An Exploratory Study of the Challenges facing Mobile-banking Services in South Africa

A Research Thesis

presented to

The Graduate School of Business

University of Cape Town

in partial fulfilment

of the requirements for the

Masters of Business Administration Degree

by

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December 2009

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ABSTRACT

This study has been conducted in order to identify and understand the biggest challenges affecting the mobile banking industry in South Africa. The study also investigated what can be done at a service provider level to mitigate those challenges. The study was performed following recognition that mobile banking is rapidly developing but that growth in South Africa has been somewhat slower than what would have been expected.

Information supporting this study was extracted from past research having focused on South Africa and from interviews with researchers and practitioners actively involved in the field. The research used a qualitative approach since a need for more such research has been identified in previous studies. The research thus took an exploratory approach and semi-structured interviews were used as research instrument.

The main findings from this research showed that there are five major challenges facing service providers. Those are user adoption, regulations, scalability of the business model, technology limitations and security. It was found that user adoption was unanimously considered as a challenge. Regulations, scalability of the business model and technology limitations were prevalent but did not affect all the service providers equally. Security was the challenge that was the least brought forward.

Several possible solutions were also presented and discussed. It was found that the user adoption challenge could be addressed at the service provider level. Scalability of the business model, technology limitations and security issues can also be partly addressed at service provider level. Regulatory issues however can only be addressed at regulator and policymaking level. However the service providers can collaborate with the policy makers in order to help in the drafting of more appropriate regulations.

This study can serve as foundation for a series of further research. The findings of the research need to be statistically validated and this can give rise to one such further research. Such research would involved end user participation and would require more time and financial resource.
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GLOSSARY

ATM – Automatic Teller Machine

GDP - Gross Domestic Product

GPRS - General Packet Radio Service

GSM - Global System for Mobile communications

HTTP - Hyper Text Transfer Protocol

KYC - Know Your Customer

POS - Point Of Sale

RFID - Radio Frequency Identification

SMS - Short Message Service

UMTS - Universal Mobile Telecommunications System

USSD - Unstructured Supplementary Service Data

WAP - Wireless Application Protocol

WiFi - Wireless Fidelity
ACKNOWLEDGEMENTS

I wish to thank all the people who have made this dissertation possible. First of all, I would like to thank Professor Thomas Koelble, my supervisor, for his guidance, support and the valuable insights he provided.

My thanks also go to all the persons who participated in the interviews; Yolande van Wyk of FNB, Brian Richardson of WIZZIT, David Reynders of POCit, Associate Professor Irwin Brown and Professor Gary Marsden of UCT. A special word of thanks to the latter for providing additional guidance for this thesis.

I also wish to thank all my classmates who have helped by providing support, guidance and putting me in contact with the right people for the interviews.

Finally I would like to thank my family for their continuous support and encouragement.

Signed: Nessen Ramsamy
1 INTRODUCTION

1.1 Research Area and problem

In the past few years, several mobile banking (M-banking) initiatives have taken off in Africa as illustrated by the success stories in Kenya, South Africa and other African countries (Hughes & Lonie, 2007). The cause of this phenomenal growth of mobile banking in some African countries is a combination of restricted access to conventional financial services and a rapidly increasing mobile phone market, the fastest-growing in the world (Blycroft Ltd., 2008). The M-PESA service in Kenya, for example, is transacting in excess of US$8.5m per day (Greenwood, 2009). Furthermore, the opportunity that mobile banking offers in providing financial services to a large unbanked population has fuelled interest from development organisations, including the World Bank.

However, adoption of mobile banking has not been uniform across all African countries where such services have been deployed. M-PESA in Kenya has 6.3 million registered customers whereas in neighbouring Tanzania, the number of registered customers for the same service is only 230,000 (Rasmussen, 2009) despite the fact that both countries have similar population size and mobile phone and traditional banking penetration pattern (Alvarez, Jansen, & Arons, 2009).

In South Africa, the mobile operators, banks and independent ventures have tried to ride the mobile banking wave. Despite one of the highest mobile phone penetration on the continent (Alvarez, Jansen, & Arons, 2009), adoption has, until now, been somewhat disappointing when compared to the Kenyan case (Mas & Morawczynski, 2009), (Mehdi, Ratan, & Toyama, 2009). In South Africa, Brown et al. (2003) report that while all major banks provided cell phone banking, very few customers actually used those services (Brown, Cajee, Davies, & Stroebel, 2003). Several studies have looked at specific individual challenges that affect mobile banking in South Africa such as research published by Brown (2003)(2005), Porteous (2006)(2009) and Ivatury (2008). However there has not been a single study that has attempted to provide a comprehensive overview of the challenges facing this sector. This paper is an exploratory study of the challenges facing mobile banking solutions providers in South Africa and the main factors that are potentially limiting the growth of this industry in South Africa.
The study aims at filling gaps both in the research and the practitioner realm. Research in the field has tended, up till now, to be technology-led with emphasis on devices and new ways to deliver services (Ducombe & Boateng, 2009). Most practitioner-based research have, in general, focused on a specific technology or service and, as such, were usually biased in favour of these specific services. The comparative studies performed have mostly looked at mobile banking services across countries and consequently could not adequately generate substantial findings within a specific regulatory, social and cultural context. This research attempts to bring together knowledge and information from the different providers of M-banking solutions in South Africa as well as past research performed specifically within the South African context, to obtain an overall understanding of the challenges that affect growth of the sector. The findings could be useful to the industry, especially to new ventures, and could possibly guide further academic and industry research.

A further motivation for such a research is that anecdotal evidence seems to show that access to financial services on mobile phones tends to boost economic activity in the poorest part of the world and positively impacts GDP (Economist, 2005). Mobile phones reduce transaction costs, broaden trade networks and substitute for costly physical transport. They are of particular value when other means of communication (such as roads, post or fixed-line phones) are poor or non-existent. Mobile phones do not rely on a permanent electricity supply and can be used by people who cannot read or write (Economist, 2005). However this observation could be affected by reverse causality, that is the ambiguity as to whether M-banking causes a reduction in poverty or whether a reduction in poverty leads to a wider use of mobile phones and mobile banking. But the possibility that mobile banking actually reduces poverty level, further justifies this. Furthermore, since the end of apartheid, the South African government has made it a priority to extend reliable financial services to its low-income citizens who traditionally have been excluded from financial access. This has not yet yielded concrete results and mobile banking may be the key to reaching the millions of unbanked South Africans.

The number of M-banking services available and the range of items that can be purchased using mobile phones differ from country to country but are expanding at an exponential rate. According to an article by Juniper research (Wilcox, 2008), total mobile payment volume will grow tenfold by 2013. According to a Gartner report the mobile payment industry will grow steadily to 190 million users in 2012 representing more than 3% of the total mobile users worldwide and will attain a level
which will be considered "mainstream" (Shen, 2009). The number of mobile payment users worldwide will total 73.4 million by the end of 2009, an increase of 70.4% over 2008 when there were 43.1 million users (Shen, 2009). The industry could make use of the present research to identify the best way to approach the field. Policy makers could also make use of this study to identify policy changes that are required to best promote industry growth and affect positively on society.

A final motivation for this research was guided by the researcher’s personal experience and interest. The researcher has an information technology background with specialisation in mobile and ubiquitous computing. He has worked both in the telecommunication and the e-commerce industry and has carried out projects that brought together technology from the two industries to create new services. This has led him to identify the scale of potential business opportunities that can arise from aggregating these two fields. However, he has, at the same time, come to acknowledge that there are several dimensions, besides technology, that affect the release and adoption of such services. These dimensions include policies and regulations, financial and economical concerns, cultural considerations etc. This research would thus allow for a better investigation of these dimensions and get a comprehensive understanding of the field.

1.2 Research questions and scope

The mobile banking industry in South Africa is dominated by three types of industry players; the banking institutions, the telecommunication service providers and the independent ventures. In most cases the product offered involves a collaboration or partnership between two or more of these industry players. These different stakeholders have traditionally approached the field with slightly different goals. Telecommunication operators aim at increasing customer base and usage, the banking institutions typically aim at increasing their customer base but also at providing service flexibility for customers, while independent ventures have claimed more philanthropic motivations such as bringing financial services to the unbanked etc. These different industry players have, so far, not been able to fully tap into the South African market.

The success of a mobile banking business does not rely solely on the technology or the business model. Porteous in 2006 published a paper on the enabling environment for mobile banking in Africa. He defines an enabling environment as ‘the set of conditions, which promote a sustainable trajectory of market development,’ (Porteous, 2006). He argues that in any new market, for the
environment to be enabling, there needs to be a right mixture of legal and regulatory openness which would ensure sufficient flexibility for businesses to experiment and sufficient certainty so that businesses feel secure that the regulatory framework will not change arbitrarily and affect them. Porteous thus argues that countries with low levels of effective regulation may encourage experimentation but would present, on the other hand, a fair amount of risk for investors given the uncertainty of the regulations. Countries with a more rigid regulatory framework may, however, stifle entrepreneurial ventures. In the South African context it is important to look at the legal and regulatory framework to determine whether it provides the right balance for M-banking businesses to develop and grow.

Besides the regulatory framework, consumer usage acceptance is another factor that affects the growth of mobile banking services. Several research papers have tried to look at what drives consumer usage acceptance of mobile payment (Poustchi & Wiedemann, 2007), (Gerpott & Kornmeier, 2009), (Mallat, 2007). These studies have proposed that factors such as technology acceptance, task-technology fit, lack of other payment methods, urgency, pricing and ease of use of technology are amongst the other factors that affect the acceptance of the mobile payment services. However factors affecting consumer acceptance would likely vary from country to country. Consequently, consumer acceptance is another aspect that needs to be investigated in order to determine its impact on the growth of M-banking services in South Africa.

Besides these commonly discussed factors, it may be insightful to understand which other factors affecting the mobile banking industry may exist in the specific South African context. There are several mobile banking service providers currently operating in South Africa. These service providers have had varying levels of success and it would be relevant to investigate the differing experiences of some of these companies. There would certainly be lessons to be learnt at the service provider level. The researcher thus puts forward a set of questions worth investigating: What are the common and the unique experiences of the different mobile banking service providers in South Africa? Could these experiences be used to extract best practices and a better way of targeting the market?

From these questions a central question for this research was derived, as follows:

“What are the challenges affecting the growth of mobile banking in South Africa and how could these challenges be addressed?”
This study was purposely limited to South Africa and not extended to the larger African or developing countries context for the following reasons:

- **The time scope for this project:** Given the limited time available to conduct this research, it would not have been possible to extend it to an international context.

- **Impact of secondary variables on the research:** Previous studies have in many cases amalgamated countries with similar characteristics such as their development stage or geographical location to derive findings. In particular, several research have looked at M-banking in developing countries (Alvarez, Janssen, & Arons, 2009)(De bruyn, 2006)(Donner, 2007)(Ducombe & Boateng, 2009)(Mehdi, Ratan, & Toyama, 2009) or more specifically in Africa (Hughes & Lonie, 2007)(Greenwood, 2009)(Mas & Morawczynski, 2009)(Porteous, 2006). However, many of these studies have failed to take into consideration the fact that different countries have different economic and regulatory systems and cultural and social settings and that these variables are likely to affect comparison in more than one way. The researcher thus argues that in order to derive more reliable findings a maximum number of variables have to be kept constant. By limiting the research to the South African case only, he wants to reduce the variation due to factors such as those mentioned above can give rise to.

- **Access to information:** A study on a regional or international scale would have required access to information in international companies. Time and financial constraints limited the possibility of obtaining new information from regional and international companies.

Furthermore, again due to the time and financial limitation which this study is subjected to, it was not feasible to perform research at a micro level, that is, an investigation from an end user perspective. Such an approach would have required user input and feedback, which is very hard to collect given the geographical spread and variation in literacy level of current and potential users. As such the research was performed at the meso-level identified by Ducombe and Boateng (2009), which implies gathering information from the service providers rather than from the users or policy makers. The research looks at processes of adoption or adaptation rather than assessing needs or requirements, looking at design of systems, areas of application or assessing impact.

### 1.3 Research Assumptions

The research makes several assumptions:
1. It was assumed that the major industry players would welcome such a research and find the information useful to help the industry grow.

2. It was assumed that the major industry players would collaborate by allocating time and resources for interviews – the response from the industry was mixed. Independent service providers were very keen to help out but it was very difficult to obtain information from banks and telecommunication service providers were very reluctant to release information for publication. This resulted in that the information obtained from the telecommunication service providers could not be used for the purpose of this research.

3. It was assumed that the people interviewed would be knowledgeable in the subject matter and would provide reliable and valid information – the industry practitioners interviewed were very knowledgeable and were thus very helpful. Where the interviewees felt less confident, they were clear about it. The opinions expressed by some of the interviewees seemed to be biased towards the type of products they offer.

1.4 Research Ethics

In conducting this research several ethical issues were taken into consideration. The research first of all abides to the American Psychological Association (APA) Guideline as stipulated by the UCT/GSB Research Guideline. The APA Guideline provides for several ethical requirements which were enforced as set out hereunder:

- **Planning:** The research project was planned in such a way that the possibility for misleading results was minimised and that it met ethical acceptability. Furthermore, participants were informed in advance about the data that would be collected and its use in the research. Questions were sent in advance when requested.
- **Responsibility:** Participants were treated in an ethical manner.
- **Reporting results and plagiarism:** Data was not fabricated or falsified and erroneous data was not used. Proper recognition is given to work performed by others through appropriate citation and referencing, as stipulated by the UCT/GSB guidelines.
- **Informed consent:** In order to ensure informed consent, participants to the study were informed of the general nature of the study as well as any potential harm or risk that the study may give rise to. Deception was not used to secure participation.
Another important ethical issue that needed to be considered in this study had to do with data protection. Since several competing companies were asked to participate in this research it was important that they were made aware of how the information gathered would be used and they were given the right to veto publication of information that could potentially affect their competitiveness or reveal key strategies. For example, one interviewee in fact requested that the information provided be not published. The request was respected. It was also important to ensure that confidential information was not shared even on an informal basis.
2 LITERATURE REVIEW

The literature review is organized in two main sections. The first section helps to clarify what mobile banking means and places the technology within the larger framework of mobile commerce and electronic banking. Although the actual research does not have a technology focus, this section aims at giving the reader a theoretical grounding in what the technology actually entails. The second section looks at the current state of research on mobile banking with particular focus on investigation of factors affecting deployment and adoption of mobile banking products. This section provides information on how research is being currently performed in this field. It also helps to identify gaps in the research field and on the best way to approach the research.

2.1 What is mobile banking (M-banking)?

Terminologies such as M-commerce, M-payment, M-finance, M-remittances and branchless banking have been indiscriminately used in the literature to describe related technologies. The terms M-banking, M-payments and M-finance refer collectively to a set of M-commerce applications which enable people to use their mobile telephones to manipulate their bank accounts, store value on an account linked to their handset, transfer funds, or even access loans or insurance products (Donner, 2007). Mobile banking (M-banking) is a subset of e-banking in which customers can access a range of banking products and a variety of savings and credit instruments, via electronic channels (Porteous, 2006).

Alvarez et al. (2009) distinguish between mobile remittance (M-remittance), mobile payment (M-payment) and mobile banking (M-banking). As such, M-remittance concerns the sending and receiving of funds, domestically and across international borders, M-payments are based on transactions, possibly over text based mechanisms, between a user and retailer, M-banking, on the other hand, encompasses a larger array of mobile account management as well as mobile financial information needs. According to the authors, mobile-remittance, mobile-payment and mobile-banking are all composites of mobile commerce. This description seems to separate M-payment from M-banking.

Porteus (2006) however classifies M-payment as a subset of M-banking. He argues that M-banking refers to access by the mobile device to the broader range of banking services, such as account based savings or transactions products offered by banks (Porteous, 2006). He further argues that M-
banking and M-payments are themselves subsets of the broader domains of e-banking and e-payments respectively. This classification of M-banking with respect to M-commerce, M-payment and e-banking is more appropriate since M-banking implies the availability of all the banking services through mobile devices. Porteous (2006) defines M-payment as “the transference of value from payer to payee, as in remittance or bill payment” (Porteous, 2006) thus placing mobile remittance as a subset of M-payment. As illustrated in Figure 1 below, mobile payments and ultimately mobile remittances can be grouped under the larger portfolio of mobile banking.

![Figure 1: M-banking as part of the electronic commerce](image)

M-finance includes mobile banking and possibly other non-bank related financial features. Branchless banking includes all banking activities that do not occur through an actual bank branch, as such the term includes mobile banking but also includes other business models such as agent banking where banks in remote areas, in substitution for an actual bank branch, use trusted agents. For the purpose of this research, only mobile banking will be looked at. As can be seen from figure 1, this also includes mobile payment and mobile remittance.

Mobile banking models can be categorised as (Porteous, 2006):

- **Additive models**: where the mobile phone is just another channel to the bank account.
• **Transformational models**: where the financial product linked to the use of mobile phones is targeted at the “unbanked” (people without bank accounts or access to banking services), which are largely poor people.

Mobile payment and mobile remittance can follow both models.

### 2.1.1 Mobile payment (M-payment)

Hu, Lee & Kou (2004), also place mobile payment as a subset of mobile commerce. They define mobile payment as the process of two parties exchanging financial value using a mobile device in return for goods and services (Hu, Lee, & Kou, 2004). Mobile payment entails the use of mobile phones to make electronic payments. An electronic payment typically involves the exchange of electronic data instead of physical money in order to purchase some product or service. The electronic data transfer eventually translates to actual money transfer and this is performed typically between two financial services providers and the payment is made to the product or service provider. With mobile payment, the electronic payment data originates from a mobile device. A classic mobile payment lifecycle involves several steps (Hu, Lee, & Kou, 2004):

1. **Registration**: The customer creates an account with a mobile payment service provider (PSP).
2. **Transaction**: The transaction typically involves four steps:
   a. The customer performs a purchase (possibly by sending a short message service message, SMS).
   b. The content provider (merchant) forwards the request to the PSP.
   c. The PSP requests the trusted third party (TTP) for authentication and authorisation.
   d. The PSP informs the content provider on the status of the authentication and authorisation. If successful, the content provider will deliver the purchased content.
3. **Payment settlement**: The actual financial settlement is made (money is transferred from customer account to content provider’s account). Figure 2 illustrates this process.
A Gartner report (Shen, 2009) defines mobile payment as paying for a product or service using mobile technology such as a short message service (SMS), Wireless Application Protocol (WAP), Unstructured Supplementary Service Data (USSD) and Near Field Communication (NFC) or contactless payment. This definition can be extended to include direct mobile billing where the customer mobile account (mobile air time) is charged for the transaction rather than using some banking instrument such as cash, bank accounts or debit and credit cards and electronic wallets.

**SMS based transactional payments**

The customer sends a payment request through an SMS message to a specific number (usually a ‘short code’, that is a short phone number that can be easily typed or remembered). A premium is charged to the customer’s phone account. If the payment is approved, that is, the system confirms that the customer has enough credit or is allowed to make this transaction, the merchant is informed of the success. The latter can then release the paid-for product or service.

**Wireless Application protocol**

In this scenario the user accesses a webpage using the Wireless Application Protocol (WAP) and performs a payment very much like a payment on the Internet using a credit card or an e-wallet service. It is to be noted that nowadays, mobile phones increasingly have the capability of accessing the Internet using HTTP as well as WAP. As such mobile banking through the Internet is likely to
be performed more and more using HTTP rather than WAP. The HTTP M-banking model would be very similar to the WAP model.

**Unstructured Supplementary Service Data (USSD)**

USSD is a standard, other than SMS, used to transmit information over the cellular network infrastructure. It is generally used to query account information in GSM. However this technology can be used to transmit M-payment data as well.

**Near Field Communication (NFC)**

NFC is a technology that typically makes use of some physical capacity of the device to transmit information to a reader using signals other than the telecommunication signals such as GSM, GPRS or UMTS. An example would be a mobile phone with a Radio Frequency Identification (RFID) tag that would transmit identification information to a reader. The user might be required to then enter a private identification number (PIN) before being authorised to make a transaction.

**Direct mobile billing**

A further mobile payment technology gaining in popularity is direct mobile billing whereby the payment is not linked to a bank account; the actual telephone credit is debited during the transaction. Such a technology is suited for the transformational model of mobile banking since no bank account is required.

McKitterick and Downling (2003) provide a different classification of M-commerce according to the following categories:

- **Mobile operator payment**
  - Network operators are already used to the billing of customers and are as such well suited to deliver payment services. This type of payment is generally more suited to micropayments. It is sometimes referred to as ‘in-band’ payment since content and payment uses the same channel. This category would include USSD, direct mobile billing and some SMS-based types of mobile payment.

- **Out-of-band payment**
  - Here the payment channel is different to the one used for purchasing. This type of payment involves a financial institution, potentially in partnership with a network
operator. This category would include WAP and some SMS-based types of M-payment.

- Proximity payment
  - By using wireless technologies, such as Bluetooth, RFID and IEEE 802.11 (WiFi), mobile devices can be transformed into sophisticated payment devices that can process both micro and macro payments. The final category would include Near Field Communication and some SMS based types of M-payment.

2.1.2 Mobile remittances (M-remittance)

In its broadest sense, remittance refers to cash or in kind transfers from one place to another (Debruyn, 2006). Mobile remittances thus imply the ability to transfer money from one place to another using a mobile device. Remittance to Sub-Saharan African region was estimated at $18.6 million in 2007 and $19.8 million in 2008 (World-Bank, 2009).

2.1.2 Section Summary

In this section, different definitions of M-banking were looked at and the term was formalised. A grouping of the relevant terminologies was provided. Mobile payment and mobile remittance, which are both subsets of mobile banking, were further described. A high level description of the technology involved was then provided. The next section looks at some seminal research performed in this area.

2.2 Past research

This section looks at some key research performed in the mobile banking area. The aim is to investigate what is already known on the subject matter, the concepts and theories relevant, the methods and research strategies that have been employed in studying this area and any unanswered research question in this area. In order to do this both qualitative and quantitative research performed in the field, were considered.

The first study looked at was commissioned by the UK Department of International Development and written by David Porteous of Bankable Frontier Associates in collaboration with the Consultative Group to Assist the Poor (CGAP) (Porteous, 2006). The report looked at mobile banking in Kenya and South Africa. Reviewing this report provided an understanding of the
regulatory challenges in this industry and gain insights on the analysis of key findings and the methodologies used in this field of research.

2.2.1 The Enabling Environment for Mobile banking in Africa (Porteous, 2006)

The report was prepared in 2006 and some of the information provided, such as the mobile penetration and service adoption figures, are arguably outdated already. However it provides a good overview and analysis of M-payment in Africa with particular focus on Kenyan and South African cases. In his paper, Porteous looks at how the expansion of mobile telephony relates to the expansion of access to financial services in developing countries with particular emphasis on Africa. The report focuses on assessing the impact of policy and regulatory environment on M-banking in the two case countries. The author argues that Kenya and South Africa can be considered as low and middle-income countries respectively. The two countries come from different starting points and face different issues (Porteous, 2006).

The study takes an exploratory approach and:

- Looks at research on existing models of M-banking and at differences in regulatory framework in different places.
- Interrogates selected major providers of M-banking in the two case countries, through the use of questionnaires.
- Uses templates to categorise the state of law and regulation in areas affecting mobile banking in the pilot countries.

The study first looks at the enabling environment for the promotion of a sustainable market development. Porteous (2006) first recognises that the regulatory needs may differ depending on the development stage of the market. He uses the four commonly theorised phases of market growth (the pioneer phase, the breakout phase, the consolidated phase and the maturity phase) as framework and argues that the need for regulation, and the risk of not having appropriate regulations, changes as the market develops. Regulations not present initially might have to be developed so as to protect society against larger scale risks at a later stage.

Porteous then proposes some barriers and regulatory issues that are likely to occur at each phase. Presently the mobile-banking market can be considered as being at the breakout phase in Kenya and still moving towards the breakout phase in South Africa. Hence South African mobile banking
providers would currently still be facing technology instability, customer understanding and trust and business model issues. At a policy and regulation level, they may be finding gaps in the current laws and they may be faced with challenges with respect to balancing innovation and abiding to legal frameworks. As they move closer to the breakout phase, new barrier issues such as interoperability and customer education and adoption would crop up. With regard to policies and regulations, providers might be faced with unexpected new entrants, frauds and other issues such as having to interface with existing systems.

Porteous argued that, at an early stage, Openness (framework that facilitates entry for new ventures) and Certainty (secure framework provided by legislations and regulations) are ideal for market development. However it is often the case in new markets that one or the other dimension is neglected (Porteous, 2006).

The report then looks at some offerings of mobile banking in developed and developing countries and focused on four solutions; M-PESA and Celpay in Kenya, MTN Mobile money and Wizzit in South Africa. M-banking models are then categorised as follows:

1. ‘Pure’ bank driven
2. Joint venture with bank, where the bank holds the account or deposit.
3. Non-bank led, where a bank holds the account and deposit
4. Non-bank driven, where a telecommunication provider or some other non-banking organisation holds the account or deposit.

Going down the list the bank becomes less important. A decisive regulatory line is however only crossed with the fourth model, where a non-banking organisation effectively becomes a depository entity through the issuance of e-money (Porteous, 2006).

M-banking sits at the intersection of several regulatory domains. Porteous argues that at least five different regulators (bank supervisor, payment regulator, telco regulator, competition regulator and anti-money laundering authority) are involved in the crafting of policies and regulations which impact on this sector. There exist large complexities in coordinating these regulators. This may be one of the biggest limitations to the growth of M-banking (Porteous, 2006). The report identifies and analyses specific issues that would be of concern for each regulator. These issues are listed below:
• ICT Policy makers
  o The recognition of e-signatures or personal identification number (PIN) by law – are e-signatures or PIN recognised during legal disputes?

• Financial regulators
  o Consumer protection considerations – What structures are in place to protect the consumer against abuse? What are the costs involved in setting up protection schemes? How do these costs affect the pricing of the service?
  o Effect of M-banking on the banking and national payment system – The effect is likely to grow as the systems gain wider use and as such there would be more regulation to control access to the system and avoid failure and large impact on the banking system.
  o The legal distinction between payments and deposits – May need to be clarified
  o Definition of the handling of e-money.
  o Provisions regarding agencies for cash withdrawal and deposits.
  o The impact of anti money laundering regulations – such measures might require documents or warranties that would in principle deter a large portion of potential users from subscribing to the service in developing countries.

• Competition regulators
  o The acceptable boundaries of co-operation.
  o Anti-competitive ‘lock in’ and ‘lock out’ issues – whereby customers could be locked into using only one provider effectively locking out potential new entrants in the industry.

• Telecommunication regulators
  o Licensing requirements
  o Solvency issues

Most of these concerns are addressed in the South African context. Porteous states that ‘in general, South Africa has a well developed legislative and regulatory environment, which create relatively high certainty’ (Porteous, 2006). He however argues that the current environment is not necessarily conducive for the rapid growth of transformational approaches. The response to the questionnaires sent to the four participating service providers in the context of the study by Porteous highlighted the following regulatory concerns:
• A lack of clarity and consistency with regard to Customer Due Diligence (CDD) (proof that the service providers know who their customers are) regulations.
• Customer protection laws requirements were not suited for the industry.
• Difficulty and cost of access to the national payment system.

One interesting observation that came out of the findings from the questionnaires is that the biggest barriers reported by the surveyed providers are not primarily regulatory or legislative. They are:

• concerns around educating customers to the use of the product.
• issues around the building of trust and awareness of a new financial brand.

Thus Porteous recognises that there are other aspects, besides policies and regulations, which may have a significant effect on whether M-banking can or will take off in a particular country. The factors listed by the author are as follows:

• Mobile phone penetration – the higher the mobile phone penetration, the more likely there will be mobile-banking users.
• Literacy level of the population – here the author argues that higher literacy level may speed up adoption.
• Access to existing e-payment infrastructure which allows for cash withdrawals – this is due to the ongoing need for physical cash and would prevail as long as e-money is not widely accepted. However the author warns that the existence of alternate ways of obtaining and handling finance may make it harder to persuade customers to shift to a new payment instrument.

Finally, Porteous proposes a framework of principles that he qualifies as ‘necessary, although they may not be sufficient’ for the enablement of M-banking in a country. The principles are grouped in two tiers and would vary at different phases in the market development.

The first tier principles are necessary for any M-banking solution to emerge, these principles are (Porteous, 2006):

1. There should be sufficient certainty around electronic contracting – that is electronic signatures must have sufficient legal recognition.
2. Customers should be adequately protected against fraud and abuse – that is there should be clear disclosure at opening and transaction time, providers should accept liability when in fault and there should be a clear, simple and fast complaint/ dispute resolution process.

3. Inter-operability should be encouraged – this implies that account holders should be able to access the payment platform of any service provider and that customers should be able to switch financial providers without having to lose their cellular number.

The second tier principles are necessary for transformational models to emerge and succeed (Porteous, 2006):

4. Customer due diligence should be risk based so as not to unduly prejudice small account holders.

5. Customers should be able to deposit and withdraw cash other than through bank branches (typically through remote agents).

6. Issuance of e-money should be allowed by appropriately capitalized and supervised entities, which are not necessarily banks.

According to Porteous, these principles could help identify the key aspects of openness while ensuring greater certainty over the possible trajectories of market development.

Porteous concludes by stating that for M-banking to reach its potential, enablement is likely to be required and that without it the market will be affected by a much lower ultimate level of usage and access.

The report helps place into context the regulatory framework issues surrounding mobile banking and shows that the challenge is not only in having the best technology or business model. However the report appears to be somehow biased towards giving a substantially higher weightage to the impact of regulations and policies to the detriment of other possible factors.

The methodology used for the research is unclear. Although the author claims to have extracted information from existing research, this is poorly reflected in the report. The choice of research tool for collecting primary data is also questionable since no information was provided on the number of questionnaires sent and to whom within the participating companies. Also, no justification is provided as to why such a limited number of participating companies were used and on the motivations behind choosing these specific companies. There was no information gathered from
‘purely’ bank driven initiatives for example. As such the reliability and completeness of the research is arguable.

The next study approached the issue from the user acceptance perspective. The research used a quantitative design and adapted a framework used for Internet banking research in order to look at user acceptance in the mobile banking field. The research was carried out in South Africa and concerns therefore the market we are looking at. However the study was undertaken in 2003, the mobile industry has changed a lot since then and some of the findings may therefore be outdated. Nevertheless the research offers a good insight into how quantitative research is performed in this field and how a framework from another field can be adapted for the mobile banking context.

2.2.2 Cell phone banking: predictors of adoption in South Africa – an exploratory study. (Brown, Cajee, Davies, & Stroebel, 2003)

This study aims at understanding how to increase the rate of adoption of cell phone banking by looking at the factors that influence such adoption in a South African context. The authors based their research on a framework developed for Internet banking (Tan & Teo, 2000) and used the nine factors from the framework to propose a set of nine hypotheses. Users were then surveyed; making use of a questionnaire that was divided as follows:

- Cell phone usage – looks at cell phone usage and user experience at making use of the device.
- Banking – enquires about the banking habit of users.
- Cell phone banking adoption and factors of influence – looks at use or intended use of cell phone banking.
- Demographic profile – gathers the demographic data of the respondents

The authors argue that due to the exploratory nature of the research, they could make use of convenience sampling. The survey was conducted at malls and shopping centres and was mostly performed in Cape Town (85%). As acknowledged by the authors, the sampling population is not representative of the whole population of cell phone users in South Africa. They recognise that the point of view of those who were not young, educated and affluent were poorly represented (Brown, Cajee, Davies, & Stroebel, 2003). They argue that it is mainly those who are employed and earning a salary that would be concerned with banking (Brown, Cajee, Davies, & Stroebel, 2003). However this is not necessarily the case. The Kenyan case of M-PESA has shown that the unbanked could be
interested in banking and that inaccessibility could be what put them off. The authors also acknowledge that most of the respondents had some idea of the concept of cell phone banking. In total they collected data from 162 respondents.

The study reports that despite the fact that 91% of the respondents had a cell phone, only 6 % had ever used cell phone banking. More interestingly 35% of respondents indicated that they would use it and 34% that they would not. The study also shows that those who use cell phone banking are generally technology enthusiasts and use above average functionalities from their cell phone. The findings report no correlation between risk and complexity. Out of the nine hypotheses proposed, four were confirmed. They are (Brown, Cajee, Davies, & Stroebel, 2003):

1. The greater the perceived advantage that cell phone banking offers over other forms of banking, the more likely cell phone banking would be adopted.
2. The greater the opportunity for trying out cell phone banking before committing to usage, the more likely it would be adopted.
3. The greater the number of banking services that would be required, the more likely cell phone banking would be adopted.
4. The greater the perceived risk of cell phone banking, the less likely it would be adopted.

The authors conclude that the factors likely to influence adoption include relative advantage, ability to try the product, the customer need for banking services from a cell phone and lower perceptions of risk. They nonetheless recognise that other factors not explicitly included in the framework proposed by Tan & Teo (2000) could have been relevant and acknowledge this as another limitation of their framework. They propose that future research look at differences in adoption processes between different forms of banking channels in view of understanding why users select certain channels. Most importantly this research highlights one major limitation of performing research with end users in South Africa; the difficulty in obtaining a fairly represented sample population. Obtaining a fair sample would involve several issues such as geographical spread, culture, finance, language etc.

Finally, for the literature review section, a review of publications was looked at in order to get an overview of the field. The work focuses on developing countries and categorises research performed in the past 8 years on mobile phones and financial services. The study enables the
identification of gaps in the research field and provides information on what and how research in the field can be undertaken.

2.2.3 Mobile Phones and Financial services in Developing Countries: A review of concepts, methods, issues, evidence and future research direction (Ducombe & Boateng, 2009).

This paper provides a review of concepts, methods, issues and evidence from 43 research articles published in peer-reviewed academic journals, non-peer reviewed studies and other practitioner-oriented sources from 2000 to 2008. It aims at primarily assessing the current state of knowledge regarding the potential of mobile phones as a delivery mechanism for financial services for the poor in developing countries (Ducombe & Boateng, 2009). Although this is not the focus of this research, since the focus of the current research is not restricted to a specific market segment, there is a substantial overlap between the publications assessed and the current research.

The term M-finance, in this paper, is used as an umbrella term for services like M-banking and branchless banking. The scope of the review means that the studies looked at, cross academic boundaries and look at various issues ranging from impact assessment of the service on the society to the technical design of the system. The type of content looked at was limited however to research addressing M-finance as a specific research area in a developing country context and excluded research in developed countries. As such some interesting studies on M-banking but relating to developed countries would have not been considered.

The authors highlight the fact that most of the research performed in the field so far have been ground level surveys carried out for specific purposes of industry practitioners as opposed to academically led research. Ducombe & Boateng (2009) do not separate in depth research from the anecdotal evidence and other literature based on opinion or policy prescriptions, arguing that the majority of the articles were not peer reviewed. This raises questions on the validity of the articles reviewed in this research and ultimately on the validity of the study itself. The paper seeks to provide a structured approach to analysing the literature and identifying gaps and trends in order to map out a research agenda for mobile phone applications and financial services in a development context.
Articles where primary data had been collected were critically assessed according to the theoretical and methodological approaches adopted. Methodological approaches were classified along a qualitative-quantitative range.

The authors first agreed on a preliminary coding scheme to be used as basis for the analysis in the study. They then reviewed and agreed on individual coding for each article. Applying the coding scheme, 43 research articles were agreed upon and included in the review.

The authors then classified the 43 research studies according to the following criteria:

1. The socio-economic level at which the research is carried out. The levels used were as follows:
   a. **Micro level**: focus is on owners or users of m-finance applications.
   b. **Meso level**: focus is on intermediaries that deliver m-finance services such as micro-finance institutions, network providers etc.
   c. **Macro level**: focus is on the institutions that deliver the infrastructure, determine regulations and policies within which the m-finance service can develop.

2. The type of problem that the research aimed to assess, including a temporal or time-dependent component. This resulted in the following four categories:
   a. Studies assessing needs or requirements
   b. Studies concerned with design of systems and areas of application
   c. Studies concerned with processes of adoption and adaptation
   d. Studies concerned with assessing impact.

3. Where the data for the study was sourced from:
   a. If new data was collected from primary sources
   b. If data was collected from secondary sources
   c. If no primary or secondary data was present

The classification shows a grouping of research around system design and areas of application at a temporal level. Collection and analysis of (new) primary data is concentrated at the micro-level and significantly less research analysed primary data at the meso and macro levels.
Another categorisation looked at the conceptual or methodological issues that showed up in the research and allowed the authors to identify gaps in the methodology and conceptual approach. The authors then positioned the studies according to whether the approaches were inspired by:

- Social theories
- Socio-technical theories
- Technical theories
- No evident theoretical approach

And whether the approach used was:

- Quantitative
- Qualitative
- Mixed (between quantitative and qualitative)
- Descriptive (where no methodological approach was evident)

The categorisation shows a good spread of research between the social theories, socio-technical theories, technical theories and research with no evident theoretical approach. 17 of the studies do not make use of a definable conceptual idea and 4 studies look primarily at technical concepts (Ducombe & Boateng, 2009).

The authors further used a schema adapted from Heeks and Bailur (2006) to differentiate between the conceptual approaches used. The schema identifies the following types of approaches:

- **Theoretically-based approaches**: make use of identifiable theory that can be applied and tested – studies they identified using this approach tended to be within the field of economics.
- **Framework-based approaches**: use frameworks derived from theoretical work – very prevalent in the studies and used in researching application, design and adoption.
- **Model-based approaches**: apply models but without reference to a deeper body of knowledge – applied principally to understand design and adoption.
- **Concept-based approaches**: make use of defined concepts, which are not necessarily grounded – used to explore transformational impact of m-finance.
- **Category-based approaches**: make use of prescribed set of factors but lacked an identifiable conceptual basis.
Out of the 43 studies, Ducombe and Boateng report 24 that are purely descriptive accounts with no discernable methodological approach. However the researchers remark that the lack of methodology does not mean that the studies are less insightful since they are often informed by experienced practitioners working in the industry. Only few studies, in proportion to the number of reviewed studies, actually extract new primary data on the basis of a prescribed methodology. Most of the surveys in the studies are cross-sectional in nature and are thus rather snapshots at a specific time. Only one study employs a purely quantitative approach.

Most studies make use of a mixed method approach using questionnaire survey techniques. Varying levels of reliability and validity testing have been incorporated in the surveys. Most studies lack appropriate triangulation; they do not use multiple research methods to cross check data or compare data to differing groups of stakeholders. The representativeness of the findings is questionable in many cases due to the small sample size used and lack of stratification and coverage (Ducombe & Boateng, 2009). Analysis is mostly restricted to users as opposed to providers of services (Ducombe & Boateng, 2009). The authors also suggest that there is a lack of in-depth qualitative case studies that could provide a basis for theorising. Another issue mentioned is with regards to assessing the impartiality of studies, which are non-peer reviewed. A large number of studies are more oriented towards specific industry needs.

The authors finally look at key research trends and gaps in the issues and evidence as well as the theoretical and methodological approaches used in the studies. Ducombe and Boateng highlight the fact that there is less research focusing on assessing impact, whether based on actual results or on forecasts as opposed to studies on application design and adoption. Since this particular field is relatively young, the scarcity of research made using actual results is not judged surprising by the authors; however they identify a gap with regards to research assessing impact based on forecasts. They argue that most research have been motivated by business models that emphasized market development rather than social models that could look more at community needs (Ducombe & Boateng, 2009).

The study also shows that a number of research highlight the potential of M-payment systems for remittance of small value but it is unclear how well the functionality of M-finance systems can be adapted to remittance channels that are largely informal, heavily based on culture, trust and social bonding (Ducombe & Boateng, 2009). The authors argue that research looking at needs and impacts seem not to have taken a very conceptual approach or used a defined framework.
Ducombe and Boateng (2009) identify the lack of in-depth qualitative studies analysing data as the most apparent gap in the methodological approach to the studies reviewed. The authors argue that this has led to a lack of conceptualisation. The authors highlight gaps in the research methods used such as non-representativeness of the population used for surveys and data collected using different methods. These affect the reliability and validity of the studies. Furthermore since most of the studies are exploratory and limited geographically, there are concerns with regards to the transferability of the findings. Finally the review shows that there has been a lack of focus, in the studies reviewed, on methodologies that emphasize user involvement.

In terms of future research direction, Ducombe and Boateng (2009) recognise that independent research is more likely to progress based on simpler research designs requiring less resources. However the authors also argue that, for research to have more impact, the research methods need to be enhanced. The authors suggest that this can be done by building on the current quantitative and mixed-method approaches and through clearer use of methodologies, which should assist in the transfer of the lessons learned. More detailed qualitative studies with more effective use of triangulation of research methods and sources of data should be designed.

2.3 Conclusion

The literature review provided some insights on mobile banking and how the technology works. There is some ambiguity in the literature around the term mobile banking and what it entails. An attempt has been made to provide a better definition by placing the term within the context of mobile commerce and e-banking. The case has been made as to why M-payment and M-remittance should be categorised as subsets of mobile banking.

Several research papers that have investigated the factors affecting deployment and use of mobile banking have been looked at. A qualitative study performed in Kenya and South Africa that looked at regulations and policies was first reviewed. Analysing this research allowed for a deeper understanding of how research is performed in this field. The research studied four African companies, two in Kenya and two in South Africa in order to understand the challenges facing these companies and proposed a set of principles that should be followed in order to improve the probability of success. The research design, methodology and findings put forward were then critically analysed. Gaps in the research were identified. In particular, the research seem to have not
placed enough emphasis on the impact that factors other than policies and regulations could have had on the development of the mobile banking product.

The paper by Brown et al. (2002) used a framework derived initially for Internet banking, in order to investigate the predictors of adoption for cell phone banking. The authors argue that there are important similarities between the two technologies. They state that four out of the nine factors put forward by the framework are valid for cell phone banking as well. Those factors are namely - relative advantage as compared to other services, the ability to try the service out first, the customer need for banking services from a cell phone and the perception of lower risk. The research takes a quantitative approach and was performed in South Africa, through questionnaires to end-users. The main limitations were that the sample used was not representative of the actual population of mobile users in South Africa and that the research was performed in 2002; the industry has evolved significantly since. This work highlights the difficulty of performing end user targeted research with a representative sample population. A larger and consequently more representative sample population is desirable but the financial and time resources required in obtaining such a sample population are substantial.

Finally we looked at a review of past literature that categorised several works in terms of their focus, the level at which the research had been performed and the methodology used (Ducombe & Boateng, 2009). This research identified research gaps in the field and suggested avenues to be investigated and points to be considered in studying this particular field. The paper shows a lack of in-depth qualitative studies analysing data, which has led to a lack of conceptualisation. The paper also reports gaps in the research methods used such as non-representativeness of the population used for surveys and data collected using different methods. These, affect the reliability and validity of the studies. Finally they foresee that independent research is more likely to progress based on simpler research designs requiring less resources and that, for research to have more impact, the research methods need to be enhanced. More detailed qualitative studies with more effective use of triangulation of research methods and sources of data should be designed.

Thus from the literature review we acknowledge a need for more in depth qualitative research that provide a better conceptualisation of the issues. The literature review also highlighted the need for quantitative end-user research with more representativeness but we argued that the resources needed to perform this type of research are beyond the scope of this project. The research will thus attempt to fill in the existing gap in providing more in depth qualitative research, that make
appropriate use of triangulation of research methods and data. The next section looks at the methodology used for the research.
3 RESEARCH METHODOLOGY

3.1 Research approach and strategy

The literature review identified several gaps in the current research within the mobile banking field. The research will attempt to fill the gap existing for in-depth qualitative research that aims at conceptualising the learning gathered so far. Qualitative research is a research strategy that emphasizes on the quality and relevance of the output rather than quantification in the collection and analysis of data (Bryman & Bell, 2007). The research strategy is inductive since the theory is being derived from the research. The epistemological position is interpretive since the objective is to understand the challenges linked to mobile banking in South Africa through an examination of the interpretation of the context by stakeholders. The ontological position is constructive since we are assuming that the systemic issues observed are the result of interactions between stakeholders rather than due to some outside impact.

The research was approached at the 'meso level' described by Ducombe and Boateng (2009). This implies gathering information at the service provider level. If placed in the context of the categorisation based on the temporal lifecycle model and level of analysis as performed by Ducombe and Boateng (2009), the research would be categorised as one that analyses the process of adoption of m-finance application.

Ducombe and Boateng (2009) also recognise the need for more in-depth user targeted research. This type of research requires a significant amount of time, financial and human resources in order to be properly conducted in South Africa given the wide geographical distributions of the sample population. Due to time constraints and a limited access to the required resources, this approach could not be adopted.

3.2 Research design, data collection methods and research instruments

Bell & Bryman (2007) propose 6 steps that can be followed in performing qualitative research. These steps are illustrated in the figure below. These steps are overarching and can accommodate different methodologies. In this research methodology section, we are concerned with steps 2 to 4, namely selecting the relevant site(s) and subjects, collecting the relevant data and interpreting the data.
3.2.1 Selecting the relevant site(s) and subjects

Taking into consideration the need for triangulation when performing qualitative research, the information was collected from three different sources, namely past research, academics and researchers having studied this field in South Africa and service providers in South Africa.

3.2.2 Collection of relevant data

In view of the limited time allocated for this research, a longitudinal design would not have been possible and a cross-sectional approach was therefore adopted. Most of the studies reviewed by Ducombe and Boateng (2009) were also cross-sectional in nature. The authors recognise in their study that research is likely to follow the current trend but that cross-sectional type of research can nevertheless provide timely information that can contribute to improving the impact, enhance programmes and contribute to policy (Ducombe & Boateng, 2009).

Primary data was collected through semi-structured interviews. In a semi-structured interview, the researcher has a list of questions on fairly specific topics (also called Interview Guide) but the interviewee has a lot of flexibility in how to reply. This is typical of qualitative research since for
qualitative interviewing, the approach tends to be much less structured. The interest resides in the interviewee’s point of view (Bryman & Bell, 2007). Two types of interviewees, industry practitioners and academics having researched the field, were contacted. Interviewees in each category were given the same set of questions and in the same order to ensure that the replies can be aggregated reliably. The interview guide is shown in Appendix A. Appendix B provides a listing of people interviewed.

Secondary data was collected by analysing data from past research. These data were used to complement the primary data collected in order to have a better understanding of the challenges limiting the growth of mobile banking services in South Africa. Bryman and Bell (2007) argue that secondary data is not only appropriate for student level research but that all researchers should consider the analysis of secondary data. For this purpose a handful of research studies that looked at challenges facing mobile banking in South Africa was chosen and used. These research were:

- The enabling environment for mobile banking in Africa (Porteous, 2006)
- The early experience with branchless banking (Ivatury & Mas, 2008)
- Investigating adoption/non-adoption of cell phones for financial transactions in South Africa (Brown, Gordon, Janik, & Meyer, 2005)
- Mobilizing money through enabling regulation (Porteous, 2009)
- Mobile phone banking and low-income customers (Ivatury & Pickens, 2006)

These studies were preferred as opposed to other research performed in the field, since they focus more on South African cases specifically.

Collecting data from two different interview sources and from past research provided a certain level of triangulation, which would increase the validity and reliability of the findings.

3.2.3 Interpretation of data
There are several techniques which have been extensively used in research to analyse qualitative data. The different techniques considered for the purpose of this research were:

- Grounded theory – starts with data and use it to develop a theory (Leedy & Ormrod, 2005).
- Content analysis – looks at documents, text or speech to see what themes emerge (Ratcliff, 2002).

Both grounded theory and content analysis were discarded as analysis method because several of the interviews were conducted by phone and were thus not recorded. Therefore transcribing these interviews was not possible. The coding would not have been consistent across all the interviews. Taylor and Bodgan (1998) argue that data analysis is probably the most difficult aspect of qualitative research to communicate and that all researchers develop their own ways of analysing qualitative data. As suggested by Ducombe and Boateng (2009), the research aimed to provide a work based on simpler research design and requiring fewer resources and went deeper in the discussion and analysis. A simpler two-phase methodology was designed to extract, interpret and categorise the data. This methodology is closely related to content analysis but the coding is less formal.

The first phase consisted of collecting all elements relating to challenges facing mobile banking in South Africa from the chosen literature and the interview transcripts. The data were clustered according to where they originated from and saved along with the report title and any suggested solutions proposed by the interviewee or author(s).

The second phase consisted of gathering related issues into categories and sub-categories (or themes). The output of this phase was the identification of 5 distinct challenges that mobile banking service providers are currently facing in South Africa.

Figure 4 below, illustrates the data collection and interpretation process.
3.3 Sampling

It was not possible to interview people from all the mobile banking service providers. A sample has been chosen comprising of representatives from the different types of service providers (i.e., from network operators, banking sector and independent organisations). Moreover, it was important that at least one company was interviewed from each category of providers so as to ensure reliability and validity of the methodology. Five interviews were conducted, all of them involving experts in the field. Unfortunately, it was not possible to obtain an interview from a telecommunication service provider. One of these service providers however argued that they do not provide mobile banking services directly but work instead in collaboration with the banks and independent service providers and as such would not be in the best position to assess the industry.
4 RESEARCH FINDINGS, ANALYSIS AND DISCUSSIONS

4.1 Research Findings

After extracting and categorising the data from the primary and secondary sources, we obtained five categories that represent the distinct challenges facing mobile banking service providers in South Africa. Each main category encompasses several subcategories. The research findings section presents information extracted from the primary and secondary data collected.

4.1.1 User adoption

The main challenge that came up in all the literature reviewed and the interviews conducted was user adoption. User adoption refers to the challenge of getting the end-user to adopt the mobile banking product.

Brown et al. (2003) devoted their paper to investigating what drives user adoption for cell-phone banking in South Africa. They argue that in order to increase user adoption, service providers have to design the mobile banking service such that it offers a relative advantage as compared to other banking channels. Otherwise the product is not in effect filling a need in the market. Promotion could improve the perception of relative advantage, which would make the service appear attractive as compared to other services such as ATM and the Internet and thus improve adoption (Brown, Gordon, Janik, & Meyer, 2005). Brown et al. (2005) talk of exposure as one of the factors affecting user adoption of mobile banking. During their research they found that few users were aware of the cell phone banking services and those who were had heard of it through word of mouth rather than through some service provider driven marketing. It is thus apparent that marketing or promotion is lacking (Brown, Gordon, Janik, & Meyer, 2005). This was also observed in a more recent survey performed by CGAP (Ivatury & Pickens, 2006). Most noncustomers surveyed know little or nothing about M-banking and perceive it as expensive and complicated. People who are unemployed consider themselves ineligible for bank accounts and banking services (Ivatury & Pickens, 2006). Brian Richardson argues that the biggest issue with regards to exposure is the access to financial resources to obtain the necessary finance for the promotion campaign (Richardson, 2009).
David Reynerds, CEO of POCit, an independent mobile payment service provider, considers the ability for service providers to offer a ‘killer application’ as the biggest challenge currently for the industry (Reynders, 2009). He argues that to obtain this ‘killer application’, service providers have to offer something that customers really need, that fills a gap in the market. He states that service providers should avoid ‘offering vitamins instead of the appropriate remedy’ (Reynders, 2009). Marsden (2009) states for his part that people do not want to deal with banks; they just want to make the payments or transfer the money. He argues that understanding the culture and changing the mindset is thus essential, for example people might not be interested in putting their money in the bank since they are more interested in hiding the money from the taxmen.

Brown *et al.* (2005) further suggest that in order to improve adoption, service providers must offer a service that appears cost worthy to customers. The service must cost less than when performing a transaction via a mobile phone or going to an automatic teller machine (ATM). A FinMark trust estimated that 2 percent of personal annual income is the most low-income people can afford to spend on banking services, thus cost effectiveness is particularly important when it comes to accessing the unbanked population (Ivatury & Pickens, 2006).

Another driver of user adoption according to Brown *et al.* (2003) is the ability for the end-user to try the product before committing to usage. This can help decrease the resistance to change. Many people are still getting used to banking over the Internet and banking over a cell phone can appear even more daunting (Brown, Gordon, Janik, & Meyer, 2005). Providing the facility to try the product can increase customer understanding and trust, a challenge identified by Porteous (2006) with respect to user adoption. Building trust and credibility is the biggest challenge facing mobile banking as identified by Brian Richardson, CEO of WIZZIT (Richardson, 2009). By allowing the customer to try the product at no cost, trust can be built and at the same time the customer gets to familiarise himself with the product and learn how to use it. Yolande Van Wyk, CEO eMoney product house at the First National Bank, identifies user education as one of the biggest challenge facing mobile banking growth and adoption in South Africa (Van Wyk, 2009). User education includes two aspects namely financial literacy and technology understanding.

Richardson (2009) identifies financial literacy as a big challenge. Through his interaction with customers he found that there is a general lack of knowledge on the financial and money management front among his target market, i.e. the unbanked (Richardson, 2009). Therefore
unbanked users have first to be taught how to use financial services before any attempt is made to try and sell the banking products to them.

Ivatury and Pickens (2006) however report that the main reason for customers not to use WIZZIT was because they did not understand the technology and found it complicated. The issue of customers not understanding the technology is brought forward once more by Ivatury and Mas in a 2008 paper published by CGAP (Ivatury & Mas, 2008). The issues associated with understanding the technology may actually be linked to the end user not being able to interact with the interface. During an interview with associate professor Irwin Brown from the UCT Department of Information Systems, the latter argued that the non-standardised user interface across devices can lead to usability problems which in turn affect adoption (Brown, 2009). He previously discussed the issue of restrictive user interface on mobile devices in his 2005 paper (Brown, Gordon, Janik, & Meyer, 2005). Marsden (2009) also talked of the challenge of appropriately representing the service on the mobile device. Even if the end-user understands the purpose of the service, the challenge is to put it on the end device in a way understandable to the end-user (Marsden, 2009). Thus it is clear that a major challenge is to provide a user-friendly interface that would appeal to the end user. On the other hand, Ivatury and Pickens (2006) observed that despite being open to new technologies, users still valued the human interaction. This mindset is likely to further delay adoption.

Brown et al. (2003) also identify providing a risk free feeling as a leading enabling factor in helping improve user adoption. The lower the perception of risk involved in using mobile banking, the more likely it would be adopted by users (Brown, Cajee, Davies, & Stroebel, 2003). In line with this, Porteous (2006) identify customer protection against fraud and abuse in the M-banking environment as an important factor in improving adoption. He suggests that part of the solution is to provide clear disclosure at the time of account opening and at the time of transaction. Also, on certain conditions, such as amounts exceeding the maximum legal limit liable by the customer, liability should be placed on service providers for unauthorized transactions. Service providers should also have a clear and fast complaint and dispute resolution process (Porteous, 2006). Another way of improving the risk-free feeling is by offering the flexibility to customers to change service provider (Porteous, 2006). For this to occur, service providers would have to support interoperability between their different systems. In a more recent paper (Porteous, 2009), Porteous states that the risk free feeling could be improved by offering effective customer protection. He warns that too much openness to innovative models from new entrants can be risky, especially once these models move beyond the small-scale pilot stages since any problem arising would affect the trust
towards the whole sector (Porteous, 2009). Thus providing the risk free feeling is not straight forward and a combination of effective customer protection and problem resolution, flexibility and inter-operability could be used to help achieve this and improve user adoption.

Finally, another factor affecting user adoption, particularly among the low-income, unbanked, population is the ability to register for the services with minimum hassle. Porteous both in his 2006 and 2009 paper identifies customer due diligence as a factor restricting access to financial services for low-income, unbanked people in South Africa. He suggests that regimes to oppose money laundering and the financing of terrorism (AML-CFT) should be proportionate (Porteous, 2009) and not unduly prejudicial remote account opening by small customers (Porteous, 2009). The current regulations make it hard for a large portion of the South African population to have access to financial services due to lack of formal physical address or identification document. Ivatury and Mas (2009) confer with Porteous by arguing that ‘Know Your Customer’ (KYC) requirements may be difficult to fulfil for poorer customers since it may be difficult for them to show proof of identity at all. They further state that this could explain the relatively low adoption of mobile banking in South Africa among the unbanked (Ivatury & Mas, 2008).

4.1.2 Regulatory environment

The regulatory environment refers to the laws and policies that apply specifically to the mobile banking industry and the other industries mobile banking depends on. Stakeholders involved in applying regulations to the sector are:

- The National Treasury
- The South African Reserve Bank (SARB)
- The Financial Intelligence Centre
- The Telecommunications Regulatory Authority
- The Banking Ombudsman

The South African government has made it a priority to extend reliable financial services to people who traditionally have been excluded from financial access (CGAP, 2008). However throughout the literature reviews and the interviews, which have been conducted for this research, regulations were regularly mentioned as one of the main challenges. There are several aspects to the challenges linked to regulations, these are discussed separately next.
Anti money laundering and combating the financing of terrorism are governed by the Financial Intelligence Center Act (FICA). According to this Act (No. 38 of 2001) “An accountable institution may not establish a business relationship or conclude a single transaction with a client unless the accountable institution has taken the prescribed steps to establish and verify the identity of the client.” (FICA, 2001) Accountable institutions must keep a record of the identity of the client and any documents obtained in verifying that identity (FICA, 2001). The original FICA regulations required individuals to produce the following documents when opening up a bank account:

1. A national identity document for personal details
2. Documentary proof of residential address

This proved to be a problem when dealing with the low-income South African market since a large number of these people did not have formal identity documents and about one third of South Africans could not provide documentary proof of residential address as they lived in informal housing (CGAP, 2008).

In 2004, an exemption clause, ‘Exemption 17’ was included in the AML regulations to allow banks to open accounts upon the presentation of only a South African national identification document.

In 2006, SARB issued ‘Bank Circular 6’ which allows non-face-to-face account opening for cell-phone banking without any documentary evidence. This in effect removes the need for KYC procedures to be performed at branches or in person (CGAP, 2008). However, the client still needs to provide an identification number and the transactions on such an account are limited to ZAR 1,000 per day (CGAP, 2008).

Despite the ‘Exemption 17’ of the Anti Money Laundering Regulations and ‘Bank Circular 6’ amendments to the regulations, remote customer due diligence remains a challenge to service providers. Yolande van Wyk from FNB, still considers that the current FICA regulations around customer due diligence make it hard for banks to access the low-income market. Brian Richardson from WIZZIT argues that the KYC regulations were formulated by people in first world economy and was not designed with the emerging markets in mind. Furthermore he reports that the banking industry tends to take a conservative approach to the regulations; that is they tend to make the minimum so as just to comply with the regulations. The SA government did improve the
regulations but the major banks are not following (Richardson, 2009). Banks are often accused of
avoiding the large number of people who are without bank accounts as they are seen as high
contact, low revenue and high-risk markets (Chipp & Ismail, 2004). Richardson thus proposes that
there should be more buy-in from the major banking institutions. Porteous (2006) observes that
although the CDD/KYC requirements on low value accounts have already been reduced through
the exemption, there is still an issue due to the lack of clarity and consistency over the application
of CDD/KYC standards over remote account opening procedures. Regulation should be risk based
and not unduly prejudice remote account openings by small customers.

Another regulation challenge brought forward by Porteous (2006) was that the policy environment
is such that it is less open to new non-bank entrants. This observation has also been made by David
Reynders of POCit (Reynders, 2009). He argues that the regulations are particularly detrimental to
new entrants. However he states that once the regulatory barriers have been cleared, the policies
were not so bad. There are, however, regulations, which are still not clear. For example, the reserve
bank is not clear on what constitutes mobile payment (Reynders, 2009). Another such regulation is
the Communications and Provision of Communication-related Information Act. Sections 40 and
62(6) of this Act would require the operators and distributors of mobile phones to perform a full
KYC procedure on any customer to whom they provide a mobile phone or SIM-card (CGAP,
2008). These provisions were suspended twice but, if they were to be implemented, they would in
effect prevent the extension of mobile banking to low-income market and counteract the benefit
obtained through Circular 6 (CGAP, 2008) since the customers would still need to meet the KYC
requirement to obtain a phone.

This overlapping of regulations was also discussed as an issue during the interview with Yolande
van Wyk of FNB. She argues that there is a need for more coordination among the regulators and
that ideally there should be only one regulator, which oversees all the others with regards to mobile
banking. Porteous (2006) argues that the overlapping and sometimes obsolete regulations reduce
the space in which operators can innovate. He also advocates coordination among the regulators
and argues that a comprehensive vision for market development between policy makers, regulators
and industry players could help define obstacles and calibrate proportionate responses to risk at
appropriate times.
Issuance of e-money, acceptance of e-signatures

One particular regulatory restriction that is discussed by Porteous (2006) is the fact that issuance of e-money was restricted to the banks only.

The South African Reserve Bank (SARB) defines e-money as “a monetary value represented as a claim on the issuer. This money is stored electronically and issued on receipt of funds, is generally accepted as a means of payment by persons other than the issuer and is redeemable for physical cash or a deposit into a bank account on demand.” (South African Reserve Bank, 2009)

Porteous (2009) argued that the role that non-banks can play in issuing e-money is being circumscribed by the current guidance note on e-money which has frustrated some potential investors. The South African Reserve Bank’s position paper on electronic money (South African Reserve Bank, 2009) considers e-money to be a supplement to physical notes and coins in the long term. All e-money-related schemes must not be in contravention of any legislation, with reference to among others:

- The South African Reserve Bank Act, No. 90 of 1989;
- The National Payment System (NPS) Act, No. 78 of 1998;
- The Banks Act, No. 94 of 1990;
- The Exchange Control Regulations; and

One other ambiguity that the paper clarifies is the difference between the terms ‘payment due’ and ‘deposit-taking’. Section 7 of the NPS Act defines payment due as ‘allowing a person, as a regular feature of that person’s business, to accept money or payment instructions from any other person for the purpose of making a payment on behalf of the first person, to a third person, to whom the payment is due’ (South African Reserve Bank, 2009). Included in this definition is the implication that there is an obligation that must be settled. This type of service may be provided by non-banks in accordance with Directive No.1 of 2007, which is the directive handling payments to third persons (South African Reserve Bank, 2009).

Any ‘person-to-person’ payments would involve a payer sending electronic value to a beneficiary who is then able to cash that value. This money is not normally due to the beneficiary in terms of an obligation and would contravene section 7 of the NPS Act and would be classified as ‘deposit-
taking’ in terms of the Banks Act (South African Reserve Bank, 2009). Section 11 of the Banks Act, 1990 (Act No. 94 of 1990 – the Banks Act) states that no person may conduct the “business of a bank” unless such a person is a public company and registered as a bank (South African Reserve Bank, 2009).

‘Business of a bank’ can be described as “the soliciting or advertising for or the acceptance of ‘deposits’ from the general public as a regular feature of the business in question” (South African Reserve Bank, 2009). A ‘deposit’ can be described as “an amount of money paid by one person to another person subject to an agreement in terms of which an equal amount or any part thereof will be repaid on demand, on a specified or unspecified date or in circumstances agreed upon” (South African Reserve Bank, 2009). The taking of deposits from the general public by an unregistered person (non-bank) is a criminal offence in terms of the provisions of the Banks Act. Thus only South African registered banks may issue e-money. According to Section 52 of the Banks Act, non-banks can enter into arrangements with banks so as to be able to offer payment-related services in conjunction with the bank. Non-banks may also provide services as system operators or third-person payment service providers in terms of Directives 1 and 2 of 2007 respectively (South African Reserve Bank, 2009).

Porteous (2006) argues that in the absence of other quick, safe and cheap ways of transferring money, it is plausible that airtime assumes some of the characteristics of money transfer or remittances.

This is because airtime shares to some degree the basic characteristics of money (Porteous, 2006):

- It uses a commonly accepted unit of account, typically denominated in currency units.
- It can be an effective medium of exchange in societies that does not allow easy remote transfers.
- It can be a store of value

The biggest issue with using airtime, as currency, is that it is not redeemable into cash at par. There is a sizeable commission and added taxes that would make it impossible for the Telco to offer face value on redemption (Porteous, 2006). Porteous (2006) however remarks that these cost factors alone do not prohibit the redemption of airtime into cash by vendors or operators. To narrow or reduce this discount would require different models for cashing out airtime (Porteous, 2006). Also redeeming airtime for actual cash will in effect make airtime become e-money and would require
some type of collaboration with a banking institution which would add to the overall cost of the service.

Porteous (2006) also considers regulations around electronic contracting and electronic signatures as another challenge linked to regulations. The South African Electronic Communications and Transactions Act covers, among other things, the requirements of writing and signatures. The Act became law in August 2002 and defines electronic signatures as “data attached to, incorporated in, or logically associated with other data and which is intended by the user to serve as a signature” (Ministry of Communications, 2002). A separate category of advanced electronic signature is also defined. Advanced electronic signatures must be uniquely linked to and capable of identifying the user based on a face-to-face identification created using means under the user’s sole control and which are linked to the data or data message to which it relates in such a manner that any subsequent change in data is detectable (Brazell, 2004). These advanced electronic signatures are given automatic legal effect where a signature is required by law; they also meet any legal requirement for a signature (Brazell, 2004). The Act stipulates that if the parties to a transaction have not required an electronic signature to be used, a data message may still have legal effect provided some means other than an electronic signature can be used to show the intent of the parties involved in the transaction. If an electronic signature is used and the parties have not agreed on the type, the signature will still be effective provided that an appropriate method was used to identify the person and indicate his/her approval (Brazell, 2004).

Consumer protection and Anti-competitive practices

Porteous (2009) calls for more effective consumer protection and in his 2006 paper, he argues that customer protection laws, designed primarily to cover the unsuitable offering of investment-type products, were inappropriately extended to the opening of basic transactional bank accounts (Porteous, 2006). South Africa has a Banking Ombudsman tasked with resolving disputes between banks and their customers involving a value of up to ZAR 1 million.

Another regulatory aspect discussed by Porteous (2006) is the need to have appropriate laws against anti-competitive practices. He particularly talks of ‘lock in’ of customers and ‘lock out’ of competitors practices. The ‘lock in’ of customers can occur when a provider prevents the customer to move to another provider by making the process impossible or very hard. The ‘lock out’ of
competitors occurs when dominant, existing, industry players prevent new entrants to get in the market by, for example, offering very low prices and running at a loss over a period of time so that the new competitor cannot get new customers and runs out of business. This has been described as a particular challenge for small players by Brian Richardson the CEO of WIZZIT (Richardson, 2009). Porteous (2009) therefore calls for appropriate competition rules.

The Jali Commission, appointed by the Competition Commission to conduct an inquiry into banking competition, is mandated to consider, among other things, the level and structure of bank charges as well as the feasibility of improving access by nonbanks and would-be banks to the national payments system (CGAP, 2008).

Exchange controls

A final issue linked to regulations and which concerns mainly mobile remittance, is exchange controls. According to the Exchange Control Regulations of 1961, only persons authorised by the national treasury, with the exception of non-bank authorised dealers with limited authority, can deal in foreign exchange (CGAP, 2008). Banks are required to maintain a complex and costly reporting system in which every single transaction in foreign exchange, irrespective of its size, must be categorised according to the manual of transactions prepared by the Exchange Control Department (at SARB) and electronically reported to SARB (CGAP, 2008). The implications for mobile remittance are that firstly it makes cross-border low value remittance costly and unappealing. Secondly, cross-border remittances can only be performed at bank branches and it does not appear that there will be a ‘branchless’ option in the near future (CGAP, 2008).

4.1.3 Scalability of the business model

In his review of the enabling environment for mobile banking in Africa, Porteous (2006) reports that African M-payment providers are all at a relatively early stage and that none had yet achieved substantial scale or market traction. He places both the Kenyan and South African mobile banking companies at the pioneer stage of market development. He then argues that, at that stage, one of the biggest barriers to growth is the scalability of the business model (Porteous, 2006). This is because the business model needs to be scalable for the service to be sustainable through the breakout phase. Scalability of the business model here implies moving from providing services to a few thousand people to millions over a much wider and complex geographical area while maintaining
the quality of service. Porteous (2006) also states that scalability at that stage is challenged by the need of finding space for innovation while avoiding contravention of existing rules and that the regulatory environment is not necessarily conducive for the scaling up of transformational mobile banking business models. Since 2006, the industry has evolved and would now be most likely overlapping the pioneer and breakout phase.

For the business models to be further scalable, the service providers would need to access new customers. The current drive is to target people who do not currently use any type of banking service, a market commonly referred to as ‘the unbanked’. Targeting this market however, leads to one of the main challenges of mobile banking according to Brown, (Brown, 2009) that is, to introduce people to banking services via a cell phone when they have not actually banked before. The complexity lies in having to teach both the use of financial services and mobile banking services. This requires adaptation of the business model. Another challenge, particularly in South Africa, in order to extend mobile banking to the unbanked, is in providing support across the different languages spoken (Brown, 2009). South Africa has 11 official languages (SAinfo, 2009), providing relevant support to the customers thus becomes very difficult since not everyone speaks English or Afrikaans. The other issue with support, as highlighted by Brown, is to do with knowing who should provide the support. Should the mobile banking service provider provide all the support? What about network issues? Also in relation to increasing the number of customers, Ivatury and Mas (2006) found through a survey that customers in South Africa value the human touch more than using electronic devices even if those were quicker to use. This places a limit on the number of people that would potentially adopt cell phones as a banking channel; again affecting the scalability of the business model.

Another factor that affects the scalability of the business model, is the limitations in terms of what can be offered by the service providers. One of the limitations could be due to mobile penetration, (Porteous, 2009) that is, the network coverage and the number of people that can access the service. This could be the result of factors such as the income level of potential customers, the market structure and the topography that would make deployment of the network infrastructure difficult and costly. To cater for the low-income level of some potential customers, Porteous (2009) suggests that business models must provide incentives to offer small value financial services.

Accessible and existing e-payment infrastructure, which allows cash withdrawal are scarce in certain areas. Infrastructure issues, such as not having a larger ATM network, have been
commented upon by Yolande van Wyk from FNB during her interview. The infrastructural constraint limits the possibility to cater for an increasing number of customers (Van Wyk, 2009). Porteous (2009) suggests that agents must be allowed to operate on behalf of banks and others to open accounts and handle cash in and out functions. Agents are independent third parties that would provide services on behalf of the service provider in exchange for a commission fee. Ivatury and Mas (2008) state that it is essential to ensure that agents have sufficient cash on hand when customers want to make a withdrawal. They argue that branchless banking through agents might not be a solution for very remote locations until predominance of cash utilisation is replaced by a predominance of electronic payments and transfers. Another solution would be to have a shared network of agents (Ivatury & Mas, 2008).

Dependence on other service providers is another issue affecting the scalability of the business model. The fact that mobile banking requires support from both the telecommunications and banking sectors create unique challenges. Non-bank providers highlight the difficulty and cost of obtaining access to the South African payment system infrastructure such as ATMs and POS acquiring (Porteous, 2006). Access to the national payments and settlement systems is reserved for banks alone (CGAP, 2008). CGAP (2008) recognise that access by non-banks to the payment system as well as the cost of services are key issues that will affect the development of branchless banking (and ultimately mobile banking) in South Africa. In recognition of this, SARB has issued a policy paper on the National Payment System Framework and Strategy (Vision 2010), which states expressly that participation by non-banks is one of SARB’s objectives.

Dependence on the banks is only one part of the problem. Yolande van Wyk of FNB, considers the dependence on telecommunication service providers as a major challenge for the bank’s mobile banking service offering. Network coverage is one of the associated issues. Network operators are often pre-occupied with voice rollout and therefore less interested in the addition of complex and unproven products (Porteous, 2006). Ivatury and Mas (2008) argue that without collaboration from the mobile operator, a mobile banking provider would need to rely on user interfaces that are less user-friendly, such as basic SMS. As such this over-dependence on other service providers could lead to stifling of innovation and frustration on the part of investors as observed by Porteous (2009).
Finally Brian Richardson (2009) talks of the challenge of obtaining resources, be it financial or human. To run a proper large-scale marketing campaign requires financing, which, according to him, is not so easily obtainable in South Africa (Richardson, 2009).

### 4.1.4 Technology limitations

The South African mobile banking industry is currently between the pioneer and the breakout stage and, at this level, issues such as technology stability and interoperability are prevalent. Technology issues affecting mobile banking in South Africa can be divided into:

1. Issues linked to the device
2. Inter-operability issues

Brown (2009) observes that the diversity in the type of phones available made it difficult to have a solution working identically across all devices. He also notes that a lot of users have limited access to the technology since the more advanced features are usually only available on high end, expensive phones that cannot be afforded by a large portion of the population (Brown, 2009).

David Reynders of POCit makes similar observations (Reynders, 2009). Marsden (2009) also highlights the issue of absence of a common platform and comments on the current use of USSD by several mobile banking service providers. He argues that USSD restricts support of service to telecommunications service providers and as such makes any non-Telco service provider dependable on the telecommunication service providers (Marsden, 2009). Marsden also talks on the usability and literacy issues. He argues that even if the end-user could understand the purpose of the service, the challenge resides in having an interface on the device that is understandable to the end user (Marsden, 2009). Ivatury and Mas (2008) on their part advocate simplicity in performing transactions and user interface as a key to addressing the usability issues.

SARB defines interoperability as “the ability of different types of computers, networks, operating systems, applications and other infrastructure, of the different banks to work in partnership effectively, without interruption, explicit communication or translation prior to each event, in order to enhance the efficiency of the payment system.” (South African Reserve Bank, 2009)

Interoperable systems lead to the development of large network externalities, which will, in the longer term, reduce operational cost and complexity for all customers (South African Reserve Bank, 2009). Porteous (2006) argues for the case of inter-operability, which would according to him lead to scale and usefulness. For this he proposes that:
• Service providers should be able to access and use the payment platforms.
• Consumers should be able to switch between financial providers.
• Cell number portability should be required in a reasonable time frame. Number portability is a competition-enabling tool whereby a subscriber has the freedom to choose a network operator whilst retaining his/her telephone number. This regulation was implemented in South Africa under Gazette No. 28091, Vol. 483 on 30 September 2005 (ICASA, 2005).

Ivatury and Mas (2008) propose that, in order to support inter-operability, a shared mobile standard, that would include provision for mobile banking, should be established.

4.1.5 Security concerns

As mentioned above, Brown et al. (2005) identify perceived risk as one of the factors affecting user adoption of the cell phone banking service. The different concepts linked to the perceived risk are:

- Physical security
- Information security and privacy

Physical security is a concern in certain parts of South Africa and not having to carry cash could improve on the feeling of physical security for customers. However Brown et al. (2005) report that one of the major inconveniences of relying on a phone for making payments is the additional hassle in case of loss or theft of the phone.

SARB identify information security as critical to the success of e-money services and their operational services (South African Reserve Bank, 2009). The technology used in e-money, for example, must be secure and ensure confidentiality, integrity, authenticity and non-repudiation so as to make sure that information or funds transfer in the payment system is not vulnerable to interception by unauthorised users (South African Reserve Bank, 2009). Furthermore with regards to e-money SARB states that the e-money security and operational services should meet the requirements of international standard bodies.

With regards to privacy, the South African Law Reform Commission has passed in August 2009 the Protection of Personal Information Act, which applies to the processing of personal information, including information relating to financial transactions. Section 18 of principle 7 of the Act specifically looks at security measures on integrity of personal information. The section states
that a responsible party must secure the integrity of personal information in its possession or under its control by taking appropriate, reasonable technical and organisational measures to prevent:

1. Loss of, damage to or unauthorised destruction of personal information; and
2. Unlawful access to or processing of personal information.

(Ministry of Justice and Constitutional Development, 2009)

Such legislation provides the regulatory framework to protect personal information and user privacy but it must be practically applied. This is where the challenge resides.

Ivatury and Mas (2008) argue that customers are likely to react negatively to (real or perceived) security risks involved in mobile banking more quickly than to the risk of loss or theft of physical cash since they will see the service as being unreliable and stop using it. The security track record of mobile service providers must thus be impeccable. Porteous (2009) on the other hand emphasizes on the importance of ensuring the safety of clients’ deposits. He argues that too much openness to innovative models from new entrants in the market could be risky, especially once these models move beyond the small-scale pilot stages. Thus, although he advocates openness, he also acknowledges that the level of openness needs to be manageable.

4.1.6 Conclusion on Findings

This section presented the findings collected during our research and discussed the five major challenges impacting mobile banking service providers in South Africa that came out of the research. The five categories identified are:

- User adoption – referring to what motivates and drives customers to adopt the product.
- Scalability of the business model – referring to how the service can scale up and cater for the increasing number of customers as these increase.
- Regulatory environment – refers to the different regulations and policies impacting directly or indirectly on the deployment of the mobile banking service.
- Technology limitations – refers to the challenges linked to the underlying technology, whether with regards to the technology infrastructure, the device or inter-operability between systems.
- Security concerns – refers to physical security, information security and privacy.
Not all the service providers are affected equally by all of the challenges above and some of these challenges are more prevalent than others. In the next section these findings are analysed and further discussed.

4.2 Research Analysis and Discussion

The previous section showed the findings from the research. The following section analyses and validates these findings by considering recurrence and prevalence of the different categories within the research sources, discussion on the different categories, validity and reliability of the research and limitations of the research.

4.2.1 Recurrence, prevalence and relevance

To analyse the recurrence and prevalence of each of the categories in the different sources used, the occurrence of each category as revealed by the interviews with the service providers and researchers was counted. The secondary sources of data, that is the past research papers, were left out of this analysis to avoid a subjective bias as these papers mostly focused on only one or a small number of categories or type of challenges and, as such, would distort the analysis. Figure 5 below illustrates the number of occurrences of each categories in all the interviews performed.

![Figure 5: Recurrence of categories in the interviews](image)

Figure 5 shows that ‘user adoption’ was, by far, the category which was most discussed during the interviews, followed by ‘scalability of the business model’. Security was the least discussed.
However, when we break down the data to individual interviews we see that there are some biases that have occurred in the above figure. Figure 6 provides a detailed breakdown of the occurrence of the categories per interview.

Although user adoption was a factor that recurred in all the interviews, it was discussed several times by Associate Professor Irwin Brown from the UCT Department of Information Science. Dr Irwin Brown has conducted several studies on user adoption of cell phone banking and hence is more knowledgeable and more likely to focus on this specific category. The graph also shows that technology limitations are not considered an issue by FNB and WIZZIT. However they both put a lot of emphasis on the challenges linked to the scalability of the business model. It is possible that aspects linked to technology limitations have been inherently included in the scalability of the business model challenges discussed by these two service providers. Security is surprisingly hardly considered an issue by the service providers. This may once more be due to the fact that aspects of security concerns can be found in the challenges to user adoption and technology limitations.
4.2.2 Discussion on the categories

In this section each of the five categories is analysed and discussed. The analysis would allow us to identify which of the challenges have a larger impact on the industry.

Getting users to adopt the mobile banking product is the challenge that is discussed the most in the different sources of information used. There are several sub-issues such as product awareness, cost effectiveness, culture and trust, user education, risk-free feeling and attracting the unbanked among others that contributed to the challenge of getting people to adopt the mobile banking services. This challenge affects growth since without getting more users to adopt their services, the companies offering these services cannot grow.

Several possible solutions have been proposed to address these challenges. Some of these solutions, such as offering the user the ability to try the product before having to pay (Brown, Cajee, Davies, & Stroebel, 2003) or providing clear disclosure at account opening and at the time of transaction (Porteous, 2006), can be implemented at the service provider level. Other solutions such as changing the mindset of customers or ensuring that they are able to switch between providers have to be implemented at user and regulator level respectively. Thus at the mobile banking service provider level, the following would help improve user adoption:

- More aggressive promotion, which highlights the advantage of this banking channel over the other banking channels and demonstrates the security of the system.
- Educating the end user on the advantages of using financial services and how to use mobile banking.
- Providing the possibility for new users to try out the service first for a given period at no cost.

A standardised interface would also help improve usability and thus increase adoption. Also in order to better target the unbanked both Marsden (Marsden, 2009) and Brown (Brown, 2009) argue that understanding the current culture in the second economy is important and that this could lead to an understanding of how the unbanked understand and handle finance.

The real challenge with regulations was identified as being the relatively large number of different regulatory stakeholders involved and the range of regulatory issues that affect mobile banking. Mobile banking has to abide to anti-money laundering regulations, regulations to combat the
financing of terrorism, consumer protection regulations, anti competition regulations, exchange control, issuance of e-money and acceptance of e-signatures regulations. These problems cannot be really addressed at the service provider level and should be dealt with more at the regulatory level. As discussed in the findings section, the South African government has already gone a long way towards easing those regulations to facilitate mobile banking, but more can be done. Coordination among policy makers is essential. It would be better if mobile banking service providers could interact with a single regulator who would, in turn, handle the other regulatory bodies. Regulation is essential for growth. As argued by Porteous (2006) an appropriate mix of ‘certainty’ and ‘openness’ is what would enable the industry to develop. The ‘certainty’ provides guarantees to both users and service providers and the ‘openness’ allows the service providers to innovate and the unbanked customers to have access to the services.

Scalability of the business model is the other important category of challenges identified. This directly challenges growth of the mobile banking industry. If the business model of the mobile banking service providers cannot cater for an increasing number of clients, then the industry cannot grow. The major sub-issues within the scalability of the business model challenge are accessing and providing support to new, typically previously unbanked, customers and dependency on other service providers. One interesting remark made by Professor Gary Marsden during his interview was that the current business model proposed by the banking institutions might not be the right one. He emits doubt on whether the current models would actually interest and help the unbanked. The key is to see what issues people really have and what are their actual needs. He thus argues that the final form of mobile banking would be very different to what it looks like now. He believes that there will be a decentralised platform, almost like a middleware, that would allow anyone to offer services (Marsden, 2009). This idea is also supported by David Reynerds of POCit (Reynders, 2009). Yolande van Wyk of FNB however believes that there will be a convergence between online and mobile banking instead. On the other hand, Brian Richardson from WIZZIT foresees many more mobile banking applications in the future.

The challenges linked to technology span device-related issues and also inter-operability issues. Device-related issues include the size and definition of the screen, the features available on the phone and the applications that can be supported. Inter-operability addresses issues such as making the mobile banking service work with other similar services and integration with bank payment systems. The growth of the industry will depend a lot on the inter-operability. As Yolande van Wyk of FNB (Van Wyk, 2009) observed, there will need to be technology standardisation between banks
in order for the industry to grow. Device issues affect adoption more. The services provided must interest every possible user. Low-income South Africans are unlikely to have phones with advanced features and would thus not be able to access services using these advanced features. Mobile banking services can thus, for the time being, only provide basic interfaces using basic technologies such as Short Message Services (SMS) or USSD. These technologies are not very user friendly and might not appeal to people who have phones that can support the more advanced features. One solution could be to offer different levels of user interaction depending on what the phone can support and have some kind of middleware that handles all the transactions in a similar way in the background. There is thus also a need for standardisation in terms of the back-end technology used for these types of transactions.

The final challenge that was discussed concerns security. There are two aspects to security namely physical security and information security and privacy. Physical security addresses the security concerns of the customers and the people providing the physical money. Using a mobile banking service improves security for the customer as it reduces the need to carry physical cash for the customer. However physical cash is still needed and there needs to be a way for people to obtain the physical cash. A solution proposed for this in several of the reviewed papers is to make use of agents. As these agents would be holding cash, they can in turn become theft targets. This issue needs to be considered. The way forward would be to reduce the need for physical cash altogether and use e-money for all types of payment and purchase. Physical security thus has a major impact on growth. Similarly information security and privacy could affect adoption and hence on growth since the trust in a system is what drives adoption and ultimately growth. Issues of information security and privacy would undoubtedly affect trust.

4.2.3 Research criteria

Bryman and Bell (2007) argue that the three prominent criteria for the evaluation of business and management research are reliability, replication and validity. They further argue that reliability and replication are very closely related and thus in general reliability and validity are the two main criteria used in establishing and assessing the quality of research. However these criteria are normally used in a quantitative research context. Bryman and Bell (2007) also highlight different schools of thoughts with regards to the applicability of the reliability and validity criteria when it comes to assessing the quality of qualitative research. There are different pros and cons to each approach and, for the purpose of this project, the amendment to quantitative reliability and validity
as proposed by LeCompte and Goetz (1982) was chosen since the same concepts can be found, but phrased differently, in the other proposed set of criteria.

**External Reliability**

External reliability refers to the degree to which a study can be replicated (Bryman & Bell, 2007). It is difficult to freeze the setting or context of a qualitative study so as to make the study replicable (LeCompte & Goetz, 1982). However, despite the fact that the research was cross-sectional in nature, restricted to South Africa, and that the field is evolving very rapidly, the methodology used for the research is replicable and not restricted to a South African context only. Consequently, the research design can be considered to show a satisfactory level of external reliability.

**Internal Reliability**

Internal reliability refers to whether the observations have been counter verified (Bryman & Bell, 2007). Only one researcher has conducted the research and as such it was hard to incorporate an appropriate level of internal reliability. However, the research was supervised by an experienced researcher who was in a better position to assess the level of internal reliability. Internal reliability however remains a concern for this study since the categorisation process used is very subjective.

**Internal Validity**

The concept of validity refers to the extent to which the data collected gives a true measurement or description of reality (Livesey, 2009). Bryman and Bell (2007) describe internal validity as the level of match between the researcher’s observations and the theoretical ideas they give rise to.

The validity of the present research was maintained through regular consultation with experienced academics to make sure that the research was following the appropriate concept. The research is independently conducted and therefore less biased and more valid as compared to studies performed by industry practitioners. However, care had to be taken in analysing secondary data so as not to introduce validity issues from other research into the present one.

**External Validity**

External validity refers to the degree to which findings can be generalised across social settings (Bryman & Bell, 2007). The scope of the research has been limited to the South African context.
and, as such, the findings are applicable only to this context. The research should be replicated if findings are to be extrapolated to other countries.

A final research criterion considered was triangulation. Triangulation entails using more than one method or source of data in the study of social phenomena (Bryman & Bell, 2007). By using several methods or sources of data, the impact of the possible shortcoming of a particular method or source of data is reduced. Some degree of triangulation was incorporated in the research by using two different methods of collecting data namely literature review and semi-structured interviews. Triangulation was increased through the collection of data from three different sources; past research, interviews with academics and researchers in the field and interviews with service providers.

4.2.4 Limitations of the study

Only five interviews were performed involving two persons from academia and three service providers. It was very hard to obtain interviews from the service providers especially from the telecommunications service providers and thus the point of view of this category of service provider has not been discussed in the study. There are also not many academics involved in mobile banking in South Africa. The limited overall number of interviews conducted makes it somewhat difficult to validate the observations made. A larger sample size would need to be used in order to have more robust findings.

Although the methodology used is replicable, the findings are mostly limited to the South African context since several non-stable variables such as culture, country regulations and mobile phone penetration are country specific. It would therefore not be appropriate to try and extrapolate the findings and hypotheses put forward to other African countries or developing countries.

Another limitation of the study has to do with the data collection. Care has been taken to review relevant past research that looked at the South African case in particular. However, it is likely that not all the past relevant research studies have been covered and as such the extraction of data from past research might not be complete. Similarly not all the service providers have been interviewed and as a result some interesting insights may have been lost.
5 CONCLUSION

This study aimed at investigating “What are the challenges affecting the growth of mobile banking in South Africa and how could these challenges be addressed?” To answer this question, first the term mobile banking was defined and the ambiguity with respect to the different terms used in the different literature reviewed was cleared. To achieve this several definitions were looked at and discussed. In line with the definition from Porteous (2006), mobile banking was defined as inclusive of mobile payment, mobile remittance and other more general banking services.

The literature was then reviewed to find how research with similar objectives had been performed in the past and what was already known on the subject. The literature reviewed showed that both qualitative and quantitative work had been done in this field and also permitted the identification of several gaps in the current research. Acknowledging the time and resource limitations for this dissertation, a deliberate choice was made to address only one of the gaps. A more in depth qualitative research looking at the ‘meso’ level was performed that is findings were collected at service provider level. This gap was chosen since past research has identified a lack of in-depth qualitative studies. Also the mobile banking industry is getting in the breakout stage and there are several mobile banking service providers in South Africa, these service providers have learned a lot on the challenges pertaining to the industry during the pioneering phase and are thus well positioned to contribute to the body of learning on this subject.

Information could not be obtained from all the service providers. Thus to avoid the data collection from the service providers to run thin, a choice was made to gather data using three different sources. Firstly data was extracted from previous research on mobile banking that have looked at the South African context. Then experts at the service provider level and researchers with knowledge on the South African mobile banking industry were interviewed. The categories obtained from the extracted data and subsequent categorisation of the information, formed the basis for the five challenges that most commonly affect growth of mobile banking in South Africa. The five challenges identified are:

- User adoption – How to get new users to adopt the product?
- Scalability of the business model – How to ensure that the service can seamlessly scale up?
- Regulations – What are the regulations that need to be considered and when do they apply.
- Technology limitations – What does the technology allow?
• Security – Concerns around physical security, information security and privacy.

This answers the first part of our question on the challenges affecting the growth of the mobile banking sector in South Africa. The sub-issues within each of the challenges were looked into. The findings were then analysed. User adoption was the challenge that recurred the most in the interviews and as such seems to be the challenge affecting the most on service providers. The challenge that seems to worry service providers the least is security. Security was the least discussed and was thus considered to have currently the less impact. Although all five challenges would impact the industry, not all of them affect to the same degree every service provider.

In the discussion section, different ways of addressing the challenges were proposed. The focus was on solutions that can be implemented at service provider level rather than at user or regulatory level. A set of possible ways for service providers to tackle those challenges was gathered from the literature and the interviews. Table 1 below summarises the most relevant solutions proposed.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solutions</th>
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<tbody>
<tr>
<td>Use Adoption</td>
<td>Design the mobile banking service such that it offers a relative advantage as compared to other banking channels.</td>
</tr>
<tr>
<td></td>
<td>• Offer something that customers really need as opposed to try to impose a new service.</td>
</tr>
<tr>
<td></td>
<td>• Try to understand the culture around money handling.</td>
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<tr>
<td></td>
<td>More aggressive and focussed promotion targeting potential users, to make people aware of this service.</td>
</tr>
<tr>
<td></td>
<td>Must offer a service that appears cost worthy to customers.</td>
</tr>
<tr>
<td></td>
<td>The end-user must be allowed to try the product first before paying for it.</td>
</tr>
<tr>
<td></td>
<td>Service providers should educate the end-users on how to use financial services and the mobile banking services.</td>
</tr>
<tr>
<td></td>
<td>Understanding the current culture in the informal economy is important since this could lead to an understanding of how the unbanked understand and handle finance.</td>
</tr>
<tr>
<td></td>
<td>Provide full disclosure at the time of account opening and transaction.</td>
</tr>
<tr>
<td></td>
<td>• Service providers should have a fast and easy complaints mechanism.</td>
</tr>
<tr>
<td></td>
<td>• They should take liability for certain types of high value transaction.</td>
</tr>
<tr>
<td></td>
<td>• They should support inter-operability with other service providers.</td>
</tr>
</tbody>
</table>
Scalability of the Business model | Agents must be allowed to operate on behalf of banks and others to open accounts and handle cash in and out functions.  
* Have a shared network of agents

| Technology limitations | Need for technology standardisation between banks in order for the industry to grow.  
| Systems should be made more inter-operable to facilitate integration to the national payment systems and reduce the overall cost.

| Security | Service providers should ensure the security of the user information they have in their possession and also the privacy of users.  
| If agents are used, the physical security of the agents needs to be taken into consideration.

Table 1: Ways to tackle the challenges facing the mobile banking industry

Thus the second part of the question has been addressed. From the above, we can see that except with regards to user adoption, most of the challenges can hardly be addressed at service provider level. It is clear that a measure of collaboration between service providers and the regulators is necessary so that appropriate solutions that would benefit the industry can be found. An interesting remark made by Marsden (2009), when he was asked about future trends in the industry, questioned the future relevance of the current models of mobile banking altogether. He argues that users only want to facilitate their payment needs and they should not have to go through banks to perform this.

Finally, the issue of validity and reliability of the research was discussed and the limitations considered. The fact that a small sample of interviews was used and not all the different types of service providers were accessed, was acknowledged. The study was very specific to South Africa and as such the findings are not applicable to other countries. However the method is replicable and can be used to derive observations in other countries.

5.1 Further research

This study addressed only one of the gaps identified by Ducombe and Boateng (2009). There are several other research areas therefore that can and should be addressed in this field. One of the areas that we think need to be addressed in priority is research involving end users. Through this study it has come to light that there are a lot of assumptions being made on what the end user and specifically the ‘unbanked’ need from mobile banking services. However, the last research performed with users in South Africa dates as far back as 2003 (Brown, Cajee, Davies, & Stroebel,
The attitude towards mobile banking has changed significantly in the past six years and the factors impacting user adoption are likely to have also changed.

Marsden (2009) argues that it might be a wrong assumption to think that the unbanked population need mobile banking. He raised several questions on the actual model of the service being offered and its usefulness:

- Is the unbanked population in need of traditional banking services?
- Will mobile banking actually help the low-income market financially or merely make use of this new market?

There may thus be further avenues of research in looking at the usefulness of the current business models and what type of model would actually be more useful for different types of customers.

Finally, an important further research would be to test the validity of the challenges proposed in this study. This research has proposed five challenges that affect growth of mobile banking in South Africa. There may be a case for testing these challenges through more elaborate surveys with end users, service providers and regulators. The challenges can be formulated as hypotheses and quantitative studies can be designed to statistically validate these hypotheses.
6 REFERENCES AND BIBLIOGRAPHY


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Richardson, B. (2009, November 9). Challenges facing growth and adoption of mobile banking from a WIZZIT perspective. (N. Ramsamy, Interviewer)


Van Wyk, Y. (2009, November 2). Interview on Challenges facing the mobile banking industry in South Africa. (N. Ramsamy, Interviewer)


# APPENDIX A – INTERVIEW GUIDE

1. Tell me about your mobile banking offerings (service providers only)?

2. What is your company’s (for non service providers - according to you the) main aim currently in providing mobile banking services?

3. What are for you the 5 main challenges facing mobile banking service providers and why? Could you rank those challenges?

4. What could be done in your view to help develop this industry?

5. What are the major trends your foresee in this industry?

6. Do you think there are major differences between the South African mobile banking market and other African markets such as Kenya?
# APPENDIX B – PEOPLE INTERVIEWED

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>1</td>
<td>Associate Professor Irwin Brown</td>
<td>Department of Information Systems, University of Cape Town</td>
</tr>
<tr>
<td>2</td>
<td>Professor Gary Marsden</td>
<td>Department of Computer Science, University of Cape Town</td>
</tr>
<tr>
<td>3</td>
<td>Mr David Reynders</td>
<td>Managing Director, POCit</td>
</tr>
<tr>
<td>4</td>
<td>Mr Brian Richardson</td>
<td>Chief Executive Officer, WIZZIT</td>
</tr>
<tr>
<td>5</td>
<td>Ms Yolande van Wyk</td>
<td>Chief Executive Officer, eMoney product house at FNB</td>
</tr>
</tbody>
</table>