowing them to better segment their target markets for this channel usage. This would allow more informed marketing and advertising campaigns focused at the correct segments where the most revenue could be utilised.

The identification and confirmation of these factors which influences cell phone banking adoption of Cell phone banking, provides banks with information on what is expected and what is required to make this channel more utilised amongst their

customer base. The perceived value factor would provide information that convenience and timesaving value propositions should be marketed aggressively. Cost and relative advantage should also be marketed to customers but these items are not as important as the former items mentioned.

The perceived risk factor emphasises what the banks need to focus on by addressing security risks for Cell phone Banking and informing customers that transacting via Cell phone Banking is secure. For example security and education of how the service works should be bundled in marketing and advertising campaigns.

The trialability factor provides a core reason that affects the adoption of Cell Phone Banking by a South African. This information highlights to the banks that they would need to offer a trial version of Cell phone Banking where a customer could experience and play with the application without the fear that they could lose information or incur losses on their bank accounts.

The perceived credibility factor emphasises what the customer's concerns would be for adoption of Cell phone Banking. Thus if a bank wants to be successful in acquiring a customer to this channel, they need to ensure that trust with the technology and confidence is already established. For example, a bank could offer a money-back guarantee if it is found that a customer was not in error whilst transacting. This factor would also speak to the brand where if the brand has been associated with bad practices previously, it will be harder to convince customers to adopt a new service such as Cell phone Banking.

Lastly, the perceived complexity factor could provide banks with information on what setup and registration process is required to make adoption of Cell phone Banking easier. The underlying reason for this factor is lack of understanding of the technology used for Cell phone Banking and marketing campaigns should speak to how easy it is to set up Cell phone Banking. Banks should also address the setup procedures where necessary e.g. set up the cell phone for WAP. This information should be visible and easily accessible on the Cell phone Banking application itself.

The profiling together with the identified factors provides beneficial information to banks to ensure that if they want to increase adoption of Cell phone Banking in their environments, they would be aware of what is required to make this happen. Essentially the factors identified provide the banks with an opportunity to increase their sales and increase profits by addressing the factors via innovative marketing and educational promotions to tell customers what Cell phone Banking is, how it works, what the benefits are and highlight the security aspects and advantages.

#### **6.4 Regulatory changes that could foster cell phone banking adoption**

In addition to reconsidering how to execute existing responsibilities and duties, more effective conditions can be created by regulators to foster the cell phone banking environment. The exact definition of an enabling environment is subjective but could be defined as being characterized by openness to new cell phone banking models and a degree of certainty in regulatory frameworks or guidance regarding new approaches. Several regulatory changes that could bring more certainty and help promote cell phone banking, include regulations governing the use of agents to facilitate financial services, the ability of mobile operators to deploy mobile financial systems as a principal operator, the characterization of value stored in a mobile account as a deposit and therefore eligible to earn interest and to be protected by deposit insurance, and appropriate anti-money laundering and combating fraud and terrorism regulation for the mobile context. The specific areas of focus indicated below identify some regulatory changes that could promote cell phone banking.

The telecommunications regulatory regime may place restrictions on the ability of mobile operators to offer non-telecommunications services, such as cell phone banking or m-payment services. In some countries, the telecommunications regulator may require additional licenses. For example, value-added service licenses may be required and the specific service to be provided must be included in the license. Requiring a separate license or the inclusion of service descriptions in a license are not insurmountable barriers to the launch of cell phone banking services. However, depending on the licensing process, including the efficiency of the regulator in

processing license applications or amendments, such requirements may create barriers limiting or slowing the entry of mobile network operators into the cell phone banking market.

In addition, coordination of licensing requirements with other regulators is key here as it may be that the cell phone banking provider may also be subject to licensing requirements from the financial regulator. In order to foster cell phone banking, it may be useful to see what efforts can be made to streamline any licensing process that is imposed on cell phone banking providers.

## **6.5 Suggestions for further research**

One possible area for future research is to investigate the registration channels used for Cell phone banking in South Africa and determine what factors are likely to increase the adoption of Cell phone banking via the respective channels. Marketing of Cell phone Banking has been in place for some time now in South Africa, but the adoption is still not as expected with the increased number of highly technical cell phones on the market.

Another possible area for future research is to investigate what the different demographics of the South Africa population perceive Cell phone Banking is and how it benefits them. This area of study would be important as it is possible that there are different needs from the different segments. Understanding of these could also drive different strategies for banks in terms of providing functionality that suit the different segments e.g. the mass market needs could be totally different to a wealthy customer's needs.

Various other factors could be explored and explicitly examined such as awareness, cost and security. Elements of these may be represented in the factors examined, but these may provide more information if they operationalized as distinct factors.

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## APPENDIX A: SURVEY QUESTIONNAIRE

**Please complete the section by ticking the options applicable to your statement.**

Mark applicable with a cross (X)

### Section A : Cellphone Use and Technology

No	Question	YES	NO	Don't Know
1	Do you have a cellphone?			
2	Do you know what Wireless Application Protocol (WAP) is?			
3	Is your cellphone WAP enabled?			
4	Do you know what Wireless Internet Gateway (WIG) is?			
5	Do you know what menu based banking is?			
6	Do you think cellphone banking is easy to use?			
7	Do you know the difference between WAP and WIG?			

8. What do you use your cellphone for? (Mark all that apply)

To receive calls	
To make calls	
Banking	
Playing Games	
Internet	
SMS	
Social Media	
Calculator	
Other	

**Section B: General**

1. Which Bank do you currently use? (You may choose more than one option if necessary)

ABSA	
FNB	
Standard Bank	
Nedbank	

2. Which of the following do you most use for banking?

Internet	
Telephone	
ATM	
Cellphone	
Branch	

3. Have you ever used your cellphone to perform a banking transaction?

YES	
NO	

4. If NO, would you ever use your cellphone to perform a banking transaction?

YES	
NO	
Don't know	

**Section C: Cellphone banking adoption factors**

Mark with an X for each question below (only select one option per question)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't know
	1	2	3	4	5	
<b>Trialability - I would be more likely to use cellphone banking if:</b>						
I could test cellphone banking first						
I could use it on a trial basis to see what it offers						
I could see a trial demonstration first						
<b>Complexity - I am less likely to use cellphone banking because:</b>						
Cellphone banking is complex to use						
Cellphone banking requires a lot of effort						
Cellphone banking requires a complex setup/registratrion process						
<b>Perceived Value - I would be more likely to use cellphone banking if:</b>						
Cellphone banking offered me better capability than other banking channels						
Cellphone banking was free						
Cellphone banking is a convenient way of banking						
Cellphone banking would save me time when perform banking transactions						
<b>Perceived credibility - I would be more likely to use cellphone banking if:</b>						
I know that if I made a mistake using cellphone banking my bank would refund me						
I know I could trust the technology						
I know that my banking details are safe if my phone is stolen or lost						
<b>Perceived Risk - I am less likely to use cellphone banking because:</b>						
Cellphone banking is a risky mode of doing banking						
I am concerned about the security aspects of cellphone banking						
Information concerning my cellphone banking transactions can be tampered with by others						

**Section D – Demographic Profile**

Mark with an X for each question below

1. Age Group

18 -25	26 - 30	31 - 35	36 - 40	41 - 50	51+

2. Gender

Male	
Female	

3. Highest level of education

Did not finish school	
Matric	
University/Technikon	
Other	

4. Salary per Annum (Before Tax)

R0 – R60,000	
R60,000 – R100,000	
R100,000 – R250,000	
R250,000 – R500,000	
Greater than R500,000	

## APPENDIX B: CONFIRMATORY FACTOR ANALYSIS USING NCSS 2007

Loadings Plot	Storage	Template
Variables	Reports	Scores Plot
<p><b>Input Variables</b></p> <p>Variables: <input type="text" value="IT1-PR3"/> <input type="button" value="↑"/> <input type="button" value="↓"/> Data Input Format: <input type="text" value="Regular Data"/></p>		
<p><b>Covariance Estimation Options</b></p> <p><input checked="" type="checkbox"/> Robust Covariance Matrix Estimation Robust Weight: <input type="text" value="4.0"/></p> <p>Missing Value Estimation: <input type="text" value="None"/> Maximum Iterations: <input type="text" value="6"/></p>		
<p><b>Factor Options</b></p> <p>Factor Rotation: <input type="text" value="None"/> Number of Factors: <input type="text" value="5"/></p>		<p><b>Communality Options</b></p> <p>Communality Iterations: <input type="text" value="6"/></p>

Loadings Plot	Storage	Template
Variables	Reports	Scores Plot
<p><b>Select Reports</b></p> <p><input checked="" type="checkbox"/> Descriptive Statistics <input checked="" type="checkbox"/> Community Report</p> <p><input checked="" type="checkbox"/> Correlation Report <input checked="" type="checkbox"/> Community Bars</p> <p><input checked="" type="checkbox"/> Correlation Bars <input checked="" type="checkbox"/> Variable List</p> <p><input checked="" type="checkbox"/> Eigenvalue Summary <input type="checkbox"/> Score Coefficients</p> <p><input checked="" type="checkbox"/> Eigenvector Report <input checked="" type="checkbox"/> Iteration Report</p> <p><input checked="" type="checkbox"/> Eigenvector Bars <input checked="" type="checkbox"/> Score Report</p> <p><input checked="" type="checkbox"/> Loadings Report</p> <p><input checked="" type="checkbox"/> Loadings Bars</p>		<p><b>Select Plots</b></p> <p><input checked="" type="checkbox"/> Scores Plot</p> <p><input checked="" type="checkbox"/> Row Numbers</p> <p><input checked="" type="checkbox"/> Loadings Plot</p> <p><input checked="" type="checkbox"/> Row Numbers</p>
<p><b>Report Options</b></p> <p>Minimum Loading: <input type="text" value="0.400"/> Precision: <input type="text" value="Single"/></p> <p>Variable Names: <input type="text" value="Names"/></p>		<p><b>Plot Options</b></p> <p>Number of Factors Plotted: <input type="text" value="3"/></p>