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Factors influencing the adoption of mobile banking services at the Bottom of the Pyramid in South Africa

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Abstract

With the convergence of banking services and mobile technologies, users are able to conduct banking services at any place and at any time through mobile banking (Gu, Lee & Suh, 2009). This research examines the factors influencing the adoption of mobile banking by the Bottom of the Pyramid (BOP) in South Africa, with a special focus on trust, perceived cost and perceived risk including the facets of perceived risks: performance risk, security/privacy risk, time risk, social risk and financial risk. The research model includes the original variables of extended technology acceptance model (TAM2) (Venkatesh & Davis, 2000).

Data from this study was collected through a physical hardcopy survey in townships around Gauteng. The research has found that customers in the BOP will consider adopting mobile banking as long as it is perceived to be useful and perceived to be easy to use. But the most critical factor for the customer is cost; the service should be affordable. Furthermore, the mobile banking service providers, both the banks and mobile network providers, should be trusted. Trust was found to be significantly negatively correlated to perceived risk. Thus, trust plays a role in risk mitigation and in enhancing customer loyalty.

Keywords

Adoption of mobile banking, perceived risk, trust, perceived cost, Bottom of the Pyramid (BOP).

Declaration

I declare that this research report is my own, unaided work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I obtained the necessary authorisation and consent to carry out this research.

……. 10 November 2010

Khumbula Masinge Date

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Chapter 1 – Introduction to Research Problem

1.1 Introduction

The convergence of telecommunication and banking services has created opportunities for the emergence of mobile commerce, in particular mobile banking. Mobile banking services provide time independence, convenience and promptness to customers, along with cost savings. Mobile banking presents an opportunity for banks to expand market penetration through mobile services (Lee, Lee & Kim, 2007).

According to the International Telecommunication Union (ITU) report, there is significant growth in the use of mobile phones, with over 90% of the population in South Africa using them (ITU, 2009). Mobile phones have become a tool for everyday use, which creates an opportunity for the evolution of banking services to reach the previously unbanked population through mobile banking. The use of mobile banking can make basic financial services more accessible to low-income people, minimising time and distance to the nearest retail bank branches (CGAP, 2006).

To get more low-income people or the previously unbanked to have effective access to banking facilities is also an objective of the financial Sector Charter (BASA, 2003). Mobile banking (or another form of mobile money transfer) provides a secure means of accessing and transferring funds, provides a channel for access to savings products and services, and gives access to credit for low-income housing or financing agricultural development and insurance products and services (BASA, 2003; GSMA, 2009).

There are possible benefits for using mobile banking, however questions still remain about whether low-income customers will adopt mobile banking in a scale that would make a meaningful economic impact. The question is, will low-income customers view banking through their mobile phones as reliable and trustworthy, or risky? (CGAP, 2006).

Prahalad (2005) argues that there is a fortune at the Bottom of the Pyramid (BOP) economic segment (meaning poor or low-income people). Karnani (2007, 2009) argues against Prahalad's notion, indicating that the poor do not have purchasing power and are price sensitive. This research will examine how the cost factor as compared to the benefit of mobile banking affects the decision of a low income individual to adopt a mobile banking service.

There are also regulatory barriers which may prevent mobile operators from independently offering innovative mobile money services (FICA, 2002; GSMA, 2009). In South Africa, banks are in partnership with mobile operators to offer mobile banking (mobile money) services (MTN banking, 2009; WIZZIT, 2005). The mobile banking providers are making investments into the mobile banking infrastructure for effective provision of mobile banking service to the low-income market. Hence, it is important for mobile banking service providers to understand the factors influencing the intention to use or adopt mobile banking in the low-income economic segment, in order to obtain the expected return on investment made (CGAP, 2006). A clear understanding of these factors will enable mobile banking service providers to develop suitable marketing strategies, business models, processes, awareness programmes and pilot projects (GSMA, 2009).

This research examines the factors influencing the adoption of mobile banking on low-income earners in South Africa.

1.2 Research Problem

Mobile banking can provide benefits for both the mobile banking service provider and the low-income customer, i.e. people at the BOP in South Africa. In order for mobile banking service providers to effectively provide mobile banking services to the previously unbanked or low-income population, there is a need for proper understanding of the BOP population's behaviour patterns.

There are basic questions which need to be answered: what are the factors influencing the adoption of mobile banking on the BOP? Do customers at the BOP behave differently from middle and upper income people? Do people at the BOP perceive risk and cost differently? Do they have sufficient knowledge about mobile banking service providers, services and products to trust them?

Research has been conducted on the areas of mobile commerce and mobile banking, with foci on different factors and contexts. Wu and Wang (2005), in a study on middle class populations, found that cost had minimal significant impact on the adoption of mobile banking, however it is critical when the technology is first introduced. This study will be conducted on the low-income market, a population with little disposable income. Karnani (2009) indicates that the BOP population are price sensitive. Hence, it is necessary to understand the effect of cost on the BOP population.

Various studies on perceived risk in the context of online banking (Tan & Teo, 2000; Im, Kim & Han 2008; Wu & Wang, 2005) and mobile banking (Brown, Cajee, Davies, & Stroebel, 2003; Walker, 2004) exist, however the perceived risk variable has only been modelled as a single construct. When the perceived risk is modelled as single construct, it fails to reflect on the characteristics of the risk factor (Lee, 2009).

In South Africa, Brown *et al.* (2003) conducted an exploratory study that examines the factors that influence the adoption of cell phone banking in South Africa. Walker (2004) conducted a similar study to examine the factors affecting the adoption of a wireless delivery channel (mobile banking service) in retail banks in South Africa (Walker, 2004). The study by Brown *et al.* (2003) was urban based in Cape Town, and some of the questionnaires were sent by email. Similarly, the study by Walker (2004) was conducted in the context of urban based bankers, a segment of the population that was contacted by email. Both the research by Brown *et al.* (2003) and Walker (2004) did not therefore accommodate the majority of the population in the BOP segment who lack access to the internet.

A study by Wu and Wang (2005) on the costs of mobile commerce showed that perceived cost had minimal significance when compared to other variables such as perceived risk, compatibility and perceived usefulness .

This study will contribute to the research by assessing the relevance and effects of perceived cost, trust and perceived risk in influencing the adoption of mobile banking services. This study will focus on the previously unbanked or

underbanked consumer base and potential customers in the BOP economic segment in South Africa (SA).

1.3 Research Objectives

The main objective of this study is to investigate the factors influencing the adoption of mobile banking by the Bottom of the Pyramid economic segment in South Africa. Various studies were conducted in South Africa and other countries, looking at different factors such as risk, trust, cost and perceived benefit (Brown *et al.*, 2003; Walker, 2004; Wu & Wang, 2005; Luarn & Lin, 2005; Zhang, Gou & Cheng, 2008; Yen, Wu, Cheng & Huang, 2010).

The study seeks to investigate the effects of perceived risk, trust and perceived cost on the adoption of mobile banking by the BOP economic segment in South Africa. The following questions will be investigated:

Question 1: What are the main factors influencing the adoption of mobile banking by the BOP?

Question 2: How does the customer at the BOP perceive risk with regards to mobile banking?

Question 3: What influences the customers at the BOP to trust mobile banking?

Question 4: How do customers at the BOP perceive the cost of mobile banking?

Question 5: How does perceived usefulness and perceived ease of use influence the adoption of mobile banking at the BOP?

This research seeks to achieve the following:

i. To assess the effect of five facets of perceived risk (performance risk, security/privacy risk, time risk, social risk and financial risk) with regards to the adoption of mobile banking for customers at the BOP.
ii. To reveal the effect of consumer trust on the adoption of mobile banking for customers in the BOP.
iii. To assess the effect of banking perceived cost on the adoption of mobile banking for customers at the BOP.
iv. To assess the effect of perceived usefulness and perceived ease of use with regards to adoption by the BOP.

1.4 Research Scope

This research is conducted in Gauteng, South Africa. The survey will be conducted on the low income markets, which are mainly based in townships, informal settlement and rural areas. The research will cover the following main constructs: adoption of mobile banking, perceived usefulness, perceived ease of use, perceived cost, customer's trust and perceived risk. This research will be based on the technology acceptance model (TAM) (Davis, 1989) as a research model.

The scope of the research is described by the following definitions:

- Perceived risk refers to the five facets of risk including performance risk, security/privacy risk, time risk, social risk and financial risk.

- Trust refers to the three dimensions of trust, influenced by ability, integrity and benevolence. This will be observed from three perspectives: the bank, mobile network provider and wireless infrastructure.
- Perceived cost refers to the transaction cost of conducting mobile banking transactions, including the airtime and bank charges.
- Technology acceptance model refers to the acceptance or adoption of mobile banking according to literature.
- Bottom of the Pyramid (BOP) refers to the low income market in South Africa, as defined in literature.

1.5 Research Motivation

The primary purpose of this report is to investigate factors likely to influence the adoption of mobile banking, with a special focus on the BOP in South Africa.

This research contributes to the financial services sector, in that it brings an understanding of consumer behaviour with regards to the adoption of mobile banking services. It also contributes to active academic research and adds to the understanding of technology adoption, economic developments and mobile banking services in the BOP consumer base.

To achieve the objective of this research, a review of the literature on the adoption of mobile banking was conducted. The extended technology acceptance model (TAM2) (Venkatesh & Davis, 2000) was adopted. A revised research model was used based on the TAM2 model, with the addition of trust, perceived cost and perceived risk (with five facets: performance risk, security/privacy risk, time risk, social risk and financial risk).

The revised research model is used on this research, and will contribute to the literature by incorporating the integral roles of perceived risk, trust and perceived cost into innovative technology adoption.

Pitta, Guesalaga and Marshall (2008) acknowledged that the BOP market may offer opportunities to create value for both the poor people and the mobile banking service provider. The mobile banking service provider needs to understand the characteristics of people in the low-income sector and to recognise that serving the BOP market requires a different business model (Pitta *et al.*, 2008). This research will contribute to the understanding of the mobile banking services providers, in terms of patterns and behaviours of the customers at the BOP with regard to perceived risk, trust and perceived cost in order for them to develop suitable business models and marketing approaches for BOP customers.

1.6 Structure of the report

Chapter 1: Introduces the research problem, research objectives and the rationale for the study.

Chapter 2: Through a literature review, this chapter describes the mobile banking situation in South Africa and defines the Bottom of the Pyramid (BOP) economic segment in the South African context. It further describes the research conducted on the main constructs in this research: perceived risk, perceived cost and trust. It conducts an assessment of various technology adoption models and suggests a suitable model for this research.

Chapter 3: Provides a research model based on the key factors likely to affect the adoption of mobile banking by the BOP in SA. It defines the research question and hypotheses for this research.

Chapter 4: Provides details of the research methodology, which uses empirical research to test the hypotheses.

Chapter 5: Presents the data analysis and hypotheses testing results.

Chapter 6: Discusses the findings of the research, synthesis with the literature and provides conclusions for the hypotheses.

Chapter 7: Discusses the implications for business, gives recommendations for future studies and concludes this study.

Chapter 2: Literature Review

2.1 Introduction

This chapter critically reviews the literature that pertains to the developments in South African mobile banking situation and defines the Bottom of the Pyramid (BOP), which is the context of this study. The background of mobile commerce and mobile banking technologies is reviewed. The literature review then discusses a technology acceptance framework for mobile banking. It further reviews the constructs within the framework, which includes perceived usefulness , perceived ease of use, perceived risk, perceived cost and trust. The variables (risk, trust and cost) are added to the extended technology acceptance model (TAM2) (Venkatesh & Davis, 2000) to develop a research model to investigate factors affecting adoption of mobile banking by the BOP in South Africa. The structure of the literature review was designed to discuss the SA BOP context and mobile banking concept first, for better understanding of the relevance of the research model and main construct of the study.

2.2 Bottom of the Pyramid (BOP) in SA

According to Prahalad (2005), the distribution of wealth and the capacity to generate incomes in the world can be captured in the form of an economic pyramid. According to Prahalad (2005) there are more than four billion people at the BOP living on less than $2 per day purchasing power parity (PPP), in both developing countries and least-developed countries. Karnani (2007) used the 2001 World Bank estimates of 2.7 billion people at the BOP living on less

that $2 per day (PPP); and furthermore in 2009, Karnani (2009) used an estimated the figure of 2.5 billion people on the BOP. Jaiswal (2008) used the 2005 World Bank estimates of 2.4 billion people living in low-incomes countries. This study will not focus much on the estimated figure for the BOP population, but rather on the definition of BOP. PPP in international dollars is used rather than United States dollars to have a better comparison, since PPP exchange rates take into account the local prices of goods and services not traded internationally (cost of living) (Karnani, 2007; Jaiswal, 2008; Louw, 2008).

Prahalad (2005) argues that there is a fortune at the Bottom of the Pyramid and that the private sector and entrepreneurs should target these vast untapped rural markets in developing countries with low-cost services and appropriate business strategies. This notion is opposed by Karnani (2007, 2009), who suggests that it is a fallacy to claim that there is much “untapped” purchasing power at the BOP. The poor consume most of what they earn, and as a consequence, have a low savings rate. Guesalaga and Marshall (2008), in a study comparing the buying power index (BPI) of BOP consumers in different geographic areas, found that more than 50% of the purchasing power resides in the BOP segment in developing countries. However, the BOP consumption concentrates mainly on food, housing, and household goods (Guesalaga & Marshall 2008).

Karnani (2009) argues against the BOP proposition made by Prahalad (2005), who estimates that the BOP market size is $13 trillion. Karnani estimates the

market size to be $360 million. However, both Karnani and Prahalad use the same BOP definition of people living on less than $2 per day (Karnani, 2009).

In Mokoto (2009), Meltzer (2009) indicated that in South Africa, about 23 million people are considered to be at the BOP, with almost three million living on less than five rand (R5) per day and 18 million living on less than R20 per day (Meltzer, 2009; Mokoto, 2009; MarketingMix, 2010).

The focus of this study is neither to establish the existence of a fortune or lack of fortune at the BOP, nor to gauge the market size of the BOP. Rather, this study seeks to establish a suitable BOP definition to use for the adoption of mobile banking in the BOP segment.

Louw (2008) conducted a study to redefine the BOP, where the BOP definition was categorised into segments. Firstly, BOP1 is defined as people living on less than $2 per day PPP, as defined in Prahalad (2005). Secondly, BOP2 defined the upper section of the BOP1 market with a population of people earning more than $2 per day PPP (Louw, 2008). Louw does not provide a ceiling for BOP2, a point also noted by Mokoto (2009).

A South African perspective study by Chipp and Corder (2009) provides individual and household definitions of BOP based on a living standard measure (LSM). The BOP is defined to be individuals with a personal income of $8 per day (with 21 working days per month) and all adults with a household income of $13 a day, as outlined in Table 2.1 (SAARF, 2009; Chipp & Corder,

2009). Based on Table 2.1, the average personal income level is R1,312 and household income is R2,069 in the Foundation segment.

Table 2.1: Income levels across the Pyramid (at rate of US$ = R7.50)

	Pyramid			
	Foundation	Core	Buttress	Apex
	Mean	Mean	Mean	Mean
Av personal income (in Rands)	R1,312.00	R2,642.70	R6,071.52	R11,159.02
Average $ per day on personal income	$8.33	$16.78	$38.55	$70.85
Av household income (in Rands)	R2,069.60	R4,664.16	R12,125.90	R23,562.60
Average $ per day on household income	$13.14	$29.61	$76.99	$149.60

Source data: AMPS 2008b (SAARF, 2009); Chipp and Corder, (2009)

The four tiers of the South African pyramid are labelled from the top of the pyramid as the Apex segment, followed by Buttress, then the Core with the bottom labelled as the Foundation, as outlined in Table 2.2 and Figure 2.1 (Chipp & Corder, 2009). The Foundation is very similar to the BOP segment (Chipp & Corder, 2009), hence for the purpose of this research they will be treated as the same.

Table 2.2: The South African Pyramid (000s)

	TOTAL	
The South African Pyramid	'000	%
Population ('000)	31,305	100
The Apex of the Pyramid (Group A - LSM 9 &10.)	4,463	14.3
The Buttress of the Pyramid (Group B - LSM 7 & 8)	5,105	16.3
The Core of the Pyramid (Group C - LSM 5 & 6)	10.534	33.6
The Foundation of the Pyramid (Group F - LSM 1-4)	11,194	35.8

Source: SAARF (2009). AMPS 2008B (Chipp & Corder, 2009)

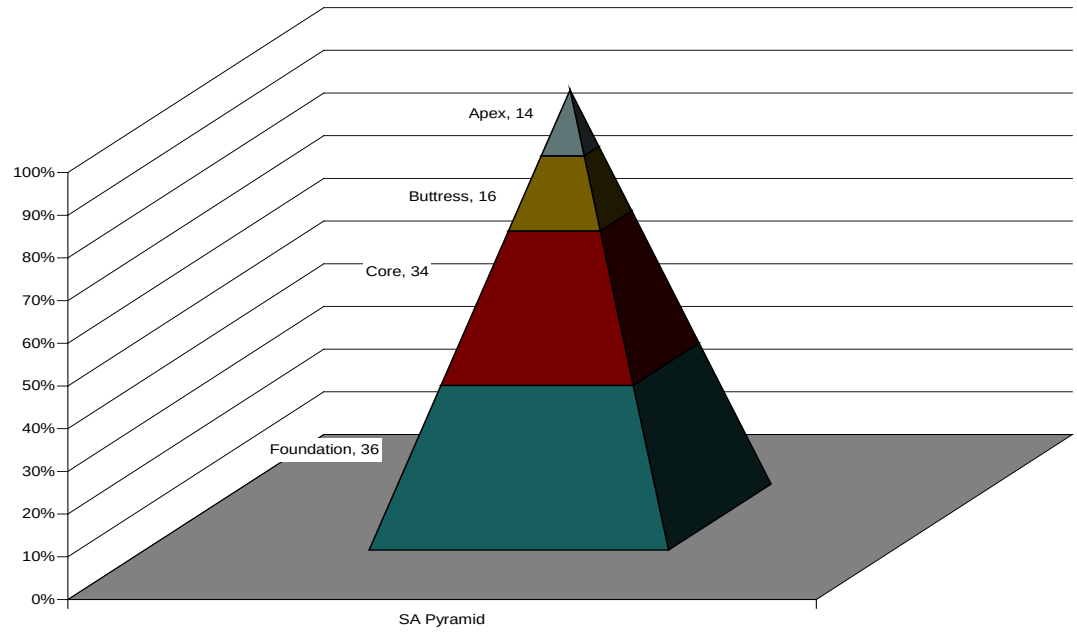

Figure 2.1: The South African Pyramid (Source: Chipp & Corder, 2009)

Both Table 2.2 and Figure 2.1 show that approximately 36% of the population are in the Foundation segment (BOP). This implies that about 15 million people in South Africa are at the BOP. Based on AMPS 2008B, the Foundation segment is categorised to consist of people in LSM1-4, and the Core segment to be people from LSM 5 & 6 (SAARF, 2009; Chipp & Corder, 2009). As discussed in the previous section, according to the objectives of the Financial Sector Charter, banks were expected to increase access to banking services for people in LSM 1-5 (BASA, 2003). For the purpose of this study, to accommodate the people in LSM 5 both the Foundation and Core segment need to be considered. In the Core segment, the maximum level for personal income is $16.78 per day and the average household income is $29.61 per day or R4,664 per month (SAARF, 2009; Chipp & Corder, 2009).

Considering the mobile banking context of this study, the definition of BOP will be based on various definitions reviewed in this study, ranging from $2 per day PPP (Prahalad, 2005; Karnani, 2007; Louw, 2008) to an average household income of $29.61 or R4,664 per month (Chipp & Corder, 2009; SAARF, 2009). For the purpose of the questionnaire range to be used, people with incomes of less than R5,000 per month will be regarded as the BOP. Alternatively, if income is not provided, then the LSM 5 or a lesser category will be used according to AMPS 2008B (as outline in Appendix A) (SAARF, 2009).

2.3 Development of Mobile Banking

2.3.1 Mobile commerce (m-commerce)

Mobile Commerce (m-commerce) is defined as a business transaction conducted through mobile communication networks or the Internet (Siau & Shen, 2003). M-commerce can offer value to consumers through convenience and flexibility by enabling time and place independence (Kim *et al.*, 2009; Venkatesh *et al.,* 2003).

Mobile banking is an application of m-commerce which enables customers to access bank accounts through mobile devices to conduct and complete bank-related transactions such as balancing cheques, checking account statuses, transferring money and selling stocks (Kim *et al.*, 2009; Tiwari & Buse, 2007, p. 64). Luo, Li, Zhang and Shin (2010), defined mobile banking as an innovative method for accessing banking services via a channel whereby the customer interacts with a bank using a mobile device (e.g. mobile phone or personal digital assistant (PDA)).

There are challenges associated with m-commerce, and specifically mobile banking. Mobile devices with a small screen size, limited screen resolution and uncooperative keypad may make it difficult for the customer to use mobile banking (Kim *et al*., 2009). Mobile banking is also vulnerable to information and transaction eavesdropping risk, just like other e-commerce applications such as Internet banking (Siau *et al*., 2003).

2.3.2 Mobile Banking technology solutions

Currently, mobile banking is implemented through three different technology solutions: browser-based applications, messaging-based applications and client-based applications (Kim *et al.*, 2009; Tiwari & Buse, 2007, p. 84).

The browser-based application is essentially a Wireless Access Protocol (WAP)-based internet access (Kim *et al*., 2009). This requires a compatible mobile phone which is WAP-enabled. The mobile phone is used to access banking portals through the Internet.

On the messaging-based applications, the communication between the bank and the customer is carried out via text messages. For example, by using a registered mobile number, the customer sends a predefined command to the bank, then uses text messages to conduct transactions with the bank. An example of messaging-based applications is the Unstructured Supplementary Service Data (USSD), which has compatibility with most mobile phones. Existing mobile banking applications based on USSD includes WIZZIT in South Africa (WIZZIT, 2005), M-PESA in Tanzania (Camner & Sjöblom, 2009), M-PESA in South Africa (Nedbank, 2010b) and FNB mobile banking (FNB, 2010).

On client-based applications, special software is installed in the mobile phone. An example of a client-based application is what is called the SIM Toolkit standard (STK) (Tiwari & Buse, 2007, p. 101). For instance the M-PESA in Kenya uses the STK technical platform (Safaricom, 2007; Camner & Sjöblom, 2009).

2.3.3 Mobile banking in South Africa

Low Cost Banking in SA

According to the objectives of the Financial Sector Charter (BASA, 2003), banks were expected to increase effective access to financial transaction services to the low-income segment of the population (LSM 1-5) (SAARF, 2009). Conferring low-income people access to banking facilities ensures a secure means of transferring money, provides access to credit for low-income housing or agricultural development, inclusion to the formal economy, access to insurance products and an improved saving culture (BASA, 2003).

In October 2004, the Banking Council of SA announced the launch of the Mzansi account as part of the requirements to be met as set out in the Financial Sector Charter (BCSA, 2005; BASA, 2003). The Mzansi bank account was developed to provide an entry-level account to the poorest segment of the population, who fall into category LSM 1–5 (BASA, 2010). By the end of 2005, 1.4 million Mzansi accounts had been opened. This figure increased at a rate of 21% year-on-year to approximately 3.9 million accounts by the end of 2009 (BASA, 2010).

In South Africa, a study was conducted by Business Action for Africa (2006) assessing the role of legislation, the Financial Sector Charter, political pressure, new technology and commitment from the banks in introducing innovative low-cost banking services, such as Sekulula cards. Through the Sekulula card, social grant beneficiaries benefit from the use of Visa's payment system to

receive payments in a safer, more efficient way, whilst offering substantial benefits for all stakeholders (Business Action for Africa, 2006).

There are regulatory requirements which restrict banks or mobile network providers to provide innovative products for mobile money transfers (GSMA, 2009). For example, the Financial Intelligence Centre Act (FICA) requires banks to verify the identities and residential addresses of customers opening a bank account, in order to reduce financial related crimes such as money laundering and fraud (FICA, 2002). Hence, mobile money services such as M-PESA and WIZZIT can only be implemented when the network service provider is in partnership with a bank. To better understand the status of mobile banking in SA, examples of initiatives by various mobile banking service providers in particular banks are highlighted in the next subsections.

M-PESA Money Transfer (Nedbank Cellphone Banking)

M-PESA is a money transfer service which was first introduced in Kenya in March 2007 by Safaricom in partnership with Vodafone (Safaricom, 2007). The M-PESA service enables users to deposit, withdraw and transfer money using a mobile phone at M-PESA agents countrywide (Safaricom, 2007). The M-PESA application is installed on the SIM card and works on all makes of handsets. M-PESA is widely used in Kenya and Tanzania (Camner & Sjöblom, 2009), it is free to register and the user does not need to have a bank account (Safaricom, 2007).

In August 2010, Nedbank and Vodacom officially launched M-PESA money transfer in South Africa (Nedbank, 2010a). M-PESA is based on the Unstructured Supplementary Service Data (USSD) technology; it is currently available for Vodacom subscribers (Vodacom SIM card holders and ported SIM cards) (Nedbank, 2010b). The registered M-PESA user does not need to have a bank account, there are no monthly fees and no minimum balance is required (Nedbank, 2010b).

WIZZIT Cellphone Banking

Another example is the initiative by WIZZIT Bank, a division of the South African Bank of Athens, where a WIZZIT cellphone banking system was launched in November 2004 in an attempt to provide solutions to the previously 'unbanked' society in SA (WIZZIT, 2005). WIZZIT uses the 'pay-as-you-go' model, i.e. users pay per transaction (20c per 20 seconds on MTN and Vodacom) and there are no monthly fees (WIZZIT, 2005).

Standard Bank Cellphone Banking

Standard Bank, in conjunction with MTN, implemented the MTN banking, a mobile money service which was based on WIG which the client needed to install on their SIM card (Standard Bank, 2005). The use of cellphone banking enables the bank, as part of self-service banking, to provide convenient, safe and cost effective services to their customers (Standard Bank, 2010). The cellphone banking services are implemented using two options; the WAP-based option and a new cellphone banking option which works on any type of phone

(Standard Bank, 2010). To use Standard Bank's cellphone banking, the user needs to have an account with the bank.

ABSA Cellphone Banking

ABSA have implemented two cellphone banking options; WAP-based (Internet via a cellphone) and Wireless Internet Gateway (WIG) based, which is enabled through secure SMSes (ABSA, 2010). With the WIG cellphone banking, the banking menu is downloaded to the SIM card, which allows for a convenient selection of transactions and the secure transmission of encrypted information between the cellphone and the bank (ABSA, 2010). The ABSA WIG cellphone banking is currently available for Vodacom and MTN subscribers.

FNB Cellphone Banking

FNB have implemented cellphone banking based on the WAP and USSD technology available to all FNB account holders. In addition, FNB has introduced eWallet, which is a money transfer service (FNB, 2010a); as well as Pay Wallet which enables FNB Corporate, Commercial and Public Sector clients to electronically pay their unbanked recipients directly to their cellphones (FNB, 2010b). This allows the recipients to have immediate access to their funds at any full service FNB ATM without the need of a bank card.

From the above examples we can see that several mobile banking solutions exist in SA. The penetration of these products into the lower income segments is, however, limited. A clearer understanding of the factors which would

enhance adoption would be beneficial in order to build scale in the mobile financial services sector.

2.4 Technology acceptance theoretical background

Since the late 1980s, technology adoption research focused on exploring the determinants of users' intentions to use new technologies. Many theories have been developed to study Information Technology (IT) adoption issues, including the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the technology acceptance model (TAM) (Davis, 1989), the extended technology acceptance model (TAM2) (Venkatesh & Davis, 2000), the theory of planned behaviour (TPB) by Ajzen (1991), the innovation diffusion theory (Rogers, 1995) and the unified technology acceptance user technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003).

TAM suggests that perceived usefulness (PU) and perceived ease of use (PEOU) are the two most important factors in explaining individual users' adoption intentions and actual usage (Davis, 1989). Davis (1989) defines PU as the degree to which a person believes that using a particular system will enhance his or her job performance. In addition, PEOU refers to the degree to which the person believes that using the system will be free of effort (Davis, 1989).

TAM has been extensively tested and validated and is a widely accepted model, which can be modified or extended using other theories or constructs (Taylor & Todd, 1995; Davis & Venkatesh, 2000; Wu & Wang, 2005; Luarn & Lin, 2005; Zhang, Gou & Cheng, 2008; Yen, Wu, Cheng & Huang, 2010).

Venkatesh and Davis (2000) introduced such social and organisational factors as subjective norms, impression, quality of output and work relevance into the TAM model and proposed the so-called extended TAM model (TAM2).

Wu and Wang (2005) combined TAM2 and innovation diffusion theory (IDT) by Rogers (1995), in a study focused on investigating the drivers of mobile commerce. The PU and PEOU constructs from the TAM2 model were combined with perceived risk and cost constructs. From the IDT the compatibility constructs were added to the research model (Wu & Wang, 2005). For a better understanding of the construct, the IDT model is described in this study.

In IDT, Rogers (1995) defines diffusion as the process by which innovation or perceived new technology is communicated through certain channels over time among members of a social system. Rogers (1995) proposed and defined the five attributes determining the rate of adoption of new technology as follows:

- Relative advantage: is the extent to which the innovation is perceived as better than the technology it replaces, including technical performance, cost, risk, or other attributes (Rogers, 1995);
- Compatibility: is the extent to which an innovation is perceived as being consistent with the existing values, past experiences and needs of potential users (Rogers, 1995);
- Complexity: is the level of difficulty in understanding and using the technology (Rogers, 1995);
- Observability: is the extent to which the results of a new technology can be observed or visible to others (Rogers, 1995);

- Trialability: is the ability to try or experiment with the performance of new technology on a limited basis (Rogers, 1995).

Many authors, for a variety of different technologies including Voice over Internet Protocol (VoIP), Internet banking and mobile banking, have studied Roger's IDT (Walker, 2004; Bidoli, 2004; Venkatesh *et al*., 2003).

For a better understanding of the most suitable model to use for this study, it is necessary to discuss the UTAUT model and applicable determinants.

UTAUT was proposed by Venkatesh *et al*. (2003) after reviewing the following eight IT adoption theories: TRA, TAM, the motivational model, TPB, the PC utilisation model (PCUM), IDT, the social cognitive theory (SCT), and the integrated model of technology acceptance and planned behaviour. In UTAUT, the factors influencing the adoption and usage of information technology includes: performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh *et al.*, 2003).

Venkatesh *et al.* (2003) defines the factors as follows:

- Performance expectancy refers to the extent to which an individual believes that using the system will help him or her achieve better results on the task (Venkatesh *et al.*, 2003; Wang & Wang, 2010).
- Effort expectancy refers to the extent of ease associated with the use of the system (Venkatesh *et al.*, 2003).
- Social influence refers to the extent to which an individual perceives that important others believe he or she should use the new system (Venkatesh *et al.*, 2003).

- Facilitating conditions refers to the extent to which an individual believes that an organisational and technical infrastructure exists to support use of the system (Venkatesh *et al*., 2003).

UTAUT is considered to be the most important theory for IT adoption research in Information Systems (IS) fields in the future. The model has been empirically examined and found to outperform the other eight individual models, including the TAM model (Carlsson, Carlsson, Hyvonen, Puhakainen & Walden, 2006). However, UTAUT is not perfect. To apply UTAUT in certain special IT applications such as mobile banking, modification and revision is needed as recommended by Venkatesh *et al.* (2003).

In a study by Carlsson *et al.* (2006) using the UTAUT in Finland, performance expectancy and effort expectancy are found to be the main determinants of behavioural intention in using mobile services (Carlsson *et al.*, 2006). The UTAUT model has also been revised to study mobile commerce acceptance, where additional determinants such as trust, privacy, convenience and cost were shown to affect the behavioural intention (Min, Ji & Qu, 2008).

The effort expectancy from UTAUT, PEOU from TAM and complexity from IDT are regarded as similar (Venkatesh *et al*., 2003). Similarly, the relative advantage of IDT and performance expectancy of UTAUT are analogous to PU from TAM (Taylor & Todd, 1995; Venkatesh *et al*., 2003). For this study, the terms POEU and PU are adopted as independent variables on the research model.

Luarn and Lin (2005) conducted a study in Taiwan, where TAM and the theory of planned behaviour (TPB) by Ajzen (1991) were combined. The study investigated the possible factors affecting mobile banking users' behavioural intentions. These factors include perceived usefulness (PU), perceived ease of use (PEOU), perceived credibility, self-efficacy, and perceived financial cost (Luarn & Lin, 2005).

In a study by Lee (2009) in Taiwan which investigated the factors influencing the adoption of internet banking, the TAM and TPB were integrated with perceived risk and perceived benefit constructs were added to the research model. In a study by Lee (2009), the following five antecedents of perceived risk were discussed: performance risk, social risk, financial risk, time risk and security risk.

For the purpose of this study, a research model is proposed as outlined in Figure 2.2, consisting of the original determinants of TAM2: PU, PEOU, adoption of mobile banking (analogous with Behaviour Intention), Actual Usage (AU) and additional determinants: the five facets of perceived risk, trust and perceived cost.

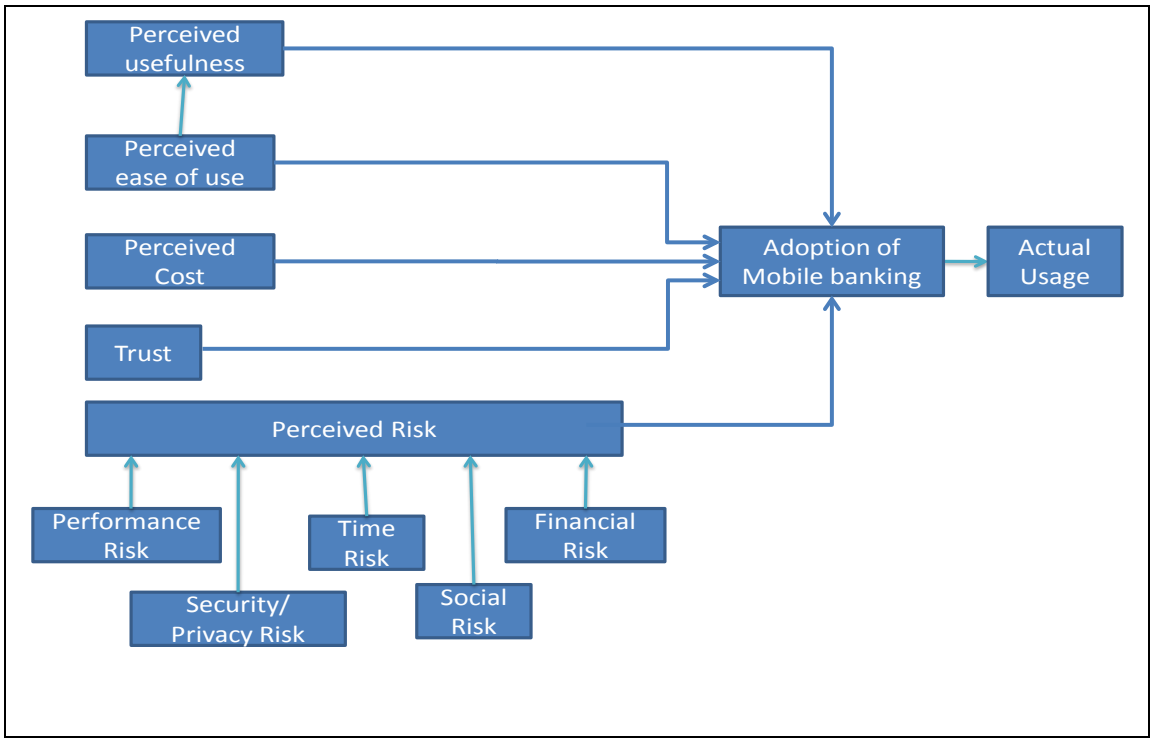

Figure 2.2: Research Model based on TAM2 with perceived risk, trust and perceived cost

2.5 Perceived risk of mobile banking

Various studies on consumer perceptions of risks were conducted in the context of online banking (Tan & Teo, 2000; Im, Kim & Han 2008; Wu & Wang, 2005), but the perceived risk variable has only been modelled as a single construct. When the perceived risk is modelled as single construct, it fails to reflect on the characteristics of the perceived risk (Lee, 2009).

Lee (2009) conducted a study on perceived risk in the context of Internet (online) banking adoption. The perceived risk was divided into five facets (performance risk, social risk, financial risk, time risk and security risk), which provided a more in-depth understanding of the characteristics of risks regarding Internet banking (Lee, 2009). Mobile banking may be considered an extension of Internet banking, but with its own unique characteristics given that a cell

phone is used rather than a web browser on a personal computer (Brown, Cajee, Davies & Stroebel, 2003). Thus, a similar set of risk factors can be derived for mobile banking by using the five risk facets as used by Lee (2009) as a basis: performance risk, social risk, financial risk, time risk and security risk. As defined by Lee (2009), these five risks can be described for mobile banking as follows:

- Performance risk: refers to losses incurred by deficiencies or malfunctions of mobile banking servers (Lee, 2009). According to Littler & Melanthiou (2006), a malfunction of a banking server would reduce customers' willingness to use banking services, and a similar notion applies in the context of mobile banking.
- Security/privacy risk: is defined as a potential loss due to fraud or a hacker compromising the security of a mobile banking user. In a similar study, Luarn and Lin (2005) used the construct 'perceived credibility', which is defined as the extent to which a person believes that using mobile banking will have no security or privacy threats. For this study, security/privacy risk will be considered to be similar to a lack of credibility.
- Time/convenience risk: this refer to a loss of time and any inconvenience incurred due to the delays of receiving payments or the difficulty of navigation (finding appropriate services and relevant commands) (Lee, 2009).
- Social risk: refers to the possibility that using mobile banking may result in disapproval by one's friends/family/work group (Lee, 2009).
- Financial risk: is defined as the potential for monetary loss due to transaction errors or bank account misuse (Lee, 2009).

Lee (2009) & Lee, Lee and Kim (2007) found that all five risks: security, financial, time, social and performance risks, emerged as negative factors in the intention to adopt online banking. However, social risk was found to have an insignificant effect on the intention to adopt online banking (Lee, 2009).

A study by Im *et al*. (2008) found that when deploying a technology perceived by users to be high risk, managers need to emphasis 'ease of use'. When deploying a technology perceived to be low risk, managers need to focus on communicating the 'usefulness' of the technology (Im *et al.*, 2008).

A study by Wu and Wang (2005) conducted on mobile commerce, where more than three-fifths (60%) of the respondents had online transaction experience, showed that perceived risks have positive influences on the behavioural intention to use the product. The study by Wu and Wang (2005) fails to clearly explain the reason for these results; it rather assumes that the respondents might have been aware of the existing risk of mobile commerce.

A study by Tan and Teo (2000) on the adoption of Internet banking revealed that perceived risk is a significant determinant. Brown *et al.* (2003) applied Tan and Teo's Internet banking adoption framework to the mobile banking context. Brown *et al*. (2003) found perceived risks to be significant factors affecting mobile banking adoption. However, in their studies, perceived risk was modelled as a single construct (Tan & Teo, 2000; Brown *et al.*, 2003).

For this study, all five risk facets will be adapted as antecedents of perceived risk in the research model (as outlined in Figure 2.1). As per the literature review, it is hypothesised that security, financial, time, social and performance

risks are more likely to have a negative effect on the adoption of mobile banking.

2.6 Perceived cost

Perceived cost is defined as the extent to which a person believes that using mobile banking will cost money (Luarn & Lin 2005). The cost may include the transactional cost in the form of bank charges, mobile network charges for sending communication traffic (including SMS or data) and mobile device cost.

A study by Wu and Wang (2005) on mobile commerce acceptance showed that perceived cost had minimal significance when compared to other variables such as perceived risk, compatibility and perceived usefulness . A further qualitative investigation on the same study was conducted, which revealed that perceived cost is normally a major concern when a technology is first introduced (Wu & Wang, 2005). However, when there is an emergency or sudden need, the utility benefits outweigh the cost issues. The study by Wu and Wang (2005) was conducted on respondents with an average income level of US$650 per month (equivalent to approximately R5000). This income level was regarded as being a good financial status, implying that the users could afford mobile commerce (Wu & Wang, 2005).

This study however focuses on the BOP context, a population with low disposable income. According to Karnani (2009) people at the BOP have very low purchasing power and are price sensitive. According to Guesalaga and Marshall (2008), in developing countries, the consumption pattern of the BOP concentrates mainly on basic needs such as food, housing and household

goods; with less spending on information and communication technology (ICT). Therefore, perceived costs should be considered with regards to the adoption of mobile banking, especially in the BOP context.

For this study, perceived cost is included in the research model as having a direct effect on the adoption of mobile banking (as outlined in Figure 2.1). Hence, it is anticipated that the perceived cost of mobile banking services is more likely to negatively influence the adoption of mobile banking.

2.7 Trust in mobile banking

Customer trust is recognised as a critical factor for the success of mobile banking. With the surge of both electronic commerce (e-commerce) and mobile commerce (m-commerce), more studies have been conducted on the conceptual structure, formation of the mechanisms of trust and effects of trust (Bhattacherjee, 2002; Kim, Shin & Lee, 2009; Kim, Chung & Lee, 2010; Shin, 2010).

In a study by Kim *et al.* (2009) which examined the effect of initial trust in mobile banking user adoption, trust was defined as a psychological expectation that a trusted party will not behave opportunistically. In Kim, Chung and Lee (2010), trust was defined as a feeling of security and willingness to depend on someone or something.

Kim *et al.* (2009) further makes a distinction between initial trust and experience or knowledge-based trust. This study will focus on initial trust, as users are

more likely to have less experience with service providers with regard to the use of mobile banking.

A study by Siau and Shen (2003) classified trust into two categories: trust of technology and trust of mobile banking service providers. This is supported by Lee, Lee and Kim (2007) in a study that focused on three trust dimensions: trust in bank, trust in mobile network provider and trust in wireless infrastructure.

A study by Bhattacherjee (2002) provided a definition and measurement of the consumer's trust of an e-commerce service provider, based on the three dimensions or typology of trust: ability, integrity and benevolence. Bhattacherjee (2002) defined these as follows:

- Ability refers to the perception of the consumer about the competency and salient knowledge of the mobile banking service provider to deliver the expected service;
- Integrity refers to users' perceptions that the service provider will be fair, honest and adhere to reasonable conditions of transactions;
- Benevolence refers to the extent to which a service provider will demonstrate receptivity and empathy towards the user. The service provider will make a good faith effort to resolve users' concerns and intends to do good to the users beyond profit motives.

For the purpose of this study the three dimensions of trust: ability, integrity and benevolence (Bhattacherjee, 2002), will be used, together with trust from the three perspectives of bank, mobile network provider and wireless infrastructure (Siau & Shen, 2003; Lee *et al.*, 2007).

In the mobile banking context, trusting intentions represents users' willingness to engage in subsequent transactions with the service provider (Bhattacherjee, 2002). Higher levels of trust in a service provider will therefore lead to greater intentions on the part of the user to engage in mobile banking transactions.

A study by Gu, Lee and Suh (2009) verified the effect of trust on behavioural intentions in mobile banking, using the trust from the banks' perspective. This indicates that trust helps reduce fraud and potential risks caused by opportunistic behaviour and provides users the ultimate benefit of getting more reliable banking services from honest banks (Gu *et al.*, 2009). To better understand the role of the customer trust on the adoption of mobile banking, the concept of brand loyalty and customer loyalty is also introduced in this study.

In a study by Lin and Wang (2006), brand loyalty is simply defined as the repetitive purchase of preferred brand products or services. It further defines customer loyalty as a customer's favourable attitude toward the mobile vendor that results in repeat buying behaviour (Lin & Wang, 2006). For the purpose of this study customer loyalty will be used. According to Reichheld and Schefter (2000), to earn customer loyalty in an online business it is critical to first earn customers' trust. A study by Harris and Goode (2004) found that trust is positively and directly associated with customer loyalty for online services. Since mobile banking is considered an extension Internet banking (Brown *et al.*, 2003), it is therefore considered to be part of the online services.

Hence a customer's trust in a mobile banking service provider is likely to positively influence the adoption of mobile banking.

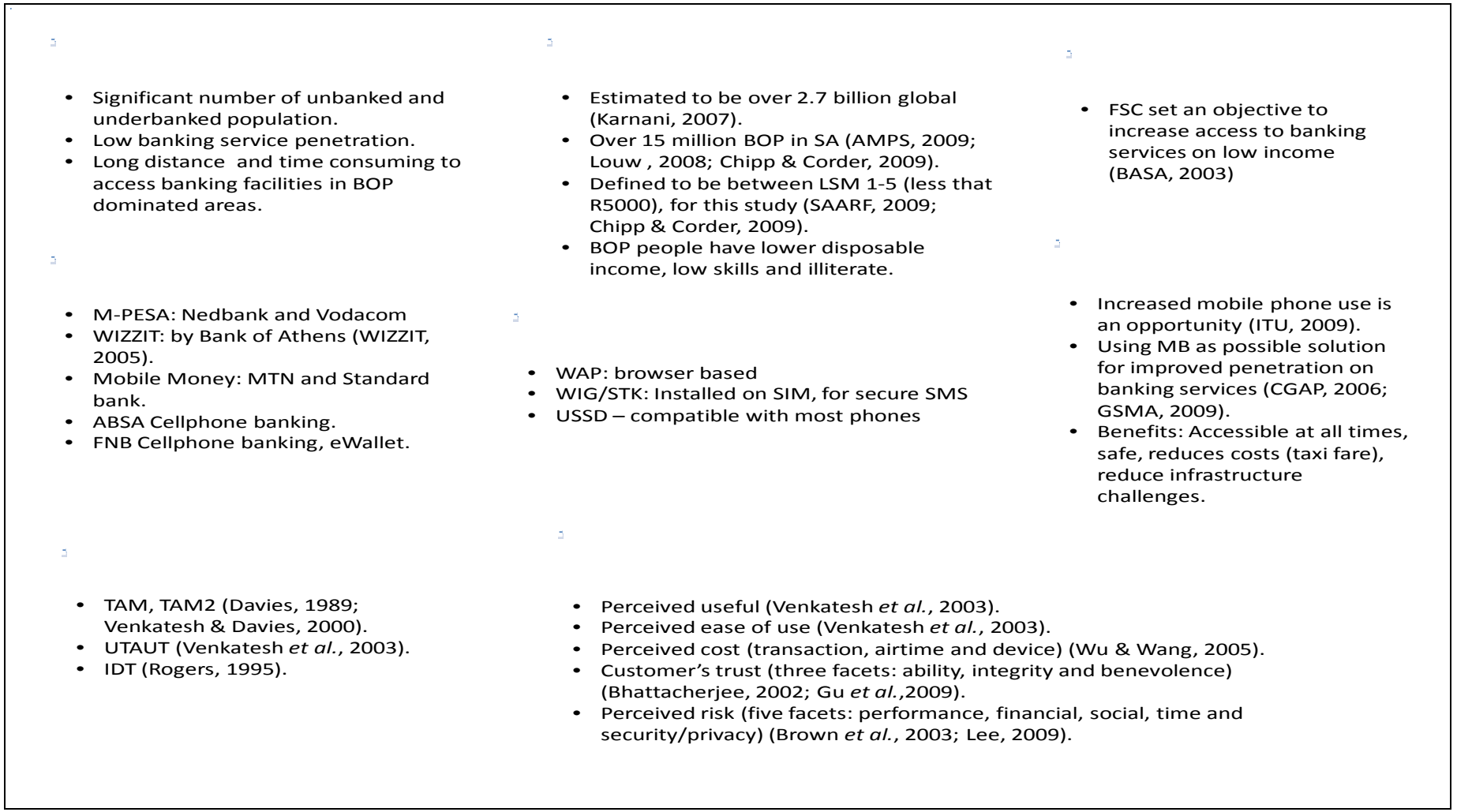

Figure 2.3: Summary of Literature Review

Chapter 3: Research Questions and Hypotheses

3.1 Research Questions

The main objective of this study is to investigate the factors influencing the adoption of mobile banking by the Bottom of the Pyramid (BOP) economic segment in South Africa. The literature highlighted various factors affecting the adoption of this technology, several of which are regarded as significant for the context of this study, and therefore a quantifying approach of identified factors is adopted.

The secondary objective of the study is to investigate the effects of perceived risk, trust and perceived cost on the adoption of mobile banking by the Bottom of the Pyramid (BOP) economic segment in South Africa, as well as the effects of the original determinants of the TAM2 model (PU, PEOU) on the adoption of mobile banking at the BOP context.

3.2 Research Model and Hypotheses

Hypotheses based on TAM2

Venkatesh *et al*. (2003) hypothesised that PU and PEOU are determinants of the behaviour intention (BI). For this study, BI is analogous to the adoption of mobile banking. This means that PU and PEOU will have a significant impact on a user's adoption of mobile banking. The relationship between PU and PEOU is that PU mediates the effect of PEOU on attitude and intended use. This means that while PU has a direct impact on attitude and use, PEOU

influences attitude and use indirectly through PU. The adoption intention of a technology determines actual usage (Davis, 1989; Venkatesh & Davis, 2000). This study is conducted on the BOP market segment, a segment characterised by lower skills and literacy rates. For this study, the following hypotheses are proposed in the context of the adoption of mobile banking by people at the BOP:

H1: Perceived usefulness (PU) influences the adoption of mobile banking.

H2: Perceived ease of use (PEOU) influences the adoption of mobile banking.

H3: Perceived ease of use (PEOU) influences perceived usefulness (PU).

Perceived cost hypothesis

A study by Wu and Wang (2005) on mobile commerce acceptance showed that perceived cost had a significant effect on the adoption of mobile banking in Taiwan. This study is conducted on the BOP market segment; a segment characterised with lower disposable income. According to Karnani (2009), people at the BOP have a very low purchasing power and are price sensitive. It is hypothesised that the perceived cost of mobile banking services is more likely to negatively influence the adoption of mobile banking.

H4: The perceived cost influences the adoption of mobile banking.

Trust hypothesis

The trusting intention represents users' willingness to engage in subsequent transactions with the service provider (Bhattacherjee, 2002). The higher levels of trust in a service provider will therefore lead to a greater intention on the part of user to engage in mobile banking transactions (Gu, Lee & Suh, 2009; Lee *et al.*, 2007).

H5: Customers' trust in mobile banking service providers is likely to influence the adoption of mobile banking.

Perceived risk hypotheses

Brown *et al*. (2003) found perceived risk to be a significant factor affecting mobile banking adoption in a study conducted in urban areas. Lee (2009) found that all five risks facets: security, financial, time, social and performance risks, emerged as negative factors in the intention to adopt online banking. This study is conducted on the BOP market segment. For the context of this study the perceived risk hypothesis is as follows:

H6: The level of perceived risk is likely to influence the adoption of mobile banking.

Graphical Summary of the hypotheses

The hypotheses are integrated to the research model as outlined in Figure 3.1.

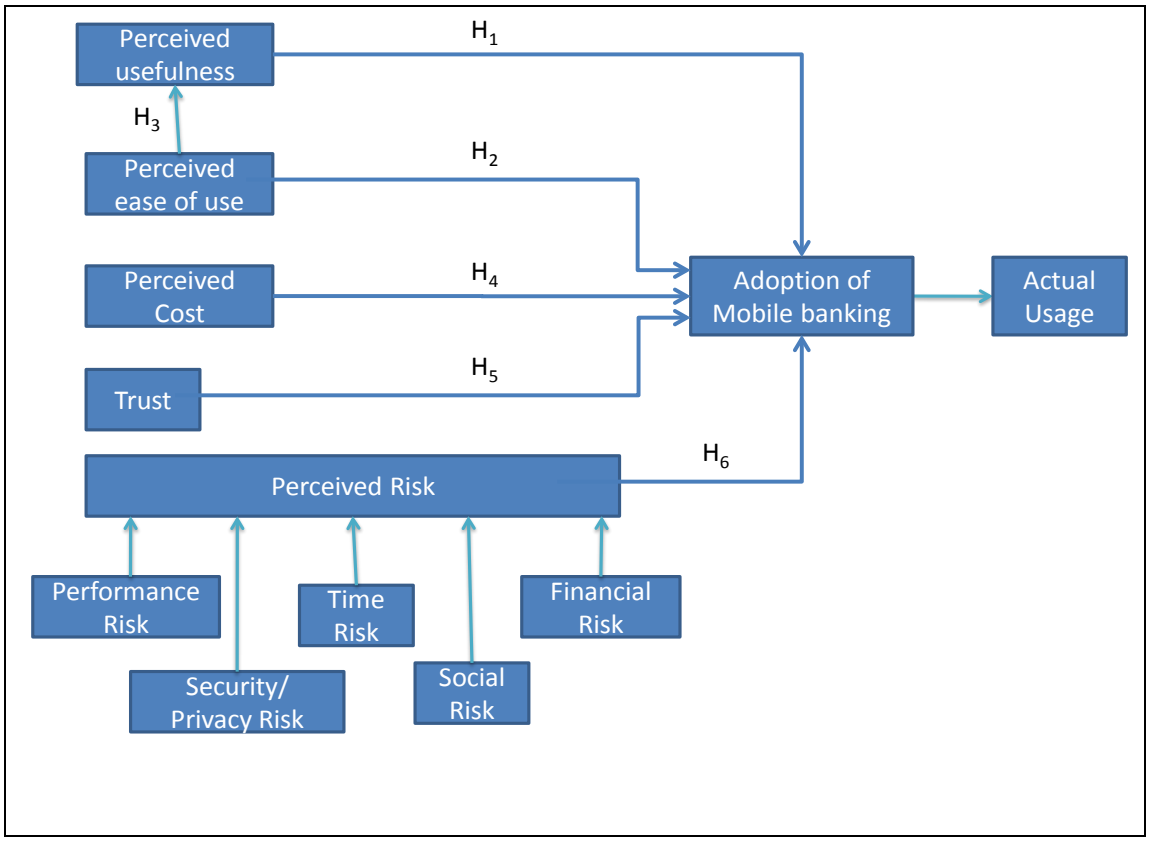

Figure 3.1: The research model with hypotheses based on TAM2 with perceived risk, trust and perceived cost

Chapter 4: Research Methodology

4.1 Research Design

In order to achieve the objectives of this study, the research followed a quantitative research methodology. Quantitative research was used to provide numerical measurement and analysis of the adoption dynamic. Survey questionnaires were used for standardisation purposes to allow for aggregation of the results.

The investigation aimed to identify whether the independent variables are statistically significant factors in the adoption of mobile banking. The research established the effect of independent variables, which included perceived risk, trust, perceived cost, perceived usefulness , and perceived ease of use on dependent variables, i.e. the adoption of mobile banking.

4.2 Population

According to Zikmund (2003, p. 369) a population is any complete group of people, companies, hospitals, stores, college students or the like that share some set of characteristics. For the purposes of this study, the population was individuals with a mobile phone and a bank account in SA, with an income of less than R5,000 per month, or a person in a category not higher than LSM 5, based on AMPS 2008b (as in Appendix A) (SAARF, 2009; Chipp & Corder, 2009).

According to ITU (2009), over 90% of the population in South Africa has a mobile phone. Mobile banking solutions are compatible and can work on all types of mobile phones (Kim *et al.*, 2009; Tiwari & Buse, 2007).

More than 15 million people (over 16 years old) are estimated to be in the BOP economic segment in South Africa (AMPS, 2009; Louw 2008; Chipp & Corder, 2009). According to a report by the Banking Council of South Africa, over 3.9 million Mzansi accounts were opened by the end of 2009 (BASA, 2010). A total population of mobile phone owners with bank accounts, who fall in the BOP economic segment, is assumed to be more than 500 000.

4.3 Unit of Analysis

The unit of analysis was a mobile phone owner with a bank account in South Africa, with an income of less than R5,000 per month or a person in a category not higher than LSM 5, based on AMPS 2008b (SAARF, 2009; Chipp & Corder, 2009). According to Zikmund (2003, p. 375), a sample unit is a single element or a group of elements subject to selection in the sample. However, to better understand the perception of people at the BOP, the research was not limited to people with mobile phones and bank accounts in SA. It also included the population without bank accounts and cellphones, who qualify to be included in the BOP category, to allow for comparison of adopters, potential adopters and non-adopters of mobile banking.

4.4 Sampling and Size of Sample

The basic idea of sampling is that by selecting some of the elements in a population, conclusions can be drawn about the entire population (Zikmund, 2003, p. 369). In this study, by selecting samples of BOP people with or without mobile banking and bank accounts in SA, a conclusion will be drawn about people at the BOP in South Africa.

The sampling method was non-probability judgement sampling in order to focus on informal settlements, rural areas or townships. According to Zikmund (2003, p. 382), with judgement (purposive) sampling, an experienced individual selects the sample based upon some appropriate characteristics of the sample member. In this study the characteristics are based on the BOP context of the study. The sample falls into the BOP segment as defined as a unit of analysis section. According to Zikmund (2003, p. 423), sample size has a direct influence over the accuracy of the research findings. To determine a suitable sample size, it is necessary to specify the variation or standard deviation of the population, magnitude of acceptable error and confidence level.

For a population of 500 000 or more, a sample of 306 is required to obtain a 95% confidence level and a range of error of 5% (Zikmund, 2003, p. 428).

Approximately 450 questionnaires were prepared and circulated. A total of 316 responses were received. Of these, seven (7) responses had to be discarded due to invalid or incomplete data entries. Thus, the sample comprising of a total of 309 respondents was used for analysis. According to Zikmund, this exceeded the minimum required sample size to achieve a 95% confidence level for a population greater than 500,000 (2003, p. 429).

4.5 Data Collection

A paper based survey questionnaire was prepared and distributed to the intended BOP population, in townships or informal settlements in Gauteng Province, South Africa.

About 99% of the respondents were based in Soweto Township, which included the following sections: Meadowlands (32.4%), Dobsonville (26.2%), Mofolo (8.4%), Central West Jabavu (30%) and Zandspruit (2%). The remaining 1% of the respondents were based in Tembisa and Midrand. This was due to the fact that this study is based on the low income (BOP) context, where a hardcopy based survey was administered to the respondents. Due to the high cost implications of conducting the survey, mainly Soweto Township was covered.

The operational definition or measurement instrument for perceived usefulness , perceived ease of use and the five facets of perceived risk constructs were adapted from Lee (2009). The measurement instrument for the perceived cost construct was adapted from Wu and Wang (2005). The measurement instrument for the three dimensions of trust: ability, integrity and benevolence, were adapted from Bhattacherjee (2002), and the instrument from the perspective of trust from the bank, network operator and wireless network is adapted from Gu *et al.* (2009).

According to Zikmund (2003, p. 312), using a Likert scale allows the respondents to indicate their attitudes by checking how strongly they agree or disagree with the constructed statements. Five alternatives are generally offered: strongly agree, agree, uncertain, disagree or strongly disagree (Zikmund, 2003, p. 312). Brown *et al.* (2003) used the five-point Likert scale in a

study on the adoption of mobile banking in South Africa. For the purpose of this study, a five-point Likert scale was used.

4.5.1 Pre-Test

Before conducting the main survey, a pre-testing (pilot study) was conducted to validate the instrument. According to Zikmund (2003, p. 359), a pre-testing study provides an opportunity for the researcher to determine whether the respondents had any difficulty understanding the questionnaire. The pre-test affords an opportunity to check whether there are any ambiguous or biased questions (Zikmund, 2003, p. 359). The pre-testing study was sent to four respondents in two batches, who were selected on a convenience basis. In the first batch, the respondents were asked to comment on the length of the instrument, the format, general understanding of the words used, and wording of the scales. All feedback was recorded and adjustments made to the questionnaire. The second batch was sent with all adjustments reflected, and an observation was made to judge the level at which the respondents interacted with the questionnaire. Once the pilot phase was completed, the survey was distributed to the intended population.

4.5.2 Distribution of the Survey

The survey was administered in Soweto Township by a company called Siyakhula Research Survey under the management of Mr Sicelo Ntshingila. A total number of five experienced personnel (Administers) administered the survey. Prior to the distribution of the survey to respondents, the company

conducted a two day workshop to discuss the whole survey for a better understanding of the methodology to be followed, the general mobile banking concept, questions or statements in the questionnaire and a possible explanation of the questionnaire in the vernacular. The company informed the community about the survey, visited the police station and met the community representative before distribution of the survey. The Administers of the survey were able to assist the respondents, especially illiterate ones, in completing the survey, translating the sentences to vernacular and explaining the mobile concept.

4.5.3 The Questionnaire

The survey questionnaire consisted of two parts. The first section focused on the respondent's demographic information. The demographic variables included: gender, age, level of education, work status, income level, and whether the respondent had a bank account and mobile phone (Appendix C). The respondents were also requested to indicate whether they currently use mobile banking and the time it took for them to access the nearest bank branch. To verify the respondents' BOP economic category, respondents were requested to indicate household items they possess in order to categorise them according to LSM (as indicated in Appendix A).

The second section asked each of the respondent's perceptions of the statement based on the variables in the research model using the 5-point Likert scale from 1 ("strongly disagree") to 5 ("strongly agree"), as found in Appendix C.

The questionnaire aimed at identifying whether the independent variables were statistically significant factors influencing the adoption of mobile banking. The dependent variable has been defined as: the adoption of mobile banking, whereas the independent variables selected for this study (identified through the literature review) are: Perceived usefulness , perceived ease of use, perceived risk (including the five facets of risks), trust and perceived cost (Table 4.1).

Table 4.1: Survey Questionnaire related to variables

Construct	Code	Item	Hypotheses	Source
Perceived usefulness	PU1	I think that using mobile banking would enable me to accomplish my tasks more quickly.	H1	Lee, 2009; Luarn & Lin, 2005
	PU2	I think that using mobile banking would make it easier for me to carry out my tasks.		
	PU3	I think that mobile banking is useful.		
	PU4	Overall, I think that using mobile banking is advantageous.		
Perceived ease of use	PEOU1	I think that learning to use mobile banking would be easy.	H2, H3	Lee, 2009; Luarn & Lin, 2005
	PEOU2	I think that interaction with mobile banking does not require a lot of mental effort.		
	PEOU3	I think that it is easy to use mobile banking to accomplish my banking tasks.		
Performance risk (facet of perceived risk)	PFR1	Mobile banking services may not perform well because of network problems.	H6	Lee, 2009
	PFR2	Mobile banking services may not perform well and process payments incorrectly.		
Financial risk (facet of perceived risk)	FR1	When transferring money through mobile banking, I am afraid that I will lose money due to careless mistakes such as wrong input of account number and wrong input of the amount of money.	H6	Lee, 2009
	FR2	When transaction errors occur, I worry that I cannot get compensation from banks.		
Social risk (facet of perceived risk)	SOR1	I'm sure that if I decided to use mobile banking and something went wrong with the transactions, my friends, family and colleagues would think less of me.	H6	Lee, 2009
	SOR2	When my bank account incurs fraud or hacking, I will have a potential loss of status in my social group.		

Time risk (facet of perceived risk)	TMR1	Using mobile banking services would lead to a loss of convenience for me because I would have to waste time fixing payments errors.	H6	Lee, 2009
	TMR2	It would take me lots of time to learn how to use mobile banking services.		
Security/ privacy risk (facet of perceived risk)	SPR1	I would not feel totally safe providing personal privacy information over mobile banking.	H6	Lee, 2009
	SPR2	I'm worried about using mobile banking because other people may be able to access my account.		
	SPR3	I would not feel secure sending sensitive information across mobile banking.		
Perceived cost	PC1	I think the equipment cost is expensive to use.	H4	Wu & Wang, 2005; Luarn & Lin, 2005
	PC2	I think the access cost is expensive to use.		
	PC3	I think the transaction fee is expensive to use.		
Ability (facet of trust)	TRT1	Mobile banking service providers have the skills and expertise to perform transactions in an expected manner.	H5	Bhattacherjee, 2002
	TRT2	Mobile banking service providers have access to the information needed to handle transactions appropriately		
Integrity (facet of trust)	TRT3	Mobile banking service providers are fair in their conduct of customer transactions.	H5	Bhattacherjee, 2002
	TRT4	Mobile banking service providers are fair in their customer service policies following a transaction.		
Benevolence (facet of trust)	TRT5	Mobile banking service providers are open and receptive to customer needs.	H5	Bhattacherjee, 2002
	TRT6	Mobile banking service providers make good-faith efforts to address most customer concerns.		
Overall trust	TRT7	I believe banks are trustworthy.	H5	Bhattacherjee, 2002; Gu, Lee & Suh, 2009
	TRT8	I believe mobile network providers are trustworthy.		
	TRT9	I believe wireless infrastructure can be trusted.		

4.6 Data Analysis

Descriptive statistic (such as mean and frequencies) analysis was conducted on the demographics data. The data collected from the returned questionnaires were captured onto an Excel spreadsheet for analysis. The data was sorted to group questions according to applicable constructs under test. Statistical analysis was conducted on the data.

According to Zikmund (2003, p. 529), analysis of variance (ANOVA) is used when statistical differences in the means of more than two groups or population are to be compared. In this study the dependent variable is categorised into three groups; a group of adopters, potential adopters and non-adopters. A question within the questionnaire was included to enable the categorisation of respondents into three groups: adopters (respondents who currently use mobile banking), potential adopters (respondents who intend to use mobile banking if affordable, secure and trustworthy or other factors), and non-adopters (respondents who are not interested in using mobile banking). ANOVA was used to compare the means of the three groups to test for statistical significance at 0.05 level.

Discriminant Analysis was used to determine which independent variables were the best predictors of the dependent variable's outcome. Of these, the possible outcomes could be current usage of mobile banking, interest to use mobile banking in the future or no interest to use mobile banking in the future. A various combination of independent variables, which included: Perceived usefulness, perceived ease of use, perceived risk, trust, and perceived cost was tested to establish the best combination of predictors.

The Pearson Correlation Coefficient (T-Test) was used to establish the correlation between the selected construct; perceived usefulness (PU) and perceived ease of use (PEOU), and between trust and perceived risk. This test was conducted to establish any possible indirect effect of certain independent variables on the adoption of mobile banking.

4.7 Scale Results

The composite reliability was estimated to evaluate the internal consistency of the measurement model. Table 4.2 outlines the reliability of the measurement instrument. The composite reliabilities of the constructs included in the model ranged from 0.61 to 0.82 (see Table 4.2). All the main constructs have Cronbach's alpha above 60 which is acceptable; greater than the recommended benchmark of 0.60 (Wu & Wang, 2005). This shows that all measures had strong and adequate reliability and discriminate validity.

Table 4.2: Assessment of main construct reliability

Main Constructs	Mean	Std Deviation	Cronbach's Alpha
Perceived usefulness (PU)	4.04	0.63	0.76
Perceived ease of use (PEOU)	3.82	0.64	0.61
Perceived risk (PR)	2.86	0.66	0.82
Cost	3.08	0.78	0.63
Trust	3.61	0.51	0.72

Table 4.3 shows the results of the various facets of the perceived risk construct. Performance risk had Cronbach's alpha of 50 and security/privacy risk had Cronbach's alpha of 54. Time risk showed the lowest value of Cronbach's

alpha, with 0.18. The effect of the three facets (performance risk, security/privacy risk and time risk) individually had a minimal effect on the overall reliability of the perceived risk construct, hence the three facets were not removed. As outlined in Table 4.3, all facets of the trust construct have Cronbach's alpha above 60 which is acceptable.

Table 4.3: Reliability Metrics: Facets of Construct

Facets of Constructs	Mean	Std Deviation	Cronbach's Alpha
Facets of perceived risk (PR)			
Performance risk	2.89	0.81	0.50
Financial risk	2.82	0.97	0.73
Social risk	2.94	0.98	0.64
Time risk	2.51	0.77	0.18
Security/privacy risk	3.06	0.84	0.54
Facets of trust			
Ability	3.51	0.87	0.68
Integrity	3.72	0.66	0.65
Benevolence	3.61	0.63	0.69

4.8 Limitations

The survey was mainly conducted in historically black-dominated townships and shopping centres close to such townships; this resulted in limited variety in terms of the race.

The survey questionnaire was in English only, even though during the completion of the questionnaire the Administrators provided some translation into vernacular, some respondents might have pretended to understand the English language. This could have led to misinterpretation and misunderstanding on the content of various questions, especially for any illiterate population.

During analysis, some respondents without bank accounts and mobile phones were included in the results due to a limited sample to make the necessary comparison; this might have influenced some results indirectly.

Chapter 5: Research Results

5.1 Introduction to results

The previous chapter presented a description of the methodology approach to test the hypotheses outlined in chapter 3. This chapter presents the results of the statistical analyses described in chapter 4; it reveals the demographic profile of survey results, test results of the scale and provides aggregate information about the survey responses.

In chapter 6, the findings outline of this chapter will be discussed with reference to the hypotheses (as outlined in chapter 3) and literature (as outlined in chapter 2).

5.2 Sample size and response rate

Approximately 450 questionnaires were prepared and circulated. A total of 316 responses were received. Of these, seven (7) responses had to be discarded due to invalid or incomplete data entries. Thus the sample comprising of a total of 309 respondents was used for analysis. This exceeded the minimum required sample size of 306 to achieve a 95% confidence level for a population greater than 500,000 (Zikmund, 2003, p. 429). The usable response rate amounted to 100%, which is satisfactory. From the received questionnaire feedback, some meaningful results were found and documented.

5.3 Demographic Characteristics

This section outlines the findings on the demographic characteristics of the sample, which includes the geographic location of the respondents, age, gender, race, education level, working status/occupation, income level and possession of a mobile phone and bank account.

5.3.1 Demographics – Age and Gender

The highest percentage of respondents were between the ages of 25 and 35 years (37%), the second largest age group was between 35 and 50 years (35%), the third largest group was between 16 and 24 years (23%), and the last group was over 50 years (5%). The average age was 33 years, while the standard deviation of the age distribution was 9.5. In SA an applicant needs to be 18 years old to have a bank account without their parents' consent; according to the results only one respondent was less than 18 years (17 years). When combining two age groups, the group between 25 and 50 years contributed 72% of the respondents, which represents the majority portion of the working population in South Africa.

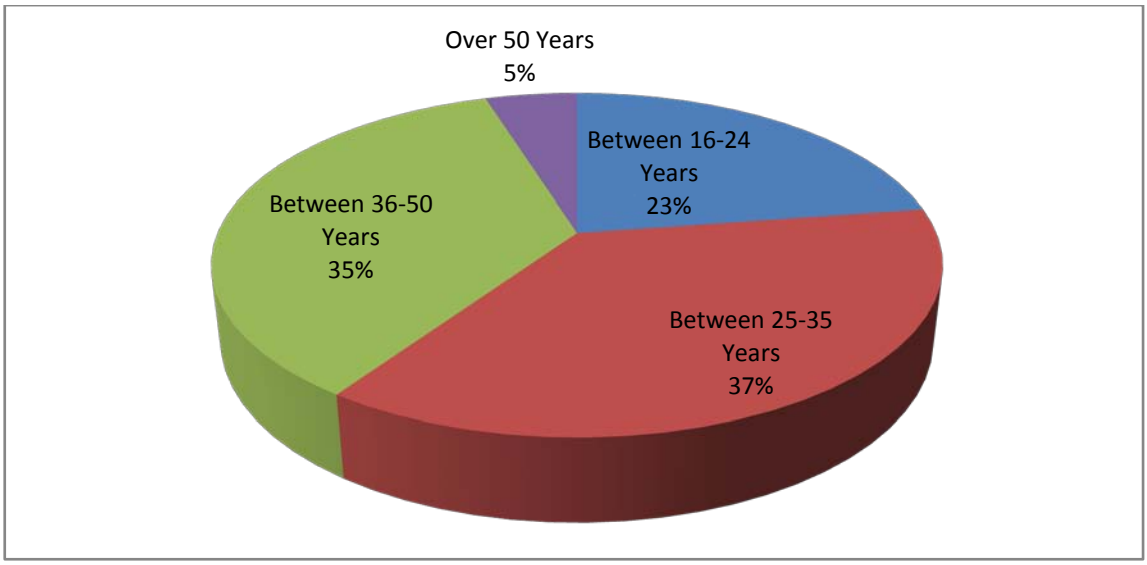

Figure 5.1: Age Representation

Table 5.1 shows a fairly even split between male and female respondents, with females showing a slightly dominant percentage (54%).

Table 5.1: Gender Representation

Gender	Number of Responses	Percentage
Male	142	46%
Female	167	54%

5.3.2 Demographics – Education level, Working status and Income Level

The majority of the respondents (71%) had either matriculated or had some high school education.

Table 5.2: Education level Representation

Education level	Number of Responses	Percentage
No formal education or some primary school	7	2.3%
Primary school completed	34	11.1%
Some high school or Matriculated	211	71.2%
Technical or apprenticeship	15	4.9%
College/University/Post matric	32	10.6%

Note: With 3 missing responses

A high percentage of the respondents (37.9%) were unemployed (Figure 5.2); this was consistent with the education level and geographic location of the respondents. It is disheartening to note that the number of unemployed respondents on this study (37.9%) is higher than both the official unemployment figure of Gauteng (27.1%) and the unofficial unemployment figure of SA (32.5%), as per 2009 Development Indicators (Presidency RSA, 2009). Table 5.3 shows that from the Unemployed group (37.9% of total respondents), only 27.4% was between 16-24 years, the rest of the respondents were above 25 years. Considering that the group between the ages of 16-24 years is normally still studying or not actively looking for employment, it reduces the employment level of the total respondents to 27.5%.

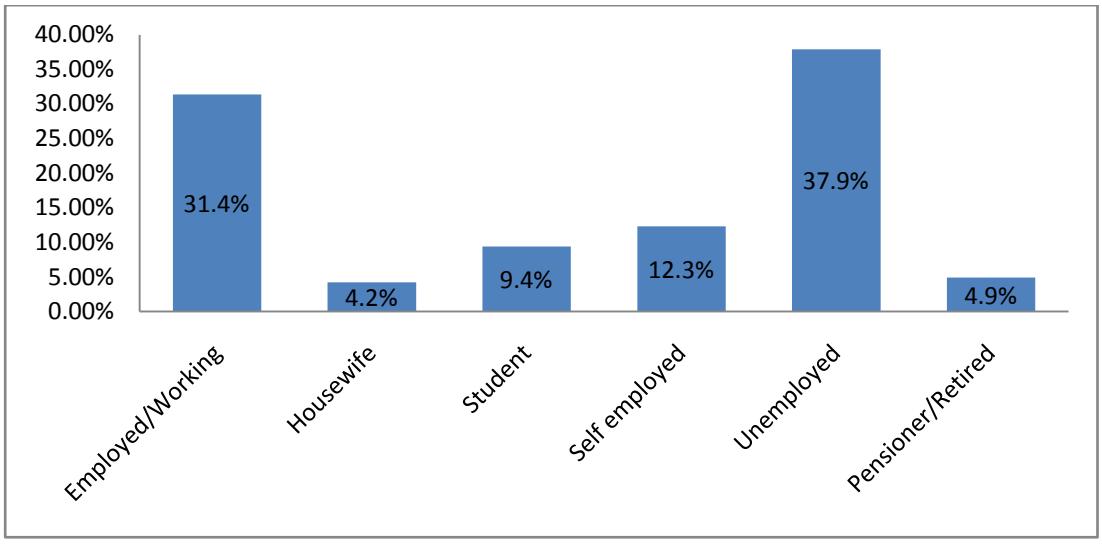

Figure 5.2: Work Status (Occupation) Representation

Table 5.3: Age Range within the Unemployed Group

Age Range within Unemployed Group	No. of Responses	Percentage
16-24 Years	32	27.4%
15-35 Years	48	41.0%
36-50 Years	28	23.9%
over 50 Years	9	7.7%

A total of 308 respondents (99.7% of the total respondents) had an income level of less than R5,000. The population of this study included people with or without a mobile phone and bank account in SA, with an income of less than R5,000 per month in order to have a suitable sample to compare the perspective from all three groups (adopters, potential adopters and non-adopters). In line with the context of this study, the results of the income level clearly represent the Bottom of the Pyramid (BOP) economic segment.

5.3.3 Access to mobile banking facilities (mobile phone and bank account)

To determine whether the respondents were in possession of a mobile phone and bank account, the respondents were requested to indicate whether they currently possess a mobile phone and bank account. On the mobile phone question, approximately 84% of the respondents had a mobile phone, and the remaining 16% of the respondents had no mobile phones (Figure 5.3). Regarding bank accounts, approximately 72% of the respondents had a bank account, with the remaining 28% of the respondents having no bank account.

Figure 5.3: Possession of mobile phone and bank account

The respondents were asked the time it takes them to access the nearest bank branch. Figure 5.4 shows that the majority (66%) of the respondents take less than 20 minutes to access the nearest bank branch.

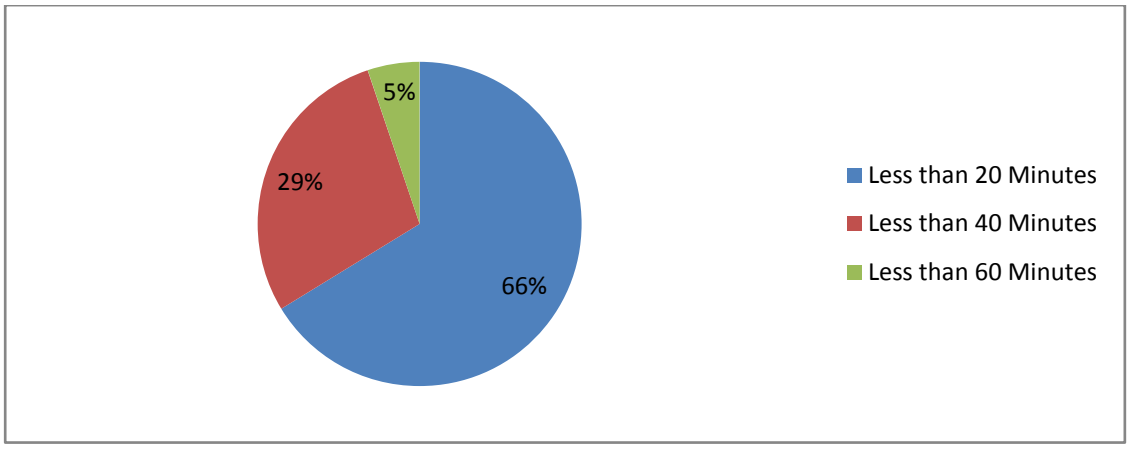

Figure 5.4: Time to nearest bank branch

5.4 Descriptive Analysis Results

5.4.1 Current use or intention to use mobile banking services

To determine whether the respondents were currently using a mobile banking service, the respondents were asked to indicate whether they currently use or intend to use mobile banking. Three categories of answer options were available for the respondent to choose the applicable answer. The three options included, firstly 'Yes', secondly 'No, but interested in using, if useful, affordable and secure,' and thirdly 'No, not interested'.

The respondents who answered 'Yes' were categorised as Adopters (Group A); those who answered 'No, but interested in using it in the future', were categorised as Potential Adopters (Group B); and those responded 'No, not interested' were categorised as Non-Adopters (Group C).

To examine the significant differences between the means of more than two groups when there is one variable, a simple analysis of variance can be used

(ANOVA) (Salkind, 2008, p. 202; Zikmund, 2003, p. 529). For individual analysis of the various factors affecting the adoption of mobile banking, ANOVA was used.

In Figure 5.5, the results showed that approximately 30% of the respondents used mobile banking services (Group A), with 58% currently not using the mobile banking service, but interested (Group B). The remaining 12% of the respondents indicated no interest in using mobile banking services (Group C).

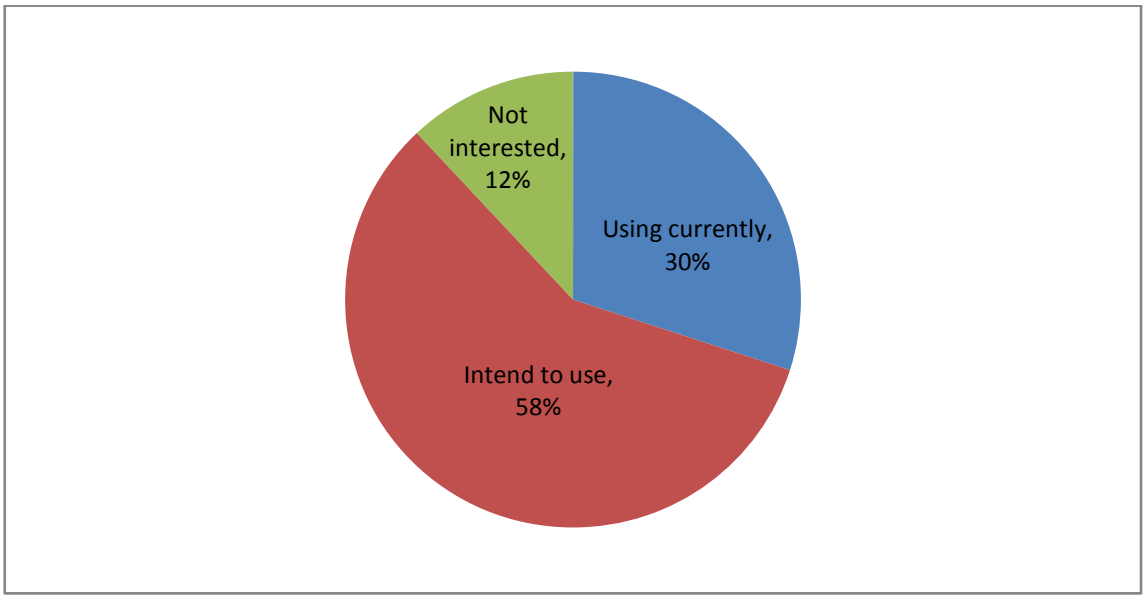

Figure 5.5: Use or intention to adopt mobile banking service

Table 5.4a shows the three groups of respondents: those who currently use mobile banking, those who are interested in using mobile banking in the future and those who are not interested in using mobile banking; in relation to the profile in terms of possession of bank account and mobile phone. About 96% of the respondents who currently use mobile banking have bank accounts. It is

interesting to note that about 4% of the respondents who currently use mobile banking do not have bank accounts; they currently use mobile banking for money transfers.

Approximately 63% and 77% of the respondents, who indicated an interest in using mobile banking in the future, were in possession of bank account and mobile phone respectively. The remaining 37% and 23% of respondents did not have a bank account and mobile phone respectively; this is a potential opportunity for both the banks and mobile network providers to provide access to bank account and mobile phone services. Of the respondents who indicated no interest in the use of mobile banking in the future, 39% and 16% of respondents did not have a bank account and mobile phone respectively. This may be a contributing factor to the lack of interest.

Table 5.4a: Use of mobile banking and possession of bank account and mobile phone

Use of Mobile Banking	No. of Responses	%	Possession of Bank Account	No. of Responses	%	Possession of mobile phone	No. of Responses	%
Yes	91	29.4%	yes	87	96%	yes	91	100%
			no	4	4%	no	0	0%
No, but interested	180	58.3%	yes	114	63%	yes	138	77%
			no	66	37%	no	42	23%
No, not interested	38	12.3%	yes	23	61%	yes	32	84%
			no	15	39%	no	6	16%
Total	309		yes	224	72%	yes	261	84%
			no	85	28%	no	48	16%

Table 5.4b shows categories of respondents in terms of possession of bank accounts and the relative response on the current use or future intention to use

mobile banking. The majority of the respondents with a bank account (51%) and without a bank account (78%) who are currently not using mobile banking, indicated an interest in using mobile banking in the future. About 10% and 18% of respondents with a bank account and without a bank account respectively, indicated no interest in using mobile banking in the future.

Table 5.4b: Possession of banking account and use of mobile banking

Possession of Bank Account	No. of Responses	%	Use of Mobile banking	No. of Responses	Percentage
Yes	224	72%	Yes	87	39%
			No, but interested	114	51%
			No, not interested	23	10%
No	85	28%	Yes	4	5%
			No, but interested	66	78%
			No, not interested	15	18%
Total	309				

5.4.2 Perceived usefulness (PU)

Table 5.5 shows that Group A (respondents currently using mobile banking) had the highest Mean (4.3) on the PU construct, which means they mostly 'agreed' that mobile banking is useful. Group B (respondents not using mobile banking, but interested to use) also 'agreed' that mobile banking is useful (with a Mean of 4.1). Group C (respondents not interested in using mobile banking), showed a Mean of 3.4, which means they were 'neutral/undecided' on the usefulness of mobile banking. The current users of mobile banking (30% of respondents) and the respondents who showed an interest in using mobile

banking (58%), perceived mobile banking as useful. The perception of usefulness was not based on actual utilisation, but rather on the behavioural intention of the respondents.

The results of the Duncan's Multiple Range test showed that there is significant difference between the Means of the three groups (Group A, B and C).

Table 5.5: Duncan's Multiple Range Test: Perceived usefulness (PU)

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	4.29[a]	0.49
B: Not using MB, but interested to use	180	4.06[b]	0.49
C: Not using MB and not interested	37	3.40[c]	1.01

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

5.4.3 Perceived ease of use

Table 5.6 shows that the current users of mobile banking (30% of respondents) perceived mobile banking to be easy to use. Group A (30%) had the highest mean (4.0) on the PEOU construct, which means they mostly 'agreed' on the

'ease of use' of mobile banking. Group B (58%) also 'agreed' that mobile banking is easy to use (with a mean of 3.8). Group C (12%), showed a Mean of 3.5, which means they were between 'neutral' and 'agreed' on the 'ease of use' of mobile banking.

The results of the Duncan's Multiple Range test showed that there are significant differences between the Means of the three groups (Group A, Group B, Group C). The results of the PEOU construct were consistent with the PU construct.

Table 5.6: Duncan's Multiple Range Test: Perceived ease of use (PEOU)

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	4.04[a]	0.60
B: Not using MB, but interested	180	3.79[b]	0.57
C: Not using MB and not interested	37	3.47[c]	0.86

Note: Mean with different superscript (a, b and c) means there is a significant difference at 0.05 level.

5.4.4 Perceived cost

Three questions were asked to establish the perception of respondents with regard to costs of mobile phones, airtime and bank charges. On whether the cost of mobile phones is expensive, the highest percentage (35%) of

respondents indicated that they are not sure. On whether the cost of airtime is expensive, the highest percentage (38%) of the respondents disagreed. It is interesting to note that on the 'whether the cost of bank charges is expensive' question, the highest percentage (42%) of the respondents agreed that the cost of bank charges are expensive.

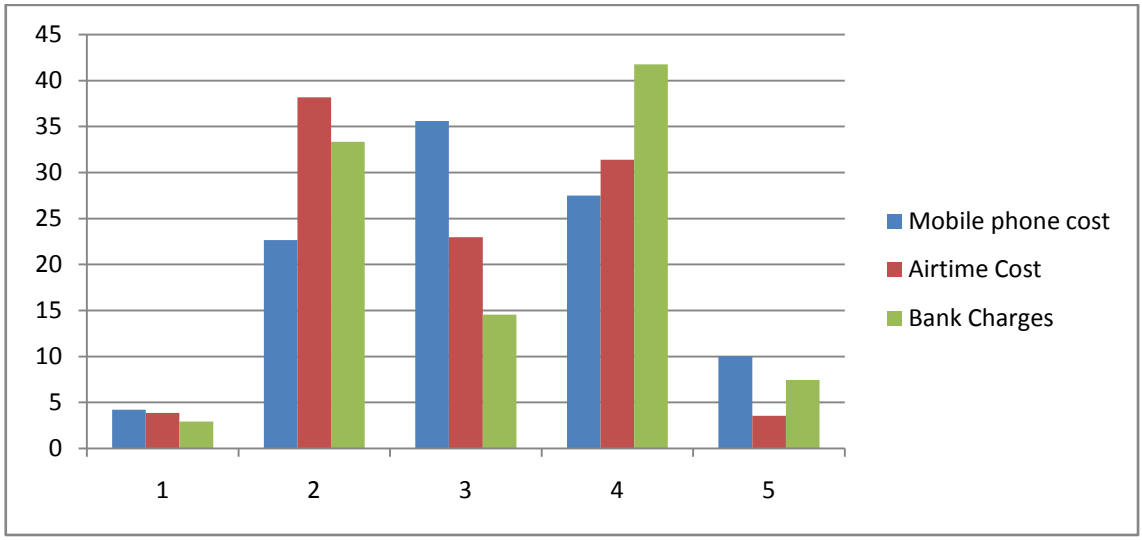

Figure 5.6: Cost of Mobile banking services *(1- strongly disagree and 5-strongly agree)*

Table 5.7 highlights that the respondents who are not interested in using mobile banking (12%) felt that mobile banking is costly. Group C had the highest Mean (3.6) on the cost construct, which means they mostly 'agreed' that mobile banking is costly. Group A and Group B had Means of 2.9 and 3.1 respectively, which means that both Group A and Group B were 'neutral' on whether mobile banking is perceived to be costly. In Group C, there were a total of 15 respondents without a bank account (61%) and the other 23 respondents had a

bank account (39%). The respondents with a bank account remained in the majority, and therefore dominated in terms of the perception within Group C.

The results of the Duncan's Multiple Range test showed that there is a significant difference between the Means of Group C and the other two groups (Group A and B). There was no significant difference between the Means of Group A and B.

Table 5.7: Duncan's Multiple Range Test: Perceived cost

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	2.86 [a]	0.84
B: Not using MB, but interested	180	3.11[a]	0.71
C: Not using MB and not interested	37	3.57[b]	0.77

Note: Mean with different superscript (a, b and c) means there is a significant difference at 0.05 level.

5.4.5 Customer's trust

The results of the Customer's trust construct were subdivided into various facets, which included Ability, Integrity and Benevolence. The results are outlined in the subsections below.

5.4.5.1 Ability

Table 5.8 shows that the current users of mobile banking (30%) felt that mobile banking service providers (both Banks and Mobile Network Providers) have the necessary ability to render the mobile banking service. Group A had the highest Mean (3.8) on Ability (as facets of customer's trust construct), which means the response was almost 'agreed' that mobile banking service providers have the ability (competence, knowledge and necessary information) to render the service. Group B had a Mean of 3.5, which means the response was between 'neutral' and 'agree' that mobile banking service providers have the ability to render the service. Group C showed a Mean of 3.1, which means the response was 'neutral' on the ability of the mobile banking service providers.

The results of the Duncan's Multiple Range test showed that there is a significant difference between the Means of the three groups (Group A, Group B, Group C).

Table 5.8: Duncan's Multiple Range Test: Ability

Grouping	Number of samples (N)	Mean	Standard Deviation
A : Currently using mobile banking (MB)	91	3.77^{a}	0.75
B: Not using MB, but interested	180	3.45^{b}	0.88
C: Not using MB and not interested	37	3.14^{c}	0.96

Note: Mean with different superscript (a, b and c) means there is a significant difference at 0.05 level.

5.4.5.2 Integrity

Based on Table 5.9, the results showed no significant difference between the Means of the three groups (Group A, Group B and Group C). Group A had a Mean of 3.7, Group B a Mean of 3.7 and Group C a Mean of 3.6. All the groups almost 'agreed' that mobile service providers have Integrity (as a facet of trust). This means that all groups felt that mobile service providers are generally fair and honest when conducting mobile banking transactions.

Table 5.9: Duncan's Multiple Range Test: Integrity

Grouping	Number of samples (N)	Mean	Standard Deviation
A : Currently using mobile banking (MB)	91	3.73[a]	0.63
B: Not using MB, but interested	180	3.74[a]	0.61
C: Not using MB and not interested	37	3.62[a]	0.58

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

5.4.5.3 Benevolence

In Table 5.10, the respondents who are currently using mobile banking (30%) and those who are interested in using it in the future (58%), felt that mobile banking service providers are benevolent towards users of mobile banking. Group A and Group B had Means of 3.6 and 3.7 respectively on Benevolence (as a facet of trust construct). This means that the response was almost 'agree' that mobile banking service providers have benevolence (open, receptive, empathy and good-faith effort) towards the user. Group C had a Mean of 3.3, which means the response was 'neutral' on Benevolence.

The results of the Duncan's Multiple Range test showed that there is a significant difference between the Means of Group C and the other two groups (Group A and Group B), but no significant difference between the Means of Group A and Group B.

Table 5.10: Duncan's Multiple Range Test: Benevolence

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	3.63 [a]	0.63
B: Not using MB, but interested	180	3.66 [a]	0.61
C: Not using MB and not interested	37	3.36 [b]	0.69

Note: Mean with different superscript (a, b and c) means there is a significant difference at 0.05 level.

5.4.5.4 Overall customer's trust

Questions were asked to establish the feeling of respondents on the trustworthiness of the banks, mobile network service providers and the wireless infrastructure. As highlighted in Figure 5.7, it is important to note that in the three questions, respondents had the highest percentage on the 'agree' response. This means that the majority felt that banks, mobile network service providers and wireless infrastructure are trustworthy.

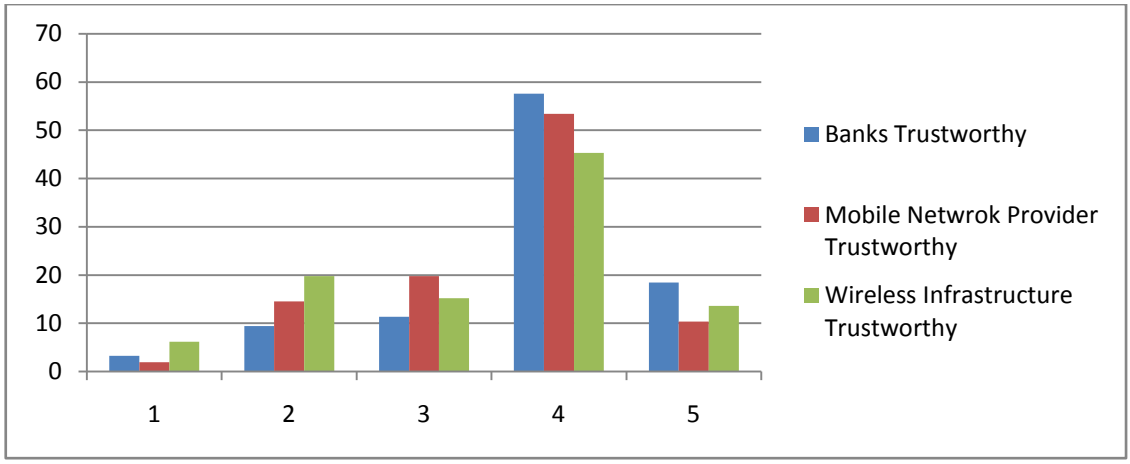

Figure 5.7: Trustworthiness of mobile banking service providers *(1- strongly disagree and 5- strongly agree)*

Table 5.11 outlines that the respondents who are currently using mobile banking (30%) and those who are interested in using it in the future (58%), felt that mobile banking service providers are trustworthy. Group A and Group B had Means of 3.7 and 3.6 respectively on Customer's trust. This means that the response was almost 'agree' that mobile banking service providers are trustworthy. Group C had a Mean of 3.4, which means the response was 'neutral' on trustworthiness of the mobile banking service provider.

The results of the Duncan's Multiple Range test showed that there is a significant difference between the Means of Group C and the other two groups (Group A and Group B), but no significant difference between the Means of Group A and Group B.

Table 5.11: Duncan's Multiple Range Test: Customer's trust

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	3.68[a]	0.50
B: Not using MB, but interested	180	3.63[a]	0.49
C: Not using MB and not interested	37	3.37[b]	0.58

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

According to Table 5.12, there is no meaningful difference in the Means amongst the facets of trust.

Table 5.12: Variance between trust facets

Importance of facets	Facets of trust	Mean[#]	Standard Deviation
1	Integrity	3.72	0.66
2	Benevolence	3.61	0.63
3	Ability	3.51	0.87

Mean[#]: where 1= least likely and 5= mostly likely, to affect the adoption of mobile banking positively.

5.4.6 Perceived risk

The results of the perceived risk construct were subdivided into various facets, which included performance risk, financial risk, social risk, time risk and security/privacy risk. The results are outlined in the subsections below.

5.4.6.1 Performance risk

In Table 5.13, the results showed no significant difference between the Means of the three groups (A, B and C). The Means of Group A, B and C are 2.9, 2.8 and 3.0, respectively. All the groups were 'neutral' on how the respondents felt about performance risk in mobile banking, such as possible network problems or incorrect processing of payment.

Table 5.13: Duncan's Multiple Range Test: Performance risk

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	2.93[a]	0.70
B: Not using MB, but interested	180	2.84[a]	0.81
C: Not using MB and not interested	37	3.00[a]	1.05

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

5.4.6.2 Financial risk

In Table 5.14, the results showed no significant difference between the Means of the three groups (A, B and C). The Means of Group A, B and C are 2.8, 2.8 and 2.5, respectively. All the groups were 'neutral' on how the respondents felt about financial risk, such as the possible loss of money due to transaction errors or the possibility of getting any compensation from the bank should errors occurs.

Table 5.14: Duncan's Multiple Range Test: Financial risk

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	2.83[a]	0.91
B: Not using MB, but interested	180	2.86[a]	0.91
C: Not using MB and not interested	37	2.57[a]	1.31

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

5.4.6.3 Social risk

In Table 5.15, the results showed no significant difference between the Means of the three groups (Group A, B and C). Group A, B and C had a Mean of 3.0, 2.9 and 2.8, respectively. All the groups were 'neutral' on how the respondents felt about social risk in mobile banking, such as possible loss of social status

with family, friends or with the respondents' social circles should something go wrong during the course of conducting mobile banking.

Table 5.15: Duncan's Multiple Range Test: Social risk

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	3.05[a]	0.93
B: Not using MB, but interested	180	2.90[a]	0.98
C: Not using MB and not interested	37	2.81[a]	1.15

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

5.4.6.4 Time risk

The results in Table 5.16 showed no significant difference between the Means of the three groups (A, B and C). The Means of Groups A, B and C are 2.4, 2.6 and 2.6, respectively. All the groups were between 'disagree' to 'neutral' on how the respondents felt about the time risk of mobile banking, such as loss of time trying to learn how to use mobile banking or loss of time trying to fix transaction errors that might have occurred during the course of conducting mobile banking.

Table 5.16: Duncan's Multiple Range Test: Time risk

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	2.41[a]	0.74
B: Not using MB, but interested	180	2.55[a]	0.77
C: Not using MB and not interested	37	2.57[a]	0.86

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

5.4.6.5 Security/privacy risk

In Table 5.17, the results showed no significant difference between the Means of the three groups (A, B and C). The Means of Group A, B and C are 3.1, 3.0 and 2.8, respectively. All the groups were 'neutral' on how the respondents felt about security/privacy risk associated with mobile banking, such as concerns with sending personal information over the mobile banking infrastructure or concerns that someone might access the bank account without the respondents' consent.

Table 5.17: Duncan's Multiple Range Test: Security/ privacy risk

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	3.15[a]	0.81
B: Not using MB, but interested	180	3.06[a]	0.85
C: Not using MB and not interested	37	2.82[a]	0.86

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

5.4.6.6 Overall perceived risk

This subsection summarises the results of the overall perceived risk with all facets, as discussed on the previous subsections.

In Table 5.18, the results showed no significant difference between the Means of the three groups (Group A, B and C). The Means of Group A, B and C are 2.9, 2.9 and 2.8 respectively. All the groups were 'neutral' on how the respondents felt about the perceived risk of mobile banking, as a contributing factor on the adoption of mobile banking.

Table 5.18: Duncan's Multiple Range Test: Perceived risk

Grouping	Number of samples (N)	Mean	Standard Deviation
A: Currently using mobile banking (MB)	91	2.91[a]	0.62
B: Not using MB, but interested	180	2.86[a]	0.65
C: Not using MB and not interested	37	2.76[a]	0.78

Note: Mean with different superscript (a, b and c) means there is a significant difference between Means at 0.05 level.

5.5 Analysis of variance (ANOVA) Results

Table 5.19 below shows the ANOVA results of all the main constructs and the facets of perceived risk and trust.

The F value represents the obtained F value ($F_{(2,305)}$), meaning the obtained F value with 2 degrees of freedom in the numerator and 305 degrees of freedom in the denominator. Pr is the probability of obtained F value greater than the critical value at the 0.05 level. When the Pr value is less than 0.05, it implies there is significant difference between the Means of the three groups as discussed in the previous section (Group A, B, and C).

Table 5.19: Summary of ANOVA Results

Source (Independent Variable)	DF	DF2	Mean	F Value	Pr>F (at 0.05)
Perceived usefulness (PU)	**2**	**305**	**4.04**	**31.15**	**<0.0001**
Perceived ease of use (PEOU)	**2**	**305**	**3.82**	**11.83**	**<0.0001**
Perceived cost	**2**	**305**	**3.08**	**11.76**	**<0.0001**
Trust	**2**	**305**	**3.61**	**5.29**	**0.0055**
Ability (facet of trust)	2	305	3.51	8.11	0.0004
Integrity (facet of trust)	2	305	3.72	0.50	0.6095
Benevolence (facet of trust)	2	305	3.61	3.48	0.0320
Perceived risk (PR)	**2**	**305**	**2.86**	**0.60**	**0.5495**
Performance risk (facet of PR)	2	305	2.89	0.73	0.4851
Financial risk (facet of PR)	2	305	2.82	1.43	0.2401
Social risk (facet of PR)	2	305	2.94	1.00	0.3678
Time risk (facet of PR)	2	305	2.51	1.08	0.3416
Security/privacy risk (facet of PR)	2	305	3.06	2.09	0.1254

Dependent Variable: Adoption of mobile banking

5.5.1 ANOVA Results: Perceived usefulness

The obtained F value of perceived usefulness is 31.15 and Pr is <0.0001 (Table 5.19). This means that there is a significant difference between the Means at 5% level. This implies that there is a main effect for perceived usefulness for the adoption of mobile banking. Hence the research hypothesis H1: perceived usefulness (PU) is likely to influence the adoption of mobile banking; can be accepted.

5.5.2 ANOVA Results: Perceived ease of use

The obtained F value of perceived ease of use is 11.83 and Pr is <0.0001 (Table 5.19). This means that there is a significant difference between Means at 5% level. This implies there is a main effect for perceived ease of use for adoption of mobile banking. Hence, the research hypothesis H2: perceived ease of use (PEOU) is likely to influence the adoption of mobile banking; can be accepted.

5.5.3 ANOVA Results: Perceived cost

The obtained F value of perceived cost is 11.76 and Pr is <0.0001 (Table 5.19). This means that there is a significant difference between Means at 5% level. This implies there is a main effect for Cost to adoption of mobile banking. Hence, the research hypothesis H4: The perceived cost is likely to influence the adoption of mobile banking; can be accepted.

5.5.4 ANOVA Results: Trust

The obtained F value of trust is 5.29 and Pr is 0.0055 (Table 5.19). This means that there is a significant difference between Means at 5% level. This implies there is a main effect for trust for adoption of mobile banking. Hence, the research hypothesis H5: Customer's trust in mobile banking service provider is likely to influence the adoption of mobile banking; can be accepted.

Taking a closer look on the various facets of trust, the ANOVA results of each facet are reflected as following:

ANOVA Results for Ability

The obtained F value of Ability is 8.11 and Pr is 0.0004 (Table 5.19). This means that there is a significant difference between Means at 5% level. This implies there is a main effect for Ability as a facet of trust to adoption of mobile banking.

ANOVA Results for Integrity

The obtained F value of Integrity is 0.50 and Pr is 0.6095 (Table 5.19). This means that there is no significant difference between Means at 5% level. This implies there is no main effect for Integrity as a facet of trust to adoption of mobile banking.

ANOVA Results for Benevolence

The obtained F value of Benevolence is 1.43 and Pr is 0.0320 (Table 5.19). This means that there is a significant difference between Means at 5% level. This implies there is main effect for Benevolence as a facet of trust to adoption of mobile banking.

5.5.5 ANOVA Results: Perceived risk

The obtained F value of perceived risk is 0.60 and Pr is 0.5495 (Table 5.19). This means that there is no significant difference between Means at 5% level. This implies there is no main effect for perceived risk to adoption of mobile banking. Hence, the research hypothesis H6: The level of perceived risk is likely to influence the adoption of mobile banking; cannot be accepted.

The ANOVA results of each facet of perceived risk are as follows:

ANOVA Results for Performance risk

The obtained F value of performance risk is 0.73 and Pr is 0.4851 (Table 5.19). This means that there is no significant difference between Means at 5% level. This implies there is no main effect for performance risk as facet of perceived risk to adoption of mobile banking.

ANOVA Results for Financial risk

The obtained F value of financial risk is 1.43 and Pr is 0.2401 (Table 5.19). This means that there is no significant difference between Means at 5% level. This implies there is no main effect for financial risk as facet of perceived risk to adoption of mobile banking.

ANOVA Results for social risk

The obtained F value of social risk is 1.00 and Pr is 0.3678 (Table 5.19). This means that there is no significant difference between Means at 5% level. This implies there is no main effect for social risk as a facet of perceived risk to the adoption of mobile banking.

ANOVA Results for time risk

The obtained F value of time risk is 1.08 and Pr is 0.3416 (Table 5.19). This means that there is no significant difference between Means at 5% level. This implies there is no main effect for time risk as a facet of perceived risk to the adoption of mobile banking.

ANOVA Results for Security/privacy risk

The obtained F value of security/privacy risk is 2.09 and Pr is 0.1254 (Table 5.19). This means that there is no significant difference between Means at 5% level. This implies there is no main effect for security/privacy risk as a facet of perceived risk to the adoption of mobile banking.

5.6 Correlation between trust and perceived risk

The Pearson Correlation Coefficients (T-Test) results in Table 5.20 shows that the obtained correlation value (*Rho*) is -0.1703, and the Probability (Pr) of obtained *Rho* value equal to critical value at the 0.05 level is 0.00027. This means that a significant negative correlation exists between trust and perceived risk.

Table 5.20: T-test (Correlation Coefficients): trust and perceived risk

	Perceived risk	**Trust**
Perceived risk	1.00000	-0.1703 0.00027
Trust	-0.1703 0.00027	1.00000

Note: N= 309, Prob >|r| under H_0: Rho =0.

5.7 Correlation between perceived usefulness and perceived ease of use

The T-test results in Table 5.21, shows that the obtained correlation value (*Rho*) is 0.59808, and the Probability (Pr) of obtained *Rho* value equal to critical value at the 0.05 level is <0.0001. This means that a significant relationship exists between the perceived usefulness (PU) and perceived ease of use (PEOU). Hence, the research hypothesis H3: Perceived ease of use (PEOU) is likely to influence perceived usefulness (PU); can be accepted.

Table 5.21: T-test (Correlation Coefficients): PU and PEOU

	Perceived usefulness (PU)	**Perceived ease of use (PEOU)**
PU	1.00000	0.59808 <0.0001
PEOU	0.59808 <0.0001	1.00000

Note: N= 309, Prob >|r| under H_0: Rho =0.

5.8 Discriminant Analysis of all constructs

Discriminant analysis was used to establish which independent variables can best predict the outcome of a dependent variable, meaning the probability of whether the outcome of adoption of mobile banking will fall into one of the three groups (Group A: Currently using mobile banking or Group B: Interested to use or Group C: Not interested to use). From the results of the Discriminant Analysis, two variables can be seen as significant predictors of mobile banking; perceived usefulness and perceived cost. Table 5.22 shows that using perceived usefulness and perceived cost only, 68.2% of the respondents can be correctly classified to be part of the group currently using mobile banking. By using the same two variables PU and Cost, 45.1% and 51.4% of respondents can be correctly classified to be interested in using mobile banking and not interested in using mobile banking respectively.

Table 5.22: Classification matrix: Using PU and perceived cost

Variables	Group	Percent Correct (%)
Perceived usefulness & perceived cost	A: Currently using mobile banking	68.2
	B: Interested to use	45.1
	C: Not interested to use	51.4

5.9 Overall Results

Table 5.23 shows perceived usefulness to have the highest Mean, and perceived risk to have the lowest Mean, as factors affecting the adoption of mobile banking.

Table 5.23: Variance between the factors

Importance of Factors	Factors	Mean*	Standard Deviation
1	Perceived usefulness (PU)	4.04	0.63
2	Perceived ease of use (PEOU)	3.82	0.64
3	Trust	3.61	0.51
4	Cost	3.09	0.78
5	Perceived risk (PR)	2.86	0.66

Mean: where 1= disagree and 5= agree, to be a factor affect the adoption of mobile banking.*

Table 5.24 shows the summary of the overall results, as well as the outcome of the research hypotheses.

Table 5.24: Results Summary of Hypotheses

No	Hypotheses	Results	Reason
H1	Perceived usefulness (PU) is likely to influence the adoption of mobile banking.	Supported	ANOVA results, F value = 31.15, Pr<0.0001, Alpha=0.05
H2	Perceived ease of use (PEOU) is likely to influence the adoption of mobile banking.	Supported	ANOVA results, F value = 11.83, Pr<0.0001, Alpha=0.05
H3	Perceived ease of use (PEOU) is likely to influence Perceived usefulness (PU).	Supported	Correlation results, Rho=0.59808, Pr<0.0001, Alpha=0.05
H4	The perceived cost is likely to influence the adoption of mobile banking.	Supported	ANOVA results, F value = 11.76, Pr<0.0001, Alpha=0.05
H5	Customer's trust in mobile banking service providers is likely to influence the adoption of mobile banking.	Supported	ANOVA results, F value = 5.29, Pr=0.0055, Alpha=0.05
H6	The level of perceived risk is likely to influence the adoption of mobile banking.	Not Supported	ANOVA results, F value = 0.60, Pr=0.5495, Alpha=0.05

Chapter 6: Discussion of Results

6.1 Introduction

In the introduction of the report, the main objective of this study was highlighted. The objective is to investigate the factors influencing the adoption of mobile banking by the Bottom of the Pyramid (BOP) economic segment in South Africa (SA).

Some basic questions were posed, which can be reiterated as follows: What are the factors influencing the adoption of mobile banking by the BOP? Do customers at the BOP behave differently from middle and upper income people? Do people at the BOP perceive risk and cost differently? Do they have sufficient knowledge about mobile banking service providers, services and products to trust them?

The literature in chapter 2 described the research model, including factors considered for adoption of mobile banking by the BOP segment in SA. Hypotheses were then developed to test the effect of the identified factors.

The previous chapter outlined the statistical analyses results, which confirmed many of the hypotheses. This chapter will discuss individual hypotheses to better understand the effect on the adoption of mobile banking. The focus will draw the threads of the previous chapters together in order to recommend a model for future use on adoption of mobile banking by the BOP in South Africa.

6.2 Access to mobile banking service

According to the results shown in Figure 5.3, approximately 16% of the respondents did not have mobile phones and about 28% of the respondents did not have bank accounts. This is an opportunity for both the banks and mobile network providers to increase market penetration for the under-served population. According to BASA (2010), in 2009 the rate of opening low cost bank accounts was estimated at 21% growth year-on-year. This indicates that banks with suitable low cost banking services stand a good chance of significantly improving their market share in low income markets. In Figure 5.4, 66% of the respondents based in Gauteng (in Soweto Township) indicated that they take less than 20 minutes to access their nearest bank branch. As compared to other townships, Soweto is well serviced township; hence it cannot be assumed that it would take same amount of time to access the nearest bank branch in other townships or informal settlements.

6.3 Exploring the Hypotheses

This section focuses on discussing the results and evaluating the research hypotheses as presented. The majority of the hypotheses are supported by the ANOVA analysis. To reiterate, the ANOVA analysis compares the statistical differences in the means of more than two groups.

6.3.1 Perceived usefulness

Hypothesis 1 stated that perceived usefulness (PU) is likely to influence the adoption of mobile banking.

Davis (1989) defines PU as the degree to which a person believes that using a particular system will enhance his or her job performance. Mobile banking gives a user convenience; an opportunity to conduct banking transactions anywhere at any time. According to Venkatesh *et al*. (2003), PU is a determinant of behavioural intention (BI). For this study, BI is analogous to the adoption of mobile banking. It was therefore expected for PU to have a significant effect on the user's adoption of mobile banking on the Bottom of the Pyramid (BOP) economic segment.

The ANOVA results (Table 5.19) showed that the PU factor had a significant effect on the adoption of mobile banking by the BOP. Furthermore, the descriptive results (Table 5.5) showed that the mean of current users felt that mobile banking is useful.

The literature therefore reinforces the findings of the analysis, and the hypothesis that PU is likely to influence the adoption of mobile banking by the BOP is supported.

6.3.2 Perceived ease of use

Hypothesis 2 stated that perceived ease of use (PEOU) is likely to influence the adoption of mobile banking.

Venkatesh *et al*. (2003) confirmed that PEOU is a determinant of the adoption of mobile banking. The functionality of the mobile phone, screen size and type of keypad (keyboard) can be considered to be contributing factors to ease of

use (Kim *et al.*, 2009; Walker, 2003). The use of mobile phones with small keypads for mobile banking can lead to typing errors during transactions, affecting the ease of use. Small screens on a mobile phone can inhibit viewing of all information, and may also contribute to the use of relatively small font which might be uncomfortable for some users.

The ANOVA results (Table 5.19) showed that the PEOU factor had a significant effect on the adoption of mobile banking by the BOP. Furthermore, the descriptive results (Table 5.6) showed that the mean of current users felt that mobile banking is easy to use.

The literature therefore reinforces the findings of the analysis and the hypothesis that PEOU is likely to influence the adoption of mobile banking by the BOP is supported.

6.3.3 Impact of perceived ease of use (PEOU) on perceived usefulness (PU)

Hypothesis 3 stated that perceived ease of use (PEOU) is likely to influence perceived usefulness (PU).

The literature describes that the relationship between PU and PEOU is that PU mediates the effect of PEOU on the intention to use (Venkatesh *et al*., 2003). This means that while PU has a direct impact on intention to use, PEOU influences intention to use indirectly through PU.

The T-test results (Table 5.21) showed that the PEOU factor had a significant effect on perceived usefulness (PU), hence PEOU influences the adoption of mobile banking by the BOP through PU.

The literature therefore reinforces the findings of the analysis and the hypothesis that PEOU is likely to influence PU on the adoption of mobile banking by the BOP is supported.

6.3.4 Perceived cost

Hypothesis 5 stated that the perceived cost is likely to influence the adoption of mobile banking.

According to a study by Wu and Wang (2005), perceived cost had a significant effect on the adoption of mobile banking. Furthermore, the literature shows that people at the BOP have very low purchasing power and are price sensitive (Karnani, 2009). Considering the low income context of this study, where 31.4% of the respondents are employed, 12.3% of respondents are self-employed and the other remaining respondents (43.7%) are not working (unemployed, students, housewife or retired), and with 99.7% of the respondents earning an income of less than R5000 per month, it is therefore expected for cost to have an effect on the adoption of mobile banking.

The ANOVA results (Table 5.19) showed that the cost factor had a significant effect on the adoption of mobile banking on the BOP. Table 5.7 shows that the respondents who indicated no interest in using mobile banking felt that using mobile banking services is costly. According to Figure 5.6, 42% of respondents

felt that the costs of bank charges are expensive as compared to 38% of respondents who disagreed that the cost of airtime is expensive.

The literature therefore reinforces the findings of the analysis and the hypothesis that perceived cost is likely to influence the adoption of mobile banking at the BOP is supported.

6.3.5 Customer's trust

Hypothesis 5 stated that customers' trust in mobile banking service providers is likely to influence the adoption of mobile banking.

According to Bhattacherjee (2002), the definition and measurement of the consumer's trust in mobile banking service providers can be based on the three dimensions of trust: ability, integrity and benevolence.

Ability

Bhattacherjee (2002) describes ability of the mobile banking services provider as the perception of the consumer on the competency and salient knowledge of the mobile banking service provider to deliver the expected service.

The ANOVA results (Table 5.19) showed that the ability of mobile banking service providers (as a facet of customers' trust factor) had a significant effect on the adoption of mobile banking by the BOP. The respondents who currently use mobile banking felt that the mobile banking service providers have the

ability to render the mobile banking service (Table 5.8). The respondents who are currently not using mobile banking remained neutral.

The study by Bhattacherjee (2002) reinforces the findings of the analysis and supports the hypothesis.

Integrity

Bhattacherjee (2002) describes integrity of the mobile banking services provider as the user's perception that the service provider will be fair, honest and adhere to reasonable conditions of transactions.

The ANOVA results (Table 5.19) showed that the integrity of mobile banking service providers (as a facet of customer's trust factor) had no significant effect on the adoption of mobile banking by the BOP. All respondents indicated that the mobile banking service providers have integrity (Table 5.9). This means that all groups felt that mobile service providers are generally fair and honest in conducting mobile banking transactions.

This view has not been described in the literature review and should attract further consideration. However, the results of integrity as facets of customers' trust had a minimal effect on the overall results of trust, hence there was no effect on the trust hypothesis.

Benevolence

Bhattacherjee (2002) describes benevolence of the mobile banking services provider as the extent to which a service provider will demonstrate receptivity and empathy towards the user. The service provider will make a good faith effort to resolve users' concerns and intends to do good to the users beyond profit motives.

The ANOVA results (Table 5.19) showed that the benevolence of mobile banking service providers (as a facet of customer's trust factor) had a significant effect on the adoption of mobile banking by the BOP. The respondents who currently use mobile banking and those who are interested in using mobile banking in the future felt that the mobile banking service providers are trustworthy (Table 5.10).

The study by Bhattacherjee (2002) reinforces the findings of the analysis and supports the hypothesis.

Overall customer's trust

The literature highlights that the higher levels of trust in mobile banking service providers will lead to a greater intention on the part of the user to engage in mobile banking transactions (Gu, Lee & Suh, 2009; Lee *et al.*, 2007).

The ANOVA results (Table 5.19) showed that the customer's trust factor had a significant effect on the adoption of mobile banking at the BOP. The respondents who currently use mobile banking and those who are interested in

using mobile banking in the future, felt that the mobile banking service providers are trustworthy (Table 5.11).

Furthermore, the literature describes that trust can be viewed from the three perspectives of bank, mobile network provider and wireless infrastructure (Siau & Shen, 2003; Lee *et al.*, 2007).

In a study by Kim *et al.* (2009), which examined the effect of initial trust in mobile banking user adoption, trust was defined as a psychological expectation that a trusted party will not behave opportunistically. In Kim, Chung and Lee (2010), trust was defined as a feeling of security and willingness to depend on someone or something.

According to Figure 5.7, the respondents demonstrated high levels of trust across all three perspectives: the banks, mobile network providers and wireless infrastructure.

The literature therefore reinforces the findings of the analysis and the hypothesis that customers' trust in mobile banking service providers is likely to influence the adoption of mobile banking at the BOP is supported.

6.3.6 Perceived risk

Hypothesis 6 stated that the level of perceived risk is likely to influence the adoption of mobile banking. This study used a similar approach as a study by Lee (2009), where perceived risk was divided into five facets: performance risk, social risk, financial risk, time risk and security/privacy risk.

Performance risk

Lee (2009) describes performance risk as losses incurred by deficiencies or malfunctions of mobile banking servers. According to Littler and Melanthiou (2006), a malfunction of a banking server would reduce customers' willingness to use banking services, and a similar notion applies in the context of mobile banking.

The ANOVA results (Table 5.19) showed that the performance risk (as a facet of perceived risk factor) had no significant effect on the adoption of mobile banking on the BOP. All respondents remained neutral on how they felt about the performance risk of the mobile banking service (Table 5.13).

These results are in contrast to the views described in literature. The results of performance risk as facets of perceived risk contributed to the overall results of perceived risk; hence the perceived risk hypothesis is not supported.

Financial risk

Lee (2009) describes financial risk as the potential for monetary loss due to transaction errors or bank account misuse.

The ANOVA results (Table 5.19) showed that the financial risk (as a facet of perceived risk factor) had no significant effect on the adoption of mobile banking by the BOP. All respondents remained neutral on how they felt about the performance risk of the mobile banking service (Table 5.14).

These results are in contrast to the views described in literature. The results of financial risk as facets of perceived risk contributed to the overall results of perceived risk; hence the perceived risk hypothesis is not supported.

Social risk

Lee (2009) describes social risk as the possibility that using mobile banking may result in disapproval by one's friends/family/work group.

The ANOVA results (Table 5.19) showed that the social risk (as a facet of perceived risk factor) had no significant effect on the adoption of mobile banking by the BOP. All respondents remained neutral on how they felt about the social risk of the mobile banking service (Table 5.15).

These results are in contrast to the views described in literature. The results of social risk as facets of perceived risk contributed to the overall results of perceived risk; hence the perceived risk hypothesis is not supported.

Time risk

Lee (2009) describes time/convenience risk as the loss of time and inconvenience incurred due to the delays of receiving payments or the difficulty of navigation (finding appropriate services and relevant commands).

The ANOVA results (Table 5.19) showed that the time risk (as a facet of perceived risk factor) had no significant effect on the adoption of mobile banking

by the BOP. All respondents remained neutral on how they felt about the time risk of the mobile banking service (Table 5.16).

These results are in contrast to the views described in literature. The results of time risk as facets of perceived risk contributed to the overall results of perceived risk; hence the perceived risk hypothesis is not supported.

Security/privacy risk

Lee (2009) describes security/privacy risk as a potential loss due to fraud or a hacker compromising the security of a mobile banking user.

The ANOVA results (Table 5.19) showed that the security/privacy risk (as a facet of perceived risk factor) had no significant effect on the adoption of mobile banking by the BOP. All respondents remained neutral on how they felt about the security/privacy risk of the mobile banking service (Table 5.17).

These results are in contrast to the views described in literature. The results of security/privacy risk as facets of perceived risk contributed to the overall results of perceived risk; hence the perceived risk hypothesis is not supported.

Overall perceived risk

Brown *et al*. (2003) found perceived risk to be a significant factor affecting mobile banking adoption. Lee (2009) found that all five risks facets: security, financial, time, social and performance risks, emerged as negative factors in the intention to adopt online banking. This view was supported by Lee, Lee and Kim

(2007), where all five facets of perceived risk (security, financial, time, social and performance risks) emerged as negative factors in the intention to adopt online banking. However, social risk was found to have an insignificant effect on the intention to adopt online banking (Lee, 2009).

The ANOVA results (Table 5.19) showed that the perceived risk had no significant effect on the adoption of mobile banking by the BOP. All respondents remained neutral on how they felt about the perceived risk of the mobile banking service (Table 5.18). These results are in contrast to the views described in literature. The results of perceived risk do not support the hypothesis.

In a study by Wu and Wang (2005), a puzzling finding was the positive influence of perceived risk on behavioural intention to use. Wu and Wang (2005) did not provide a clear reason for that particular finding; it rather assumes that the respondents might have been aware of the existing risk of mobile commerce.

In a study by Kim, Chung and Lee (2010), trust was defined as a feeling of security and willingness to depend on someone or something. This study has shown that the respondents perceived the mobile banking service providers (banks, mobile network provider and wireless infrastructure) to be trustworthy.

In study by Lee and Chung (2009) to investigate the role that trust plays in assessing the degree of satisfaction of mobile banking users, they argue that as mobile banking involves processing banking tasks without having face-to-face

contact with bank staff, it involves risk and uncertainty. Hence to eliminate risk and uncertainty, improvement is required in customers' trust levels.

A study by Luo, Li, Zhang and Shim (2010) indicated that trust plays a role in explaining how consumers may overcome perceived risk, especially on transactions involving uncertainty. However, against their expectations, the results did not support the hypothesis on the relationship between trust and perceived risk (Luo e*t al*., 2010); no clear explanation is given for this.

The results of this study in Table 5.20 show that there is a significant negative correlation at 0.05 level between trust and perceived risk. This implies that when respondents perceived mobile banking service providers as trustworthy, the respondents' perception of risk is more likely to be low. Considering that the respondents perceived the mobile banking service provider to be trustworthy (Figure 5.7), this could be a possible explanation why the respondents did not express any risk concerns with mobile banking.

6.4 Research Model

The Discriminant Analysis as shown in Table 5.22 shows that perceived usefulness and perceived cost are the most significant predictors for adoption of mobile banking.

The results shows that of the six hypotheses tested, five of them were supported. Consistent with previous studies, perceived usefulness and perceived ease of use were found to be significant factors influencing the adoption of mobile banking. Perceived cost and customers' trust construct were

identified and tested as significant factors affecting the adoption of mobile banking at the BOP in South Africa. Perceived risk was not supported as a factor affecting the adoption of mobile banking.

One advantage of using TAM or extended TAM (TAM2) is that they have been extensively tested and validated and are widely accepted models which can be modified or extended using other theories or constructs (Taylor & Todd, 1995; Davis & Venkatesh, 2000; Wu & Wang, 2005; Luarn & Lin, 2005; Zhang, Gou & Cheng, 2008; Yen, Wu, Cheng & Huang, 2010). This study was able to confirm the applicability of TAM, in particular the perceived usefulness construct on the adoption of mobile banking at the BOP. Further, this study was able to identify the important role that perceived cost and customer's trust plays with regard to the adoption of mobile banking in the BOP context.

Chapter 7: Conclusion

7.1 Introduction

This chapter synthesizes the findings of the research. It reviews the research background and objectives, and summarises the research findings. The chapter concludes with recommendations for future research.

7.2 Review of research background and objectives

This study aimed to investigate the factors influencing the adoption of mobile banking by the Bottom of the Pyramid (BOP) economic segment in South Africa. Therefore the investigation aimed at answering:

What are the factors influencing the adoption of mobile banking by the BOP? Do the customers at the BOP behave differently from middle and upper income people? Do people at the BOP perceive risk and cost differently? Do they have sufficient knowledge about mobile banking service providers, services and products to trust them?

The study focused on the effect of the following factors:

- Perceived usefulness of mobile banking service;
- Perceived ease of use of the mobile banking service;
- Perceived cost of mobile banking service; and
- Customer's trust in the mobile banking service provider (from three perspectives: banks, mobile network providers and the wireless network infrastructure);

- Perceived risk (divided into five facets: performance risk, financial risk, social risk, time risk and security/privacy risk) associated with mobile banking services.

To comprehensively respond to the questions raised and for understanding on the dynamics at play, it is essential to share the research findings.

7.3 Research Findings

The results were able to show that perceived usefulness has a significant impact on the adoption of mobile banking by the BOP. People at the BOP will adopt mobile banking services when the value and benefit of mobile banking is evident. The current users of mobile banking services perceived mobile banking as useful.

The results show that the people at the BOP will adopt mobile banking when it is perceived to be easy to use. The current users of mobile banking services perceived mobile banking to be easy to use. The perceived ease of use variable has a significant positive relationship with perceived usefulness. This implies that the easier it is to use mobile banking, the more it will become useful. Hence, it is of paramount importance to develop mobile banking services with valuable functionality, as well as mobile devices with visible screens and usable keypads.

The results show that perceived cost is a significant factor influencing the adoption of mobile banking on the BOP, thereby making perceived cost a barrier for users of mobile banking. The people who are not interested in using

mobile banking perceived mobile banking to be costly. People at the BOP will adopt mobile banking when it is perceived to be affordable.

The results show that people at the BOP will adopt mobile banking services when the mobile banking service providers (both the banks and mobile network provider) are perceived to be trustworthy. Customer's trust of mobile banking service providers has a direct effect on the customer's loyalty. Trust has a negative significant correlation with perceived risk, and trust can play a role in mitigation of risk. The results show perceived risk had no effect on the adoption of mobile banking services by the BOP.

7.4 Practical Implications for business

The results showed that only 30% of the respondents are currently using mobile banking; 58% of the respondents are not using mobile banking but have an interest to use it in the future. This is a great marketing opportunity for businesses to reach poor people with a broad range of financial services, however it is critical for service providers to understand the behaviour patterns of low income markets. This research revealed that usefulness, as well as ease of use, cost and customer's trust in the service provider, is critical when introducing services and products to customers in low income markets.

Mobile banking service providers need to continuously strive to simplify the mobile banking application used for transactions. The marketing drive should focus on demonstrating the simplicity, usefulness and cost benefit of using mobile banking.

Furthermore, mobile banking service providers need to make an effort to build trust with customers. Service providers need to continuously demonstrate their ability to provide secure value-adding services, their intention to be fair and honest with regard to customers' requirements, and demonstrate good intent in terms of empowering customers. Mobile banking service providers need to ensure that they can deliver on the promises made during marketing initiatives. Considering that customer's trust has an effect on customer loyalty, trusted mobile banking service providers stand a better chase to gain meaningful market share.

The mobile banking service providers should begin to consider driving down the costs of mobile banking as a core of their strategic objectives. The increased use of mobile banking services will be beneficial to both the mobile banking service provider and the users. The mobile banking service provider will be able to reduce expenditure in establishing more banking branches. The people will benefit in terms of reducing taxi fare on travelling and effectively utilising time for other productive opportunities.

The use of mobile phones at the BOP is continuing to grow and the major retail banks are have started to offering mobile banking services; this is a great opportunity for banks to reach the low income market. However, there still a great number of people who are less informed about the concept of mobile banking and related benefits. Therefore, mobile banking service providers needs to direct more effort on educating communities, especially potential customers at the BOP, about the functionality, safety and benefits of mobile banking.

7.5 Recommendation for Future Research

The results of this study showed that there is a negative relationship between customer's trust and perceived risk. However, it will be necessary to look at the effect of trust on perceived risk on a broader scale. Possibly there could be a better understanding of the reasons why the respondents who placed so much trust in their mobile banking service provider did not have risk concerns. Therefore, further research is recommended on the effect of trust to perceived risk of mobile banking at the low income market.

The effect of demographic variables such as race, age, gender and culture on adoption of mobile banking on the BOP was not intensively explored. Some demographic variables may have indirect interrelation effects between the variables, for example according to Lee (2009), the cognitive propensity of individuals to risk differs across culture. This means that the customers' acceptance of mobile banking may be influenced by cultural differences. This phenomenon may require further investigation on a wider scale across various racial groups with cultural differences.

The results of this study showed that over 66% of those surveyed had access to banking facilities within 20 minutes, as they were based in the township. It would be of interest to explore the geographic effect, such as in rural areas, where it takes much longer and is more costly to access the nearest banking facilities.

7.6 Conclusion

This research contributes to the information technology/systems (IT/IS) acceptance research. It successfully applied the TAM2 in mobile banking at the BOP, in a very different context from prior studies considering that BOP people have lower disposable incomes, less skills and low literacy levels.

There is increasing growth in the adoption of mobile banking by low-income markets. Mobile banking service providers which are willing to provide useful and cost effective products stand to gain substantial market share.

This study successfully identified the factors influencing the adoption of mobile banking by the low income market.

References

ABSA (2010). Cellphone Banking. Retrieved from: http://www.absa.co.za/absacoza/content.jsp?/Home/Personal/Banking-with-Us/Cellphone-Banking

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. doi: 10.1016/0749-5978(91)90020-T

BASA (2003). Financial Sector Charter. Retrieved from: http://www.banking.org.za/our_industry/financial_sector_charter/financial_sector_charter.aspx

BASA (2010). Annual Review 2009. Retrieved from: http://www.banking.org.za/resource_centre/banking_association/publications/publications.aspx

BCSA (2005). First set of data shows Mzansi hit the spot. Retrieved from: http://www.banking.org.za/documents/2005/february/mzansidata_090205.asp.

Bidoli, M. (2004). Factors affecting the adoption of Voice over Internet Protocol (VoIP) and other converged IP services in South Africa. (Unpublished master's thesis). University of Pretoria (GIBS), South Africa.

Bhattacherjee, A. (2002). Individual trust in online firms: Scale development and initial test. *Journal of Management Information Systems*, 19(1): 211-241. Retrieved from: http://www.jstor.org/stable/40398572

Brown, I., Cajee, Z., Davies, D., & Stroebel, S. (2003). Cell phone banking: Predictors of adoption in South Africa—An exploratory study. *International Journal of Information Management,* 23(5), 381-394. doi: 10.1016/S0268-4012(03)00065-3

Business Action for Africa (2006). Sekulula & Mzansi – financial access at the bottom of the pyramid: visa. Retrieved from: http://www.businessactionforafrica.org/documents/CaseStudiesVisa.pdf

Camner, G., & Sjöblom, E. (2009). Can the success of M-PESA be repeated? A review of the implementations in Kenya and Tanzania. *Valuable Bits.* Retrieved from: http://mobileactive.org/files/file_uploads/camner_sjoblom_differences_ke_tz.pdf.

Carlsson, C., Carlsson, J., Hyvönen, K., Puhakainen, J., & Walden, P. (2006) Adoption of mobile devices/services-searching for answers with the UTAUT. *Proceedings of the 39th Hawaii International Conference on System Sciences.* Retrieved from: http://www.computer.org/plugins/dl/pdf/proceedings/hicss/2006/2507/06/250760132a.pdf?template=1&loginState=1&userData=anonymous-

IP%253A%253AAddress%253A%2B41.29.64.6%252C%2B%255B172.16.161.5%252C%2B41.29.64.6%252C%2B127.0.0.1%255D

CGAP. (2006). Mobile Phone Banking and Low-Income Customers Evidence from South Africa. Retrieved from: http://www.globalproblems-globalsolutions-files.org/unf_website/PDF/mobile_phone_bank_low_income_customers.pdf

Chipp, K., & Corder, C.K. (2009). Where practice meets theory: defining and reviewing the bottom of the pyramid for South African marketers. *GIBS BOP Conference*. *(Publication pending).* Johannesburg: South Africa.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and end user acceptance of information technology. *MIS Quarterly*, 13(3): 319-340. Retrieved from: http://www.jstor.org/stable/249008

Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention and Behaviour: An Introduction of Theory and Research*. Reading, MA, USA: Addison-Wesley.

FNB. (2010a). eWallet from FNB. Retrieved from: https://www.fnb.co.za/cellphone-services/ewallet.html

FNB. (2010b). FNB enables employers to pay the Un-banked via cellphones. Retrieved from: https://www.fnb.co.za/news/archive/2010/20100726wallet.html

GSMA. (2009, February 17). Mobile Money for the Unbanked Annual report 2009. Retrieved from: http://www.gsmworld.com/documents/mmu_2009_annual_report.pdf

Gu, J., Lee, S., & Suh, Y. (2009). Determinants of behavioural intention to mobile banking. *Expert Systems with Applications*, 36(9), 11605-11616. doi:10.1016/j.eswa.2009.03.024

Guesalaga, R. & Marshall, P. (2008). Purchasing power at the bottom of the pyramid: differences across geographic regions and income tiers. *Journal of Consumer Marketing*, 25(7), 413–418. doi: 10.1108/07363760810915626

Im, I., Kim, Y., & Han, H. (2008). The effects of perceived risk and technology type on users' acceptance of technologies. *Information & Management*, 45(1), 1-9. doi:10.1016/j.im.2007.03.005

ITU (2009). Information Society Statistical Profiles 2009: Africa. Retrieved from: http://www.itu.int/dms_pub/itu-d/opb/ind/D-IND-RPM.AF-2009-PDF-E.pdf.

Harris, L. C., & Goode, M. M. H. (2004). The four levels of loyalty and the pivotal role of trust: A study of online service dynamics. *Journal of Retailing*, 80(2), 139-158. doi:10.1016/j.jretai.2004.04.002

Jaiswal, A.K. (2008). The Fortune at the Bottom or the Middle of the Pyramid? *Innovations: Technology, Governance, Globalization, MIT Press,* 3(1), 85-100. doi:10.1162/itgg.2008.3.1.85

Karnani, A. (2007). The mirage of marketing at the bottom of the pyramid: How the private sector can help alleviate poverty. *California Management Review*, 49 (4), 90-111. Retrieved from: http://wwwupdate.un.org/esa/coordination/Mirage.BOP.CMR.pdf

Karnani, A. (2009). Romanticizing the Poor. *Stanford Social Innovation Review.* Retrieved from: http://www.ssireview.org/pdf/RomanticizingthePoor.pdf

Kim, G., Shin, B., & Lee, H.G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, 19(3), 283–311. doi:10.1111/j.1365-2575.2007.00269.x

Kim, M., Chung, N., & Lee, C. (2010).The effect of perceived trust on electronic commerce: Shopping online for tourism products and services in South Korea. *Tourism Management, In Press, Corrected Proof* doi:10.1016/j.tourman.2010.01.011

Lee, K. C., & Chung, N. (2009). Understanding factors affecting trust in and satisfaction with mobile banking in Korea: A modified DeLone and McLean's model perspective. *Interacting with Computers*, 21(5-6), 385-392. Doi:10.1016/j.intcom.2009.06.004

Lee, K.S., Lee, H.S., & Kim, S.Y. (2007). Factors influencing the adoption behaviour of mobile banking: a South Korean perspective. *Journal of Internet Banking and Commerce*, 12(2). Retrieved from: http://www.arraydev.com/commerce/JIBC/2007-08/HyungSeokLee_Final_PDF%20Ready.pdf

Lee, M. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, 8(3), 130-141. doi:10.1016/j.elerap.2008.11.006

Lin, H., & Wang, Y. (2006). An examination of the determinants of customer loyalty in mobile commerce contexts. *Information & Management, 43*(3), 271-282. doi:10.1016/j.im.2005.08.001

Littler, D. & Melanthiou, D. (2006). Consumer perceptions of risk and uncertainty and the implications for behaviour towards innovative retail services: The case of internet banking. *Journal of Retailing and Consumer Services*, 13(6), 431-443. doi:10.1016/j.jretconser.2006.02.006

Louw, A.I. (2008), Redefining BOP: In Pursuit of Sustainable Opportunity at the Base of the Economic Pyramid. (Unpublished master's thesis). University of Pretoria (GIBS), South Africa.

Luarn, P. & Lin, H. (2005). Toward an understanding of the behavioural intention to use mobile banking. *Computers in Human Behavior*, 21(6), 873-891. doi:10.1016/j.chb.2004.03.003

Luo, X., Li, H., Zhang, J., & Shim, J. P. (2010). Examining multi-dimensional trust and multi-faceted risk in initial acceptance of emerging technologies: An empirical study of mobile banking services. *Decision Support Systems*, 49(2), 222-234. doi:10.1016/j.dss.2010.02.008

MarketingMix. (2010).The bottom of the pyramid. Retrieved from: http://www.marketingmix.co.za/pebble.asp?relid=5145

Melzer, I. (2009). The Bottom of the Pyramid in South Africa. Presented at the bottom of the pyramid breakfast presentation, Sunnyside Park Hotel, JHB.

Min, Q., Ji, S., & Qu, G. (2008). Mobile commerce user acceptance study in China: A revised UTAUT model. *Tsinghua Science & Technology*, 13(3), 257-264. doi:10.1016/S1007-0214(08)70042-7

Mokoto, M.K. (2009). Challenges faced by South African companies serving the low-income markets: A market orientation perspective. (Unpublished master's thesis). University of Pretoria (GIBS), South Africa

MTN Banking (2009, February). MTN Mobile Money. Retrieved from: http://www.mtnbanking.co.za/site/MTNBanking/index2.html

Nedbank. (2010b). M-PESA. Retrieved from: http://www.nedbank.co.za/website/content/m-pesa/#dialog

Nedbank (2010a, August). Vodacom and Nedbank launch mobile money revolution in South Africa. Retrieved from: http://www.nedbank.co.za/website/content/m-pesa/press%20release%20v31.pdf

Pitta, D.A., Guesalaga, R. and Marshall, P. (2008), "The quest for the fortune at the bottom of the pyramid", *Journal of Consumer Marketing*, 25 (7), 393–401.

Prahalad, C.K. (2005). *The fortune at the bottom of the pyramid: Eradicating poverty through profits*. Philadelphia: Wharton School Publishing, 304.

Presidency RSA. (2009). Development Indicators 2009. Retrieved from: http://www.info.gov.za/view/DownloadFileAction?id=109313

Reichheld, F. F., & Schefter, P. (2000, July/August). E-loyalty your secret weapon on the Web. *Harvard Business Review*, 105–113. Retrieved from: http://www.bus.ucf.edu/rcascio/student/mar3721/Reichheld,%20E-Loyalty.pdf

Rogers, E.M. (1995). *Diffusion of innovations*. (4th Ed). The Free Press, New York.

South African Advertising Research Foundation (SAARF), (2009). AMPS 2008B. Johannesburg: SAARF. Retrieved from: http://www.eighty20.co.za

Safaricom. (2007). Safaricom launches money transfer service. Retrieved from: http://www.safaricom.co.ke/fileadmin/template/main/downloads/m-pesa_resource_centre/M-PESA_Press%20Briefs/07.03.06%20-%20M-PESA%20Launch.pdf

Salkind N.J (2008). *Statistics for people who (think they) hate statistics*. (3rd Ed). Sage Publications, University of Kansas

Shin, D. (2010). The effects of trust, security and privacy in social networking: A security-based approach to understand the pattern of adoption. *Interacting with Computers, In Press, Corrected Proof* doi:10.1016/j.intcom.2010.05.001

Siau, K., & Shen, Z. (2003). Building customer trust in mobile commerce. *Communications of the ACM*, 46(4): 91-94.

Standard Bank. (2010). Cellphone Banking. Retrieved from: http://www.standardbank.co.za/portal/site/standardbank/menuitem.042bffe99ebb1a3d63b1a0103367804c/?vgnextoid=b96b323efae06110VgnVCM100000337608c4RCRD

Standard Bank. (2005). Standard Bank and MTN ring in a new era for financial services. Retrieved from: http://www.standardbank.co.ls/SBIC/Frontdoor_02_01/0,2454,10293765_15147290_0,00.html

Tan, M., & Teo, T.S.H. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, 1, 1–42. Retrieved from: http://tech.uh.edu/faculty/conklin/IS7033Web/7033/Week14/Internetbanking.pdf

Taylor, S., Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2): 144-176. Retrieved from: http://home.business.utah.edu/actme/7410/TaylorTodd.pdf

Tiwari, R. & Buse, S. (2007). *The Mobile Commerce Prospects: A Strategic Analysis of Opportunities in the Banking Sector*. Hamburg: Hamburg University Press.

Venkatesh V. & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 45(2): 186-204. Retrieved from: http://www.jstor.org/stable/2634758

Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.

Walker, M.R. (2004). Factors affecting the adoption of mobile banking service in retail banking South Africa. (Unpublished master's thesis). University of Pretoria (GIBS), South Africa.

WIZZIT (2005, October). Cellphone banking reinvented. *SA Computer Magazine*. Retrieved from: http://www.wizzit.co.za/media/reinvented.pdf.

Wu, J., & Wang, S. (2005). What drives mobile commerce?: An empirical evaluation of the revised technology acceptance model. *Information & Management*, 42(5), 719-729. doi: 10.1016/j.im.2004.07.001

Yen, D. C., Wu, C., Cheng, F., & Huang, Y. (2010). Determinants of users' intention to adopt wireless technology: An empirical study by integrating TTF with TAM. *Computers in Human Behavior*, 26(5), 906-915. doi:10.1016/j.chb.2010.02.005

Zhang, N., Guo, X., & Chen, G. (2008). IDT-TAM integrated model for IT adoption. *Tsinghua Science & Technology*, 13(3), 306-311. doi:10.1016/S1007-0214(08)70049-X

Zikmund, W.G (Ed). (2003). *Exploring Marketing Research*. USA: Thompson Learning.

Appendix A: Living Standards Measure (LSM) by contributing variables

LSM Variables	LSM									
	LSM 1	LSM 2	LSM 3	LSM 4	LSM 5	LSM 6	LSM 7	LSM 8	LSM 9	LSM 10
	%	%	%	%	%	%	%	%	%	%
No domestic	100%	100%	100%	100%	99%	98%	91%	78%	56%	20%
0 or 1 radio set in household	100%	100%	93%	93%	86%	81%	69%	56%	41%	17%
Rural - Not in Gauteng or W. Cape	100%	91%	81%	63%	38%	15%	7%	6%	3%	5%
Hi-Fi/music centre	0%	31%	41%	47%	58%	63%	69%	75%	81%	90%
House / town house/cluster	0%	25%	35%	51%	65%	73%	79%	84%	92%	97%
TV set	0%	24%	55%	79%	94%	98%	99%	100%	100%	100%
2 cellphones in household	0%	15%	19%	26%	27%	34%	37%	35%	39%	36%
Water in house/plot	0%	12%	38%	63%	86%	98%	100%	100%	100%	100%
Fridge/freezer (not deep freezer)	0%	7%	36%	65%	89%	96%	97%	98%	99%	100%
Flush toilet in/out	0%	1%	7%	34%	58%	89%	99%	100%	100%	100%
DVD	0%	5%	11%	27%	46%	63%	70%	76%	80%	88%
Electric stove	0%	1%	4%	22%	60%	89%	98%	98%	99%	99%
3 or more cellphones in Household	0%	3%	6%	16%	23%	29%	37%	46%	47%	59%
Metro dweller	0%	2%	7%	14%	27%	50%	59%	58%	60%	65%
Microwave	0%	0%	3%	11%	32%	75%	94%	97%	98%	99%
Home theatre system	0%	1%	6%	8%	19%	32%	45%	53%	57%	71%
Built in kitchen sink	0%	0%	0%	7%	20%	68%	95%	99%	99%	99%
Hot running water	0%	0%	0%	2%	8%	42%	84%	96%	99%	100%
Washing machine	0%	0%	0%	1%	6%	36%	76%	87%	95%	99%
Motor vehicle in household	0%	1%	3%	7%	11%	25%	59%	83%	94%	99%
Deep freezer	0%	5%	6%	8%	8%	14%	30%	45%	59%	78%
Home telephone	0%	1%	2%	4%	6%	15%	28%	37%	46%	64%
VCR	0%	0%	1%	3%	7%	14%	25%	36%	47%	60%
Vacuum cleaner/polisher	0%	0%	0%	0%	0%	5%	24%	45%	70%	90%
MNet/DStv subscription (equivalent to 'cable')	0%	0%	0%	0%	2%	6%	20%	37%	53%	80%
Home security service	0%	0%	0%	1%	1%	6%	16%	24%	41%	69%
PC Desktop / Laptop	0%	0%	0%	0%	1%	5%	15%	35%	67%	95%
Tumble drier	0%	0%	0%	0%	0%	1%	7%	14%	31%	63%
Dishwasher	0%	0%	0%	0%	0%	1%	2%	3%	9%	35%

Source: SAARF (2009). AMPS® 2008B (Chipp & Corder, 2009)

Appendix B: Consent Letter

I am conducting research on the adoption and use of mobile banking services. The research is for academic purposes only. You are asked to complete a survey about this research. Your input to this research will be of great value. To complete the survey it should take no more than 20 minutes of your time. Your participation is voluntary and you can withdraw at any time without penalty. Your answers will be kept confidential. The outcome of this research may be used for academic and general purposes such as research reports, conference papers or books. By completing the survey, you indicate that you voluntarily participate in this research. If you have any concerns, please contact me or my supervisor. Our details are provided below.

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The respondents consented to participate in this survey | Yes | No |

Appendix C: Survey Questionnaire: Factors affecting adoption of mobile banking at the BOP

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

Section A: Demographic details

	User Demographics	Categories	Mark applicable with cross (X)
Q1	Where do you stay? (Provide area & province)	Area:…… Province:…….	
Q2	**Gender**	Male	
		Female	
Q3	**Race**	Black	
		White	
		Indian	
		Coloured	
Q4	**What is your age?**	……..years	
Q5	**Work Status**	Working	
		Housewife	
		Student	
		Self- Employed	
		Unemployed	
		Pensioner/Retired	
Q6	**Income Level**	No income	
		Between: R1 – R999	
		Between: R 1000 – R 1999	
		Between: R 2000 – R 2999	
		Between: R 3000 – R 4999	

		Between R 5000 – R6 999	
		R 7000 and higher	
Q7	**Education Level**	No Formal or Some primary school	
		Primary school completed	
		Some high school or Matriculated	
		Technical/apprenticeship	
		College / University/ Post matric	
Q8	Do you have or use a cell phone?	Yes	
		No	
Q9	Do you have a bank account?	Yes	
		No	
Q10	Time to get the nearest bank (branch)	Less than 20 Minutes	
		Less than 45 Minutes	
		More than 1 hour	
Q11	Do you use mobile banking?	Yes	
		No, but I will use if affordable, trustworthy, other reasons.	
		No, not interested	
Q12	If yes, What do you use mobile banking for? (Tick whatever is applicable)	Buy airtime	
		Check account balance	
		Transfer money	
		Pay store accounts	
		Pay electricity	
		Cash withdrawal	
		Others	
		Not Applicable	
Q13	Do you have any of the following at home? (Tick applicable)	Hot running water at home	

		Washing Machine	
		Motor vehicle in the household	
		DSTV	
		Home telephone	
		Vacuum cleaner	
		PC Desktop/ Laptop	

Section B: Five-point Likert Scale Questionnaire

Please complete the following questionnaire on a scale of 1 to 5. 1-strongly disagree and 5- strongly agree

Item	**Construct**	Strongly disagree	Disagree	Not Sure	Agree	Strongly agree
Q14	I think that using mobile banking would enable me to accomplish my tasks more quickly.	1	2	3	4	5
Q15	I think that using mobile banking would make it easier for me to carry out my tasks.	1	2	3	4	5
Q16	I think that mobile banking is useful.	1	2	3	4	5
Q17	Overall, I think that using mobile banking is	1	2	3	4	5

	advantageous.					
Q18	I think that learning to use mobile banking would be easy.	1	2	3	4	5
Q19	I think that interaction with mobile banking does not require a lot of mental effort.	1	2	3	4	5
Q20	I think that it is easy to use mobile banking to accomplish my banking tasks.	1	2	3	4	5
Q21	Mobile banking services may not perform well because of network problems.	1	2	3	4	5
Q22	Mobile banking services may not perform well and process payments incorrectly.	1	2	3	4	5
Q23	When transferring money through mobile banking, I am afraid that I will lose money due to careless mistakes such as wrong input of account number and wrong input of the amount of money.	1	2	3	4	5
Q24	When transaction errors occur, I worry that I cannot get compensation from banks.	1	2	3	4	5
Q25	I'm sure that if I decided to use mobile banking and something went wrong with the transactions, my friends, family and colleagues would think less of me.	1	2	3	4	5
Q26	When my bank account incurs	1	2	3	4	5

	fraud or hacking, I will have a potential loss of status in my social group.					
Q27	Using mobile banking services would lead to a loss of convenience for me because I would have to waste time fixing payments errors.	1	2	3	4	5
Q28	It would take me lots of time to learn how to use mobile banking services.	1	2	3	4	5
Q29	I would not feel totally safe providing personal privacy information over mobile banking.	1	2	3	4	5
Q30	I'm worried about using mobile banking because other people may be able to access my account.	1	2	3	4	5
Q31	I would not feel secure sending sensitive information across mobile banking.	1	2	3	4	5
Q32	I think the equipment cost is expensive to use	1	2	3	4	5
Q33	I think the access cost is expensive to use	1	2	3	4	5
Q34	I think the transaction fee is expensive to use	1	2	3	4	5
Q35	Mobile banking service providers have the skills and expertise to perform transactions in an expected	1	2	3	4	5

	manner.					
Q36	Mobile banking service providers have access to the information needed to handle transactions appropriately	1	2	3	4	5
Q37	Mobile banking service providers are fair in their conduct of customer transactions.	1	2	3	4	5
Q38	Mobile banking service providers are fair in their customer service policies following a transaction.	1	2	3	4	5
Q39	Mobile banking service providers are open and receptive to customer needs.	1	2	3	4	5
Q40	Mobile banking service providers make good-faith efforts to address most customer concerns.	1	2	3	4	5
Q41	I believe banks are trustworthy.	1	2	3	4	5
Q42	I believe mobile network providers are trustworthy.	1	2	3	4	5
Q43	I believe wireless infrastructure can be trusted.	1	2	3	4	5

Thank you for completing this questionnaire and assisting me in my research.

Kind Regards

Appendix D: Consistency Matrix

Hypotheses	Literature Review	Data collections tools	Analysis
Hypothesis 1: PU is likely to influence the adoption of mobile banking.	Venkatesh *et al*., 2003; Davis, 1989; Venkatesh & Davis, 2000; Lee, 2009; Wu & Wang, 2005; Luarn & Lin, 2005; Min *et al.*, 2008	Survey Questionnaire (Item: Q14 – Q17)	Regression Analysis, ANOVA and Descriptive statistics
Hypothesis 2: PEOU is likely to influence the adoption of mobile banking.	Venkatesh *et al*., 2003; Davis, 1989; Venkatesh & Davis, 2000; Lee, 2009; Wu & Wang, 2005; Luarn & Lin, 2005; Min *et al.*, 2008	Survey Questionnaire (Item: Q18 – Q20)	Regression Analysis, ANOVA and Descriptive statistics
Hypothesis 3: PEOU is more likely to influence PU.	Venkatesh *et al*., 2003; Davis, 1989; Venkatesh & Davis, 2000; Lee, 2009; Wu & Wang, 2005; Luarn & Lin, 2005;	Survey Questionnaire (Item: Q18 – Q20)	Regression Analysis, ANOVA, Correlations and Descriptive

	Min *et al.*, 2008		statistics
Hypothesis 4: The perceived cost is likely to influence the adoption of mobile banking.	Wu & Wang, 2005; Karnani, 2009;	Survey Questionnaire (Item: Q32 – Q34)	Regression Analysis, ANOVA and Descriptive statistics
Hypothesis 5: Customer's trust in a mobile banking service provider is likely to influence the adoption of mobile banking.	Bhattacherjee, 2002; Siau and Shen, 2003; Lee *et al.*, 2007; Gu *et al.*, 2009; Kim *et al.*, 2009; Kim *et al.*, 2010; Shin, 2010.	Survey Questionnaire (Item: Q35 – Q43)	Regression Analysis, ANOVA and Descriptive statistics
Hypothesis 6: The level of perceived risk is likely to influence the adoption of mobile banking.	Brown *et al*., 2003; Lee, 2009; Lee *et al.*, 2007; Tan & Teo, 2000; Im *et al.*, 2008; Wu and Wang, 2005; Litter & Melanthiou, 2006; Luarn & Lin, 2005.	Survey Questionnaire (Q21 – Q31)	Regression Analysis, ANOVA and Descriptive statistics