FACTORS AFFECTING THE ADOPTION OF MOBILE BANKING AMONG RURAL SOUTH AFRICANS

BY

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ABSTRACT

Financial services are not easily accessible to people in remote rural areas. In a contemporary business environment, financial institutions close bank branches in remote areas due to the cost associated with sustaining the branches. As a result people in these rural areas become excluded from participating in the financial sector.

In South Africa people face barriers to accessing financial services due to geographical locations and the cost associated with it. Mobile banking enables people to access banking services at any place and at any time. The benefits of mobile banking services are heightened in rural areas where no bank branches exist, and they offer a potentially cheap means of communicating and transacting in business.

Despite the availability of mobile banking, those that need financial services the most do not adopt it. Although people in rural areas in South Africa have access to mobile phones, this does not necessarily translate into the adoption of mobile banking. This study examines the factors that affect the adoption of mobile banking among rural South Africans. A survey questionnaire was developed and used to collect data from 211 respondents located in four rural areas in the Free State province. The results of the study contribute to knowledge by illustrating that although individuals own and use cellphones, it does not necessarily translate into them adopting mobile banking. The study found that the context of individuals, as well as perceived factors such as awareness, usefulness, cost, complexity, trust, and perceived advantages affect the adoption of mobile banking in rural South Africa.

Having an understanding of the factors that affect the adoption of mobile banking among rural South Africans brings to the fore a neglected area of study and addresses a gap in literature on the mobile banking practices of this segment of the market. The results of the study provide practical recommendations for management, future research and industry.

DECLARATION

I declare that this report is my own, unaided work. It is submitted in partial fulfilment of the requirements for the PhD in Communication Management in the Faculty of Economic and Management Sciences at the University of Pretoria. It has not been submitted before for any degree or examination at any other University.

DEDICATION

I lovingly dedicate this thesis to my parents, Vinod and Grace Ramnath, who self-sacrificed towards the education of their four children. I am eternally grateful.

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'I am because of you.'

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CHAPTER ONE
INTRODUCTION

1.1 Introduction

Access to mainstream financial services is not necessarily easily accessible to the vulnerable, low income earners, the unemployed and especially people in remote rural areas throughout the world. As financial institutions compete with each other for market share, they close bank branches in remote areas due to the viability and cost associated with sustaining the branches. As a result people in these remote, often difficult to reach rural areas become excluded from participating in the financial sector.

In South Africa and throughout the world, millions of people face barriers to accessing financial services due to geographical locations and the cost associated with it. As a result, these individuals cannot transfer funds securely, nor can they save money and access credit. Mobile technologies, in the form of mobile banking, however, have radically revolutionised the financial services landscape by creating access to financial services and enhancing communication for people in both the developed and developing world.

According to a 2014 Global System for Mobile Communications Association (GSMA, 2014) report, 2.5 billion people in developing countries are 'un-banked' with a reliance on cash or informal financial services that are generally unsafe, inconvenient to access and expensive to use. Traditional 'brick and mortar' banking infrastructure is not compelling for low-income customers, especially those located in far to reach rural areas. The report did reveal though, that over one billion people have access to a mobile phone, which can provide the basis for extending the reach of financial services such as payments, transfers, insurance, savings, and credit (GSMA, 2014).

Mobile banking has emerged as a technology that has extended the reach of formal financial services to people across all socio-economic groups and geographical boundaries (Amin, Baba & Muhammad, 2007:2). It has made it possible for people to access banking services at any place and at any time. The technology environment and mobile banking offer possibilities for increased control of personal financial activities and have important consequences for people in rural areas who may be far removed from access to infrastructure and services that are generally available to people in urban areas.

Therefore, mobile banking has the potential to be a powerful tool to increase access to financial services and to bring the un-banked populations of the world into the formal financial sector. In many countries, mobile phones are being used to access low-cost financial services through payments, transfers, insurance, credit and savings and in many emerging economies, mobile banking is enabling a wide range of digital payments (GSMA, 2016). In much of the developing world, the scarcity of financial services in rural areas gives mobile banking the potential to become the primary distribution channel, which could impact economic development and increase financial inclusion (Mutsune, 2015:35).

Despite the availability of mobile banking, the technology is at an early stage of adoption in many parts of the world, and although the penetration rates of mobile phones are high, there is substantial evidence in research to show that those that need financial services the most do not adopt mobile banking. This study, therefore, attempts to understand the factors that affect the adoption of mobile banking among rural South Africans.

This Chapter provides an introduction and outline of the study as it relates to the concept of mobile banking and the factors that affect its adoption among people in rural South Africa. It discusses the research problem; provides a background to the study; and states the objectives of the study and hypotheses. The research design and methodological approach will also be addressed, together with some limitations of the study and its contribution. An outline of the thesis will also be provided.

1.2 Background of study

The introduction of mobile phones and more so mobile banking has had a considerable impact on the lives of many people in developed and developing countries, particularly regarding the way they conduct their economic activities. In developing economies, the expansion and diffusion of this innovation has generated substantial research about and hope for the potential of these technologies, not only as communication channels, but also for financial inclusion (Mishra & Singh, 2013:507).

Throughout the world, through developments in technology, attempts are being made to lift the poor out of poverty. Technology has changed how people communicate and it has transformed the financial services landscape by creating financial inclusion. As such, it has provided an impetus for more people to enter the banking system by offering the prospect of access to banking services at low cost. Mobile banking uses mobile phones or a different mobile device for the purpose of carrying out financial transactions (Donner, 2007b in Mariscal, 2009:9). In this study, the term mobile banking is used to denote the channel through which an individual accesses financial services by using a mobile phone without having to rely on a bank branch (Mariscal, 2009:10).

Mobile phones have enabled isolated communities in remote rural areas to have access to communication flows and access to financial and health services contributing to change in peoples' lives (Sife, Kiondo & Lyimo-Macha, 2010:1). The advancement brought about by mobile technologies has seen rural communities' throughout the world embracing wireless connectivity technology ((Puschel, Mazzon, & Hernandez, 2010:391).

The mobile banking service is an important tool to enable access to financial services, as it reaches a country's rural population fast, by providing financial services to the un-banked rural poor. The benefits of financial services are heightened in rural areas where no bank branches exist and where potentially cheap means of communicating and transacting in business are offered (Oluwatayo,

2013:67). Mobile banking has the potential to offer financial access to millions of people throughout the world who remain excluded from the mainstream financial services sector, by mere access to a cellphone. It can make basic financial services more accessible by minimising time and distance to the nearest bank branch as well as reducing the bank‘s own overheads and transaction-related costs (Ismail & Masinge, 2011:5).

Many developing countries of the world are at the forefront of progressive and innovative financial inclusion (Godhino & Singh, 2013:1). Although the uptake of mobile technology is high, even amongst people in rural areas, this does not translate into an increase in the use of mobile banking among users. Also, while technologies have the potential to reach the financially excluded and those located in remote areas, these innovations are often hampered by the lack of adoption of innovation together with infrastructure and implementation constraints (Unnikrishnan & Jagannathan, 2015:145).

For example, South Africa (SA) has seen a substantial increase in the usage of mobile phones with 33 million adults using mobile phones in 2014 up from 12 million in 2004. However, a FinScope study in 2014 showed that only 24% of the adult population uses mobile banking. Over one third of adults in South Africa find technology complicated to use for financial activities (FinScope South Africa, 2014).

In SA for example financial inclusion is at 77%, and 5.3 million people are financially excluded. The excluded are difficult to access as 48% live in rural areas. However, the majority of those in rural areas have access to a cellphone (FinScope SA, 2016). The question remains: How can these 5.3 million people, who are financially excluded, be brought into the financially included realm, especially those living in rural areas? Research done by FinMark Trust through its FinScope survey has shown that the 77% financially included are mainly located in urban areas where the saturation point has been reached with regard to the provision of financial services and products (FinScope SA, 2014). Most importantly, it makes development sense to bring the rural into the financially included realm in order to reduce poverty.

Historically, societies have endured inequalities among people, and rural people have often been left out of development agendas and major decision-making processes that affect them. The rural population in South Africa is no exception and do not enjoy the benefits of their urban counterparts. However, with the introduction of mobile banking, this urban-rural divide can potentially be closed, as it provides the opportunity for people in rural areas to benefit from access to financial services; to render their lives easy; and to contribute to their economic development (Mpofu & Warikandwa, 2013:13).

Although substantial empirical studies exist that have shown the high levels of adoption of mobile phones, not many studies examine the extent of mobile banking amongst the rural poor, nor do they offer information on the factors that affect the adoption of mobile banking in this segment of the market in South Africa. This is further supported by a recent study by Assensoh-Kodua, Migiro and Mutambara (2016:35), whereby the authors found that research on mobile banking in South Africa has not focused on issues of great concern, but instead were based on academic models and practitioner involvement. They found that research has not involved the understanding and assessing of mobile banking needs and that the impact of mobile banking has therefore been neglected.

Although there has been a surge in mobile phone penetration and adoption of mobile banking globally and in South Africa, it still remains unclear as to what factors affect the adoption of mobile banking services in rural areas in South Africa. Some of the studies done in South Africa were urban-based and were conducted by researchers and scholars such as: Brown *et al*. (2003:381-394), Brown and Molla (2005:20-29), Borg and Persson (2010), Masinge (2010), Bankole and Cloete (2011), Shambare (2013), Ismail and Masinge (2011), Maduku and Mpinganjira (2012) and Wentzel, Diatha and Yadavalli (2013).

Therefore, there is a need in South Africa to understand mobile banking adoption of the rural populations and to examine the factors that are perceived to affect its adoption. This study employs the concepts that were identified from a theoretical framework in general, and more specifically from the Diffusion of Innovation (DOI)

theory and the Technology Acceptance Model (TAM), in order to examine and validate the factors that are perceived to affect the adoption of mobile banking among rural South Africans. It is expected that the findings from this study will enhance the existing body of knowledge in the field of communication and technology adoption, particularly that of mobile banking. Also, it is possible that the findings would be relevant to banking and research institutions.

1.2.1 Context of the study

In South Africa, ambiguities about what constitutes a rural area and the definitions thereof still remain. A related problem is that the rural/non-urban areas are not necessarily homogenous and include geographical areas and populations that are different from one another. Commercial and subsistence farmers, small towns and villages often have different and even contradictory functions and developmental needs, yet they fall under the category of rural. These stark differences have been compounded by the policies of racial segregation of the past which were further reinforced by the creation of independent self-governing homelands which reinforced divisions and blurred others (South Africa, 2000).

According to the Rural Development Framework (RDF), 'rural' is considered areas that are sparsely populated in which people farm or depend on natural resources. These rural areas include villages and small towns that are scattered across these areas (South Africa, 1997).

According to the StatsSA (2011) Census Metadata survey, the definition of rural in the South African context is considered to include areas that are not classified as urban, which may include tribal areas, commercial farms and informal settlements (StatsSA, 2012).

Throughout the world, rural areas are characterised by sparsely spatially dispersed populations with the economic sector mostly dominated by agriculture and where the opportunities for the mobilisation of resources are limited. People living in rural areas face major development challenges, as the spatial distribution and location of rural populations often increases the cost and difficulty of providing goods and services

effectively. As a result, the prevailing economic conditions facing rural people result in fewer opportunities than in non-rural areas (South Africa, 2000).

Rural areas in South Africa display similar characteristics to rural conditions around the world, such as high levels of poverty, economies that are not vibrant, sparse populations, and increased cost of services and goods, amongst others (Mpofu & Warikandwa, 2013:15).

According to SatsSA (2014), 48% of South African citizens reside in rural areas. Of these, some 85% live in the former homelands, and the rest on commercial farms and in small towns. The rural population is not equally distributed over the provinces. Limpopo and KwaZulu-Natal provinces have the highest proportion of rural dwellers (StatsSA, 2014).

Therefore, based on the characteristics of rural areas, mobile banking seems to offer an attractive solution to the challenges facing the rural poor. This can be attributed to its accessibility; easy communication and information channels; and access to financial services, which is a critical element of development (Mpofu & Warikandwa, 2013:15).

The Free State province

The fieldwork for this study was carried out in the Free State province in the areas of Dealesville, Edenburg, Soutpan and Boshof.

The Free State province is centrally located within South Africa with a population of 2.8 million people (StatsSA, 2013). The recent FinScope South Africa (2017) study reveals that 1.6 million (85%) of the rural people in the Free State province own and use a mobile phone. Of those who own a mobile phone, 338 000 (9%) use mobile banking.

According to the provincial government, the province is sparsely populated at 22 people per km^2 and approximately 29 percent of individuals in the Free State live in rural farming areas in the province. The Free State embodies a rural province, best known for its agricultural and mining sector. The 2013 Provincial Economic Outlook

Review (PERO, 2013) indicated that the province is economically diversified, compared to other provinces in the country, thus making it safe from internal and external shocks (Free State, 2013).

The economy has transformed to rely on tertiary industries as the main contributors towards the provinces' gross domestic product (StatsSA, 2014). Unemployment is one of the biggest challenges facing the province at 24.5 percent (5.1 million people unemployed) (StatsSA, 2014). The high rate of unemployment in the province is partly due to effects of the 2009 recession which resulted in low economic growth rates and poor job creation.

1.2.2 Banking in South Africa

An African Bank survey conducted in 2016 by Pricewaterhouse Coopers (PWC), deduced that South Africa faces a dilemma in the manner it will service un-banked customers in the future (PWC, 2016). Since 31% of the population has no bank account, the future of traditional branches against that of the disruption of technology in the banking sector is topical in many developing countries (PWC, 2016).

Bank branches were traditionally the preferred medium to reach un-banked areas in order to increase access to financial services (albeit it's limited presence) before the adoption of mobile telecommunications. The advent of mobile phones has made access to people in remote areas easier and as such, the number of mobile users in developing economies is increasing with the development of mobile banking in these regions (PWC, 2016).

In this context, Chigada and Hirschfelder (2017:2) indicate that mobile banking offers a new era for financial services, particularly in South Africa, with the high level of mobile phone ownership (89%). In 2014, the mobile phone diffusion rate of 89% in South Africa, was considered the highest in Africa (Poushter & Oates, 2015 in Chigada & Hirschfelder, 2017:5). Further to this, StatsSA (2014) shows that in South Africa, 16.4% of people in metropolitan areas, 9.2% in urban areas and 2% in rural

areas have internet access at home. The progress in mobile technology has contributed to 30.8% of all households in South Africa and 17.9% accessing the internet via mobile devices (StatsSA, 2014).

Mobile banking in South Africa serves as an important interface between banks and the lower-income population. Mobile banking offers the option of transfer, saving and investment opportunities; and providing functions such as integrating into a bank system, simplifying banking, enhancing access to finance and having control of finances (Chigada & Hirschfelder, 2017:5). Therefore, the PWC 2016 report shows that the rise in mobile communication has already had a significant impact on the role of commercial bank branches, resulting in a low number of branches, compared to developed economies. There is also a strong demand for the reduction of traditional branches, as banking activities transform and become clearer (PWC, 2016).

1.3 Research problem

South Africa has seen an increase in mobile phone use from 12 million in 2004 to 33 million in 2014. Of these, only 24% of the adult population use cellphone banking. Furthermore, in 2014, 5.3 million people in South Africa were financially excluded, with 48% of the excluded found to be living in rural areas (FinScope SA, 2014). While a large number of low income people have access to mobile phones, these groups are excluded from the financial market. Mobile technology is capable of transforming the lives of the poor, especially rural poor, beyond merely communication and information, since it can also provide access to banking in a convenient manner and therefore increase financial inclusion.

Considering that a large percentage of people in South Africa reside in rural areas and have access to mobile phones, this does not necessarily translate into effective adoption of mobile banking. Research does indicate that those who do in fact have mobile phones in rural areas do not use their phones for banking purposes. In South Africa, FinScope (2014, 2015 and 2016) studies have shown that some of the reasons relating to the poor uptake of mobile banking are a lack of understanding, trust, cost and awareness.

While many studies exist on the use of mobile technology to access financial services, not much is done on understanding the factors affecting the adoption of mobile banking among rural people in South Africa. Therefore, there was a need to understand which factors affect the adoption of mobile banking among rural South Africans and what the perceptions of the latter are of mobile banking. Having an understanding of the factors that affect the rural individual adopting mobile banking will bring to the fore a neglected area of study, and will address a gap in the literature on the mobile banking practices of rural people in South Africa.

1.4 Research objectives and hypotheses

The primary and secondary objectives of the study are outlined below.

1.4.1 Primary research objective

To examine the factors perceived to affect the adoption of mobile banking among rural South Africans.

1.4.2 Secondary research objectives

1. To determine whether mobile banking offers advantages to rural South Africans.

2. To determine whether rural South Africans find mobile banking complicated to use.

3. To determine whether rural South Africans are aware of mobile banking services.

4. To determine whether rural South Africans are prepared to try out mobile banking in order to make a decision to use it.

5. To determine whether rural South Africans find mobile banking useful.

6. To determine whether rural South Africans trust mobile banking.

7. To determine whether rural South Africans find mobile banking affordable to use.

8. To determine whether demographic variables such as age, gender, employment status and educational level of rural South Africans affect the adoption of mobile banking.

The section below provides an outline of the alternative hypotheses which were formulated from the objectives outlined above.

1.5 Hypotheses

For the purpose of this study, based on the literature reviewed and the theories considered, the following hypotheses have been stated:

H1. There is a relationship between the perceived advantages of mobile banking and its perceived usefulness.

H2. There is a relationship between the perceived advantages of mobile banking and its perceived trust.

H3. There is a relationship between the perceived advantages of mobile banking and its perceived cost.

H4. There is a relationship between the perceived advantages of mobile banking and its perceived complexity.

H5. There is a relationship between the perceived advantages of mobile banking and its perceived awareness.

H6. There is a relationship between the perceived complexity of mobile banking and its perceived usefulness.

H7. There is a relationship between the perceived complexity of mobile banking and its perceived trust.

H8. There is a relationship between the perceived complexity of mobile banking and its perceived cost.

H9. There is a relationship between the perceived complexity of mobile banking and its perceived awareness.

H10. There is a relationship between the perceived awareness of mobile banking and its perceived usefulness.

H11. There is a relationship between the perceived awareness of mobile banking and its perceived trust.

H12. There is a relationship between the perceived awareness of mobile banking and its perceived cost.

H13. There is a relationship between the perceived trust of mobile banking and the perceived cost.

H14. There is a relationship between the perceived trust of mobile banking and the perceived usefulness.

H15. There is a relationship between the perceived cost of mobile banking and the perceived usefulness.

H16. There is a relationship between the trialability of mobile banking and its perceived usefulness.

H17. There is a relationship between the trialability of mobile banking and its perceived trust.

H18. There is a relationship between the trialability of mobile banking and its perceived cost.

H19. Females and males differ with regard to the adoption of mobile banking.

H20. People in different age groups differ with regard to the adoption of mobile banking.

H21. People with different education levels differ with regard to their perception of mobile banking.

H22. People with different employment statuses differ with regard to the adoption of mobile banking.

H23. People with different marital statuses differ with regard to the adoption of mobile banking.

The research methodology that is employed in this study and the research design are presented in the next section.

1.6 Methodology

This section provides an outline of the study methodology and research design that were used to meet the objectives of the study. A detailed discussion is provided in Chapter Five of this study whereby each step in the research process is addressed.

This study adopted a quantitative approach, whereby a structured questionnaire was developed and used in a survey format in order to gather the data which were analysed numerically and statistically, and represented using tables and graphs. In quantitative research, variables are measured on a sample of subjects and the relationships between the variables are expressed by using effective statistics such as correlations, relative frequencies, or differences between means. The focus of a

quantitative approach is to a large extent on using data to test theory. In most cases, quantitative research is measured using closed questions in the form of questionnaires through surveys in order to gather data that are eventually analysed statistically (Saunders, Lewis & Thornhill, 2012:162-163).

Research design is a guideline that the researcher uses to approach the study and it illustrates how the different parts of the research work together in order to address the research aims and objectives. The approach taken in this research was deductive as it used established theories on the adoption of mobile technology. The constructs that underpin the study were determined from the theories that were examined and the literature reviewed. The study further examined the relationships between the variables to establish which factors are perceived to affect the adoption of mobile banking among rural South Africans.

Saunders, Lewis and Thornhill (2012:190) suggest that a research study can be conducted over a short period of time with no re-testing, which is referred to as cross-sectional. This study was cross-sectional in nature in that it was carried out over a short period of time, which was suitable to the study and which was cost-effective.

The random sampling technique was adopted in this study, by using a stratified sampling process. The stratified sampling technique ensured that the respondents met the requirements of being aged 18 years and older from previously disadvantaged backgrounds; have access to a cellphone; are based in a rural area (small-scale farm or former home-land); are financially included (have access to financial services like a bank account) or are financially excluded (do not have access to a bank account or make use of any financial products or services). The sample comprised an equal proportion of males and females; 211 respondents are from areas that are located in small rural farming towns in the Free State province. The respondents were selected from Dealesville, Soutpan, Edenburg and Boshof from which a minimum of 50 respondents were selected per area.

Primary data were obtained through the quantitative method using a survey which was guided by structured questionnaires. Existing literature relating to the concept of

mobile banking was reviewed. Several theories were also examined together with the literature to support the theories. Several secondary sources were examined such books, journals articles, and research papers that informed the objectives and hypotheses formulation and also determined the constructs of the study.

The questionnaire was developed in line with the objectives of the study, with guidance from the literature reviewed and theories examined, and by also considering the constructs and concepts identified in the literature. Saunders *et al.* (2012:429) consider validity and reliability as two important aspects of data collection. Validity concerns the degree to which a question measures what it intended to measure. In order to ensure the validity of the questionnaire in this study, the researcher pre-tested the questionnaire on five individuals on separate occasions. After the pre-test, the researcher addressed certain issues pertaining to the questioning technique and took cognizance of this during the actual final survey process. Reliability of the questionnaire on the other hand, depends on the extent to which the response to the same questions, when asked at different times, is consistent. This is analysed by statistical means.

1.7 Thesis outline

The study proceeds by outlining a broad international view that leads to the focus of the research. The problem identification follows a conceptual framework with support from theory and literature. The overall outline as well as structure of this thesis is discussed in this section. The thesis comprises seven chapters and each chapter is introduced as follows.

Chapter One provides an outline of the relevance of the topic/study and reasons for researching the specific topic. It includes the practical and theoretical value of the topic together with the motives for selection of such a topic/study. The research problem is expanded on together with an overview of the research objectives, research methodology and limitations of the study. The structure of the thesis is highlighted through a synopsis of each chapter in relation to the rest of the study.

In Chapter Two, an overview and perspective of mobile technology and mobile banking is provided with an exploration of mobile banking and its use globally, regionally and in South Africa. A brief understanding of mobile banking usage in rural areas in general and in rural South Africa in particular is provided. The benefits of mobile banking in general as it relates to access to finance or financial inclusion is also explored. In examining international experiences of mobile banking usage, some country examples of this is included in order to provide perspective in relation to this study and to illustrate the experiences of these countries.

Chapter Three provides the theoretical review that underpins the study. It also includes details on the key concepts and constructs in the study and elaborates on relevant theories used in the literature. The Chapter also examines literature related to the study through examining journals, newspaper articles, books, discussion papers; other existing research already completed, such as written papers, online articles, amongst others. The literature examined here mainly focuses on the factors that affect the adoption of mobile banking by using the Diffusion of Innovation Theory (DOI) and the Technology Acceptance Model (TAM).

Chapter Four includes an overview of the methodology that is adopted in the study and rationale behind the usage. This study employs the quantitative approach through a survey in order to obtain the data required for the analysis in the study. It outlines the research design and methodology adopted in the study, explains the data collection process and tools/instruments, and analytical techniques.

In Chapter Five, the results of the research are presented using graphs, tables and bar charts. The frequency and descriptive statistics are presented first, followed by the reliability tests and the factor analysis. The inferential analysis then follows together with the confirmatory factor analysis and the Structural Equation Model.

Chapter Six presents the discussion of the study and the main findings which are summarised according to the objectives of the study. This Chapter also illustrates the

rationale behind the correlations and relationships between the variables in relation to the theories and literature.

Chapter Seven provides the conclusion to the study. It offers recommendations and explains the limitations of the study, proposes future research areas and industry and management considerations.

The Reference section provides a list of all referenced papers, journals, books, articles, dissertations and other publications used during the compilation of the study and their sources.

1.8 Conclusion

This Chapter provided the outline to the study by briefly illustrating the background of the study, the research problem and the objectives that were addressed. The context of the study was given and the relevant theories that underpin the study were outlined together with the determined constructs implemented in the research. The research design and method employed in the study is also included together with the thesis framework. The next chapter includes an overview of the concept of mobile banking and provides supporting literature on mobile banking benefits for the poor, its context globally and its relevance in South Africa.

CHAPTER TWO
OVERVIEW OF MOBILE BANKING

2.1 Introduction

This Chapter offers an overview of the concept of mobile banking by including a discussion on mobile banking as a technology and how it has changed the landscape of the world of business and industry and that of ordinary citizens. This is thereafter extended to a discussion on the role of mobile phones in mobile banking which provides the reader with a general background of mobile phones in the world of banking and the role it has played in the lives of people. Mobile banking is further discussed in country contexts, using a few examples of countries in the developed and developing world.

This general overview is intended to draw attention to the transformational role of mobile banking and its significant impact as a technological innovation. The South African context is also referred to in a following section, so as to illustrate the role of mobile banking in the local context of the study, which is finally followed by a discussion on mobile banking for the un-banked population. Providing a general overview of mobile banking for the un-banked, sets the tone for further discussions to follow that are specific to this study on rural South Africans.

2.2 Mobile banking

Mobile banking technology has been instrumental in presenting opportunities for access to financial services for billions of people throughout the world, particularly rural areas with no bank branches and poor transportation and communication infrastructure (Christen, Rosenberg & Jayadeva, 2004). Mobile phones are no longer used to merely receive and make calls, but they are successfully used to carry out mobile banking services, or popularly known as m-banking. The most fundamental

change in the banking industry has been the movement from traditional brick and mortar branch banking to electronic delivery channels such as cellphones, making the industry digitised and automated (Karjaluoto, Mattila & Pento, 2002:26).

The access and penetration of mobile phones play a major role in economic development and the impact is great where the presence of landlines is low. Mobile phones affect economic growth through its impact on financial inclusion or through creating access to finance by providing mobile financial services to those who do not have access to financial services, especially in remote areas. While mobile phones have been associated with challenges, they are still considered less expensive and accessible as a communication tool for poor rural communities (Andrianaivo & Kpodar, 2011:21).

Many studies have shown that developing countries are behind high-income developed countries in information communication technology (ICT) and applications. This is mostly due to the low literacy levels and numeracy skills and high cost in mobile phone usage. People in rural remote areas are the most affected (Oluwatayo, 2013:66).

However, considering the distribution and market penetration of affordable cellular devices and growing network of service providers coupled with mobile phone connectivity, which for example is reported at just above 40% for sub-Sahara Africa, this forms a platform for mobile banking expansion and resolves any potential barrier to access to a mobile phone device (GSMA, 2017).

The strides and advances in information and communication technology today have made the adoption of mobile banking possible in many countries without the limitations of technology infrastructure. The inherent characteristics of mobile technology with its convenience of anywhere, anytime banking provide an unparalleled solution to problems of access to finance facing many developing emerging economies (World Bank, 2009).

Mobile banking is considered one of the fastest growing technologies to have entered markets and is known to have a minimum annual growth rate of at least 14% worldwide with the same rate of penetration as the introduction of cellphones. According to scholars such as Maduku and Mpinganjira (2012); Püschel, Mazzon and Hernandez (2010) and Bara (2013), the introduction of mobile banking was the result of added initiatives of banks in order to increase customer satisfaction, convenience and access to services. Mobile banking, which has a number of advantages over traditional banking methods, is an enabler of banking services to people worldwide, who have a mobile phone but no bank account. It offers advantages such as immediacy, security and efficiency and is not a geographical constraint (Mas & Kumar, 2008 in Oluwatayo, 2013:66).

Tiwari and Buse (2007:64) refer to mobile banking as the provision of financial services with the help of mobile telecommunication devices and it is a channel used by customers to interact with a bank using a mobile phone. Lee, Lee and Kim (2007:2) view mobile banking/cellphone banking as the ability to deliver financial services by using mobile devices such as a cellular phone and portable data assistant (PDA). Mobile banking enables customers to bank virtually at any convenient time and place (Suoranta, 2003:15).

For Pousttchi and Schurig, (2004:1-2) mobile banking or m-banking is a means of carrying out or executing financial services through the use of mobile communication technology. Luo, Li, Zhang, & Shim (2010:223) and Kim, Shin and Lee (2009:290) consider mobile banking as innovative in accessing banking services whereby the mobile phone or PDA is the means by which a customer interacts with the bank. This in itself gives customers the edge in anywhere, anytime banking. Cruz, Neto, Muñoz-Gallego and Laukkanen (2010:344) consider that through the introduction of mobile banking, the manner in which banking is done has revolutionized, changed and has contributed to an increase in financial inclusion in most developing countries. With mobile banking, banks have the potential to expand their market penetration in previously un-banked or rural areas since the expenses that are related to branch overhead costs are reduced (Lee, Lee & Kim, 2007:2).

Literature on the definition and reference to mobile banking and or the use of mobile phones to access financial services tend to overlap. For this study, the term mobile banking is used, as it is considered a means to bring financial services to the rural un-banked population through the use of mobile phones in an easy and accessible manner.

Cruz *et al.* (2010:344) indicate that mobile banking has the potential to create financial access for people in remote hard to reach areas by providing reliable services where internet access is limited. As a variant of mobile electronic banking, mobile banking offers consumers banking services at anytime and anywhere with benefits like convenience, immediacy, location, customization and functionality (Ha, Canedoli, Baur & Bick, 2012:219).

Mobile banking has attracted much attention as it has been presented as being able to provide affordable financial services to previously excluded populations (Ivatury & Pickens, 2006:2). Substantial research and literature have demonstrated that creating access to financial services for the un-banked can lead to efficient markets, better decision-making and meeting various development goals.

Mobile technology through mobile banking provides financial services to the poor at affordable rates. This is due to the major expenses associated with the initial stage of development of the technology coupled with other fixed costs, with low marginal rates per transaction or per new customer. The low costs therefore provided a stimulus for the development and expansion of mobile money in developing countries which in turn led to an increase in financial inclusion (FinMark Trust, 2015).

According to GSMA (2015), mobile money has extended the reach of financial services in the last decade, more than that of traditional bricks and mortar banking in the last century. To illustrate the magnitude of the impact of mobile money, the GSMA (2015) report showed that, mobile account ownership in Tanzania increased by 33.8 million from 2009 to 2014 compared to the increase in formal account ownership by only 9.9 million in the same period. The GSMA (2015) report indicated that at least 19 countries in the world have more mobile money accounts than bank

accounts, and 37 countries have 10 times more registered agents than bank branches. The results of a Global Findex showed that mobile money account growth is particularly noticeable in sub-Sahara Africa (SSA), which is a major driver of increased financial inclusion in the region (Demirgüç-Kunt & Klapper, 2012:19).

However, according to FinMark Trust, (2015) more than 20 million adults have mobile money accounts in the SADC region and as a result the mobile money penetration rate in SADC is 15 percent, which is higher than the SSA average of 12 percent. Considering that approximately 20 million people own a mobile phone in the region with no access to financial services, it is an indication of the potential role of mobile banking services (FinMark Trust, 2015).

Porteous (2006:15) indicates that there are two aspects of mobile banking which are additive and transformational. He suggests that the mobile phone contains the additive aspect whereby the device is the channel to an existing bank account. As such, it enhances the convenience of existing customers of mainstream financial institutions. Transformational mobile banking services refer to financial products that are linked to the use of the phone and are targeted at low income people.

According to Donner and Tellez (2008:319), transformational mobile banking services act as a tool to bring or create access to financial services to largely un-banked populations of developing countries. The intention is that by having access to financial services, the lives of people will be transformed and for this to take place the un-banked must adopt and use the services that are available to them. Donner (2008:320) and Tobbin (2012:75) found that it is important for policy makers, research and industry to explore the factors that enable and / or hinder the adoption of mobile banking services and to assess the usage and impact of mobile banking as a phenomenon.

Porteous (2006:26) indicates that some mobile banking systems are offered exclusively by banks, while others are offered by telecommunication service providers, and there also exists some that are in partnership between banks and telecommunication providers. Mobile phones have enabled communication between

banks and customers and therefore financial services institutions can combine information services, marketing and not only a message informing customers about bank balances (Riivari, 2005:21).

The expansion of technology-based innovations not only has the potential to achieve the objectives of sustainable development, but at an institutional level technology can effectively enhance businesses and save cost in doing business. Technology can also contribute to better management of businesses. At an individual level; technology can create opportunities and conveniences, particularly for people in remote areas (Unnikrishnan & Jagannathan, 2015:145).

The mobile phone has been one of the major and notable milestones in the technology industry with two thirds of the world's population having a mobile phone connection (GSMA, 2017). There has been substantial growth of mobile phone networks in developing countries over the years, whereby most of these countries have skipped fixed-line infrastructure and moved directly into mobile technology (Orbicom, 2007 in Rashid & Elder, 2009:1).

From 1999 to 2009, mobile phone penetration rose from 12 percent of the global population to nearly 76 percent (ITU, 2011). From virtually no connectivity in the 1990s, over 40% percent of people in sub-Sahara Africa now have a mobile phone connection. In a world where there are more mobile devices than people, mobile technology is having a transformative effect on people's lives. Consumers have become reliant on mobile technology devices, not only for communication, but also for their daily lifestyle requirements which has forced developers to enhance their technology platforms to meet the needs of consumers throughout the world (Rodríguez-Ardura, Ryan & Gretzel, 2012:4-5).

Mobile phones have evolved to become vehicles of economic empowerment for the world's poorest people. They are of value in areas with inadequate infrastructure, in the form of roads and telecommunication services in most developing countries. Mobile phones allow the easy flow of information and they make markets efficient, and have a direct impact on economic growth:

Developing countries have seen substantial growth in mobile phone subscription rates since the beginning of the millennium. The World Development Indicators data show that mobile phone subscriptions grew at an average annual rate of 954 percent in South Asia and 208 percent in sub-Saharan Africa. This is high compared to the annual growth of 46 percent experienced in East Asia and Pacific, 23 percent in Central Europe and 15 percent in Europe and Central Asia, and 12 percent in North America (World Bank, 2012). The rapid growth of mobile phone subscriptions in developing countries is an indication that the developing world is far more mobile compared to the developed world. Also notable is that in some developing countries, more people have access to a mobile phone as opposed to basic needs such as clean water, electricity and bank accounts (FinMark Trust, 2016).

Many countries have increased the production of low cost mobile phones to cater for people with lower incomes and this has also been adopted as a policy to increase mobile phone usage (Rashid & Elder 2009:2). Despite the lack of basic infrastructure such as roads, communication networks and transport, many developing countries have seen a rapid growth of mobile phones. The mobile platform has therefore emerged as the most powerful way to extend economic opportunities and key services to millions of people. Mobile phones are regarded as accessible and less expensive in closing the digital divide as the concerns regarding the ability to use mobile phones are minimized. They are known to be affordable to the low income segments of the population and therefore can be used to ensure greater participation of these groups in the development process (James, 2014:690).

2.3 Mobile banking – a global perspective

A KPMG (2014) report indicated that although the majority of banks offer some form of mobile banking service globally, the rates of adoption and use differ from country-to-country. It suggests that the rates of adoption are generally higher in developing as opposed to developed countries and attempts to explain the differences in the usage rates have been limited.

Several country cases illustrate the potential of mobile technology for financial inclusion and a tool for economic empowerment. To this end, mobile banking services are now available in 90 countries of the world according to a 2017 GSMA report. Mobile money services have spread across much of Africa, Asia, Latin America, Europe and the Middle East. As of December 2017, there were 276 live mobile money services in 90 markets (GSMA, 2017). According to Statista (2015), the number of global mobile phone users reached 4.61 billion, and is expected to reach 4.77 billion (or 65 percent of the global population) in 2017 with over 60 percent of subscribers living in the developing world (Statista, 2015).

Aker and Mbiti (2010:208) indicated that with the access to and use of mobile phones in sub-Sahara Africa (SSA) which has increased radically over the years, mobile phones have brought new possibilities and opportunities to people. Across the urban-rural and rich-poor divides, mobile phones have connected individuals-to-individuals, information, markets, and services. The effects are particularly evident in rural SSA, where in many places mobile phones have represented the first modern telecommunication infrastructure of any kind. Through the introduction of mobile phones, communication costs have been greatly reduced, thus allowing the exchange and sharing of information to be quick and cheap.

This is further supported by the GSMA (2017) report which shows that of all regions, sub-Saharan Africa has the highest level of mobile money penetration. By December 2017, 43% of mobile connections in sub-Saharan Africa were linked with a mobile money account. This indicates that mobile banking has created opportunities for many sub-Sahara Africans and others in developing countries. Furthermore, the rapid growth of mobile banking in SSA also illustrates that there is the need for low-cost financial services in developing countries to benefit other sectors of the economy which eventually lead to economic growth and development.

The poor, vulnerable and low-income households in sub-Sahara African countries often lack access to bank accounts and face high costs for conducting basic financial transactions. With the rapid growth of mobile phone usage, the rate of provision of financial services to the un-banked can also increase. However, policy and regulatory

innovation needs to go hand-in-hand with technological innovation in order to make these services a reality. Outside sub-Saharan Africa, the growth of mobile money accounts is rapid which is largely driven by the development of enabling regulatory environments, new product launches and increased investments by service providers (GSMA, 2016).

However despite this growth, there are many examples of countries that show low adoption rates of mobile banking.

In the Philippines for example, since the liberalisation of the telecommunication industry from 65 years of private monopoly ownership in 1992, a rapid growth in mobile phone usage has been noted and as such the financial system underwent major technological innovations. The changes include a significant increase in the number of alternative formal channels for delivering financial services (ITU, 2016). It launched the first successful mobile payment service as a developing country in 2004 with two mobile payment operators having an estimated 5.5 million customers (Hannig & Jansen, 2010). By the end of 2012, every individual in the Philippines owned a mobile phone regardless of their economic status with 101.9 million subscribers exceeding the total population of the country of 97.1 million.

Due to the lack of fixed telephone lines in under-served and un-served areas, the adoption of mobile devices increased. However, despite the rapid increase in mobile services and popularity, the adoption of mobile banking has been slow. This was further confirmed by Ramanathan, Roland and Romano (2014) in their study on digital banking penetration across 13 Asian markets. Their study showed that the Philippines had the lowest digital banking penetration with only 9 percent of the population using a smartphone to transact in banking services. Also an ITU (2016) report later indicated that although the rate of mobile usage is high, by 2016 the use of mobile banking in the Philippines had not reached a level of growth.

Another example is Kenya, with the e-money transfer service of M-pesa offered by mobile network operator Safaricom. M-pesa achieved the most impressive outreach of mobile payments and growth by 2006 with a subscription base of more than 7

million registered customers, many previously un-banked. Although it had a positive impact on financial inclusion which increased from 8.1 percent in 2006 to 17.9 percent in 2009, the informal financial services decreased from 35 percent to 26.8 percent, respectively. Furthermore, and most importantly, those in the population who were excluded from financial services increased from 32.7 percent to 38.3 percent over the same time frame (Hannig & Jansen, 2010). Again another indication from the Kenya example is that although mobile phone adoption rates are high, the use of mobile banking is still low and in some instances the excluded tend to get further from the system.

Zimbabwe has also embraced mobile banking in recent years and although the benefits of mobile banking services are widely known, the extent of the adoption of mobile banking is not high in Zimbabwe. Generally the success of mobile banking adoption is based on the acceptance of the technology by the consumer. Although several studies exist that examine the factors that affect the adoption of mobile banking, the results are limited and there is no one-size-fits-all outcome from the results of the studies due the different contexts (Makanyeza, 2017:1011)

According to Mago and Chitokwindo (2014:223), the Reserve Bank of Zimbabwe has led and urged financial institutions to implement strategies to promote financial inclusion. This followed the 2006 Monetary Policy Statement which acknowledged that the majority of Zimbabweans have no access to financial services. The 2006 Monetory Policy Statement of Zimbabwe was further confirmed in a FinScope consumer study that was conducted by FinMark Trust in 2012, which showed that 65% of the Zimbabwean population live in rural areas with only 5% of the rural population having access to a bank within a 30 minute reach (FinScope Zimbabwe, 2012). The study also showed that 85% of the Zimbabwean population own or have access to a cellphone demonstrating the potential for mobile banking (FinScope Zimbabwe, 2012).

To this end, a framework for financial inclusion was put in place by the Reserve Bank of Zimbabwe, the banking industry and other stakeholders. This was done to encourage banks to be more accessible to the un-banked poor by opening branches

in rural areas. Banks were also encouraged to harness technology and in so doing, develop accessible and affordable products for the majority (Mago & Chitokwindo, 2014:223). This initiative has led to innovation on the part of some banks that have created products and services aimed at providing an opportunity for the un-banked sector to participate in the access created by the financial services sector (Mago & Chitokwindo, 2014:223).

In Pakistan, by September 2012, statistics published by the Pakistan Telecommunication Authority reported high numbers of mobile phone subscribers. Also, only a small percentage of the population were known to have access to formal banks (Mahmood, 2011), making the potential of providing mobile banking to the large under-banked/un-banked population high. Therefore, mobile banking service providers have invested in infrastructure for the effective distribution of mobile banking services to the low-income populations (Kazi & Mannan, 2013:54).

These examples illustrate the potential of mobile banking through technological innovative means for the un-banked.

Emerging economies like that of Brazil, Russia, India, China, and South Africa collectively called BRICS are often regarded as economic powerhouses that constitute almost half of the world's population and one-fifth of the global economic output. At the sixth BRICS Summit held at Brazil in July 2014, discussions were held on inclusive growth and macroeconomic policies adopted by governments of BRICS countries (Unnikrishnan & Jagannathan, 2015:146). However despite the global economic output of BRICS, financial inclusion remains a major challenge hindering economic growth in these countries. The World Bank (2014) indicated that 44% of households in Brazil, 52% in the Russian federation, 65% in India, 36% in China and 46% of South African households do not enjoy access to formal banking services (The World Bank, 2014 in Unnikrishnan & Jagannathan, 2015:146).

According to the National Telecommunication Agency (ANATEL) (2009) of Brazil in Cruz *et al*. (2010:344), in 2008 the Brazilian market had 154 million mobile phone

users, translating into a penetration rate of approximately 80 percent. The vast majority of the population use old Global System for Mobile communications (GSM) technology-based mobile phones, with only a few 3G service users which was introduced in 2007 (Schnoor & Monte, 2008 in Cruz *et al.,* 2010:344). Therefore the lack of growth in the mobile banking market is due to low investment by firms. An article written by Diniz, Cernev, Gonzalez and Albuquerque (2014:2) indicated that in Brazil there are over 265 million cellphone lines in a country comprising 195 million inhabitants. However, what is apparent is that the majority of those who own mobile phones are excluded from the formal financial system. Mobile payment (MP) in Brazil is still in its infancy and is not widely available. This also raises questions as to why mobile phones and mobile banking is still not being used as a platform for financial inclusion in Brazil and what are the requirements for ensuring and enabling the expansion of this technology?

With reference to Russia, the 2014 World Bank Global Findex report showed that in 2011, 48% of the Russian adult population had an account at a formal financial institution, rising to 67 percent in 2014. While the figure as of 2011 is nearly double that of sub-Saharan Africa in the same period (34% are currently banked), it is still low compared to Western Europe and North America (World Bank, 2014). According to McDonald (2014), the number of mobile phone users in Russia is expected to reach just over 122 million by 2017 with internet usage to grow from 43% to 62% for the same period. This indicates the potential and opportunities for digital financial services to the un-banked in Russia, and with the continued growth in mobile technology usage, the rate of financial inclusion is also expected to grow (McDonald, 2014).

However, considerable progress has been noted since the Consultative Group to Assist the Poor (CGAP) carried out research in 2008 on the state of financial inclusion innovations in Russia. Russia has surpassed some developed countries with regard to the number of banks per 100 000 individuals. A significant milestone was that since September 2013 the Central Bank of the Russian Federation (CBR) began regulating the financial industry including financial markets, commercial banks, insurance companies, and microfinance institutions (Jiang, 2015).

In June 2011, the Russian government prioritized the issue of financial inclusion and approved an action plan which was proposed by the Russian Ministry of Economic Development (MED) to advance the agenda of financial inclusion. In addition, the Central Bank of the Russian Federation (CBR), and Alliance for Financial Inclusion (AFI), hosted a workshop in Moscow in October 2014 on advancing financial inclusion through digital financial services (Jiang, 2015). As such, the potential for digital finance in Russia was heightened, given the trends in mobile phone usage. Although Russia has a cash-dominated society, the digital finance service industry has made considerable progress in recent years (Jiang, 2015).

Further afield, the analysis of a FinScope survey conducted in Malawi in 2014 indicated that mobile money has a strong potential to become an enabler for financial inclusion. However, the lack of information (unawareness) of the mobile money facility poses a challenge and therefore the uptake of mobile banking is low. The survey indicated that eight in ten (80%) adult Malawians are unaware of mobile money. Out of 20% (1.5 million) who are aware of mobile money, only 22% (325 000) use it. The majority (43%) of those who are aware of mobile money do not have enough information to be able to use it. Malawi's enabling regulatory environment and cellphone access rate of 72% (adult individuals) presents a huge opportunity to empower large segments of its cash-based society. Consumers use mobile money where there is a clear, simple value proposition and the differences in the rate of adoption of mobile money services across markets are dependent on what the user regards as being of value to their needs (FinScope Malawi, 2014).

A FinScope (2014) study in Mauritius showed that although about 84% adult Mauritians surveyed use mobile phones, only 2% are registered users of mobile money. This indicates that mobile money has a strong potential to become an enabler for financial inclusion in Mauritius (FinScope Mauritius, 2014).

However, throughout the world, the success of mobile banking is found to vary. Although mobile banking has grown significantly in Tanzania and Zimbabwe, its

impact in South Africa is additive rather than transformational (Porteous, 2006:49-50).

2.4 Mobile banking in South Africa

In South Africa, there has been a substantial increase in the use of cellphones since 2004, with 33 million adults using cellphones in 2014 up from 12 million in 2004. However, despite the increase in use of cellphones at 90% in 2014, only 24% of the adult population use mobile banking which only increased from 8.3 million in 2012 to 8.6 million in 2014. Over one third of adults in South Africa find technology complicated to use for financial activities according to the FinScope South Africa Consumer survey 2014 (FinScope South Africa, 2014).

All the major banks offer mobile banking services in South Africa, as an additional access channel to existing bank accounts (Bara, 2015). Although mobile money services are positive signs for financial inclusion, South African banks are yet to capitalise on the mobile market's opportunities. The mobile money market in Africa was dominated by telecommunication companies such as Vodacom (M-pesa) and MTN (Mobile Money) (Iweala, 2015). However, Vodacom, a telecommunication mobile money service provider in South Africa, terminated its M-pesa offering as it was not commercially viable (Reuters, 2016). This was followed by MTN which also stopped new mobile money sign-ups (fin24, 2016 in FinMark Trust, 2016).

According to Meyer (2015), South Africa has a huge un-banked population, estimated to be 67%. This unbanked population gets discouraged by the banking system due to high banking fees, the requirements of the Financial Intelligence Centre Act (FICA) and a general lack of trust of banks. At the same time, South Africa has one of the highest mobile penetrations in the world, with 87% individual mobile phone ownership and 36% of those being smartphone owners according to the Mobile in South Africa 2014 AMPS Report (Meyer, 2015). This therefore indicates that regulators will be forced to adapt to enable smaller businesses to adjust to mobile money and to allow companies to launch their mobile money products thus contributing to South Africa's economic growth (Meyer, 2015).

Meyer (2015) indicates that in South Africa, the slow growth of mobile money is attributed to the limitations that regulating bodies put in place. Coupled with this is the strong hold that the top five banks have over the payment industry in South Africa. As a result, it is difficult for any company to obtain a banking license and banking partner, without which the start of a mobile banking entity would be considered illegal. This therefore limits the industry's growth (Meyer, 2015). Robb (2015) also agrees that despite South Africa's sophisticated banking infrastructure, mobile money could be less successful in South Africa compared with other African countries due to the country's rigid regulatory framework (Robb, 2015).

In a study done on South Africa by Ivatury and Pickens (2006:6) it was found that the poor were not using mobile money due to the cost, lack of awareness and complexities of the technology and a belief that the service was not appropriate for them. The study found that users tend to be wealthier than non-users, and employed, disproportionately male, and better educated.

2.5 Mobile banking for the un-banked

Mobile banking services are important tools for a country's financial inclusion policy, as it has the ability to reach a country's rural poor faster than any other mode of transfer of funds. Mobile banking is able to distribute financial services to the un-banked rural poor who generally do not have the infrastructure of transport and communication to access traditional banks. Although the adoption of mobile banking is slow in many countries as indicated in the preceding discussion, the potential for mobile banking to reach and transform communities is nonetheless present.

Financial inclusion denotes the delivery of financial services at an affordable cost to disadvantaged and low-income people (Rani, 2010). It is an important tool for eradicating poverty and narrowing the income and inequality gap. Furthermore, it plays an instrumental role in inclusive development and serves as a building block for poverty reduction strategy (Chibba, 2009 in FinMark Trust, 2016). Principles of financial inclusion include: access, affordability, appropriateness, usage, quality,

consumer financial education, innovation and diversification, and simplicity (Jordan, 2016).

Financial exclusion on the other hand, is widespread in developing countries, and although the ownership of bank accounts is widespread in high income OECD countries, only 54 percent of adults in developing countries have a bank account (Demirgüç-Kunt & Klapper, 2012:20). The significant disproportion in financial inclusion between the developed and developing world is attributed to the inability of financial service providers to expand outreach to the poor at affordable rates due to the high cost related to the operation of 'brick and mortar' traditional bank branches.

It is estimated that globally, at least 2.5 billion working-age adults have no access to formal financial services that are delivered by financial institutions that are regulated. Banking services are in the interest of the broader population and therefore ensuring the availability of banking and payment services to the entire population without discrimination is considered an important objective of financial inclusion public policy. Poverty and exclusion are related where one causes the other and vice-versa. Financial exclusion exacerbates the levels of poverty making the cost of living more expensive, unstable, and stressful. It also acts as a barrier to personal development and economic progress (Comviva, 2015).

Geach (2007:24) found that large numbers of rural households continue to be excluded from formal banking services and not everyone is included in the use of electronic communication throughout the world. People are unable to gain access to digital technology and those people are mostly located in rural areas. In Africa with the vast disparities between urban and rural, mobile banking makes financial activities and banking services convenient as they can be conducted from any place at any time.

Ismail and Masinge (2011:6) have also indicated that for the millions of people in the developing world who are excluded from banking services and are located in rural remote areas; mobile banking creates access to banking transactions and enables the participation of people in financial services.

Mobile-banking offers people the opportunity to reduce financial exclusion by offering services to low income groups that have access to mobile phones but not to financial services (Mariscal, 2009:8). New business models that offer m-banking have flourished in several developing countries and regulatory policies need to promote an enabling environment for these strategies to prosper (Mariscal, 2009:12).

Considering that the access and cost of mainstream financial services act as barriers to financial inclusion for many in the developing world (Mariscal, 2009:12), mobile technologies have made it possible for rural-based communities to embrace wireless technology (Puschel, *et al.*, 2010:390).

Since traditional banks have not been able to service large portions of poor people, especially those located in remote areas and given the high expenses of maintaining bank branches (Donner, 2008:321), mobile banking enables the flow of money among rural and poor segments of the population at lower transaction costs (Jenkins & Ishikawa, 2010). Donner (2008:321) found that for the poor, the importance of mobile banking is less about convenience and more about accessibility and affordability. Mobile banking is able to integrate the excluded population as formal players into the market (Ernesto, Roux & Mariscal, 2010:42).

Although the uptake of mobile technology is high even amongst people in rural areas, this does not translate into an increase in financial inclusion among users. For example, the rural areas of Zimbabwe are no exception to this phenomenon, and therefore have low access to basic financial services (Chitungo & Munongo, 2013:54).

Although South Africa has seen a substantial increase in the use of cellphones with 33 million adults using cellphones in 2014 up from 12 million in 2004, only 24% of the adult population use mobile banking. Over one third of adults in South Africa find technology complicated to use for financial activities according to the FinScope South Africa Consumer survey 2014, (FinScope South Africa, 2014). In this instance complexity as an attribute in the use of mobile technology is a significant factor that

influences the adoption of the technology. The same trend has also been observed in Mauritius and Mozambique whereby although the ownership of cellphones is high, the usage of mobile banking is low resulting in low financial inclusion amongst those in possession of cellphones (FinScope Mauritius 2014 & FinScope Mozambique 2014).

In Australia, remote indigenous communities are the most financially and digitally excluded groups. In these communities, the use of mobile phones, money management and banking is fragmented. The communities' cultural preference for face-to-face banking means that many people pay higher fees. Although the ownership and use of mobile phones (half of which are smart phones) is high, mobile banking adoption rates are not high (Godhino & Singh 2013:3).

In 2012, Tanzania's population was known to be about 45 million people (PHC, 2012) with most (71%) of the population residing in rural areas. Financial inclusion improved from 26.8 percent in 2009 to 55.3 percent in 2013 (FinScope, 2013). According to a Communication Statistics Report, (2015), by 2014 Tanzania had seven mobile phone companies with about 40 million subscribers and one in five people in the country using mobile money. There are also more mobile money agents than financial access points by almost 30-1. Despite the high rate of use of mobile phones and the presence of mobile money agent networks, a significant number of people still cannot access banking services, nor do they use mobile banking services.

There has been an increase in studies that document the level of adoption of mobile phones by the poor. However there is little academic research on mobile applications such as m-banking (Ernesto, Roux & Mariscal, 2010:45). Furthermore the analysis of the impact of mobile phones on development is not done extensively (Rashid & Elder, 2009:12). Also not many studies exist that examine the extent of mobile usage amongst the rural poor with the objective of increasing financial inclusion and contributing to poverty reduction.

In India, with the advancement of technology, attempts are made to change the economic status of the poor and move them out of poverty (Rani, 2010). Das' (2010:67-70) study on the scaling up of technology to build inclusive financial systems in India found that technology that is deployed in rural areas needs to be inexpensive considering the low incomes in rural areas. The study found that ICT implementations are powerful in reducing operating costs for financial institutions thus making it viable for expansion into rural and low-income areas. According to a report by the Telecom Regulatory Authority of India (TRAI), there are 936 million wireless subscribers in India (Poddar, Erande, Chitkara, Bhansal & Kejriwal, 2016:2-3). In rural India, only 5 percent of the adult population has access to a commercial bank branch and only 40 percent have bank accounts (India Brand Equity Foundation, 2016 in Poddar *et al.,* 2016:3-4). Furthermore, although mobile penetration rate is high, few customers actually take advantage of the service and use these services in India (Poddar *et al.,* 2016:3).

In a study by Medhi, Ratan and Toyama (2009:492) on mobile banking adoption and usage by low-literate and low-income users, it was observed that the increase in mobile phone penetration in poor communities is making provision for mobile enabled banking that targets the un-banked in order to bring services to the poor. Their study concluded that more research needs to be done to try to understand what prevents low-income, low-literate populations from adopting mobile banking.

Rashid and Elder (2009:13) found that in farming and fishing communities in Senegal and Ghana, there is evidence of strong economic returns through mobile phone usage. However, people still do not maximise the benefit of mobile banking through mobile phones. Other studies indicate that while mobile banking can significantly reduce transaction costs, face-to-face interactions are still preferred in many contexts despite the higher costs often associated with in-branch interactions (Rashid & Elder, 2009:13). Therefore the role of trust in these economic relationships is important to better understand the success of mobile banking.

2.6 Conclusion

This Chapter provided an overview of mobile banking. It was elaborated on in a global and South African context and the discussion extended to mobile banking for the rural and un-banked populations. The information showed that the technological revolution of mobile phones has had a major impact in the world of business and the daily lives of ordinary people. This has further enhanced access to banking, and through the innovation of mobile banking, people have been able to do banking far easier at any time and from anywhere.

However, what was notable was that although the use of mobile phones itself is high throughout the world, people in the most remote rural areas do not use the benefits of mobile banking that is offered via the mobile phone. Studies on why people do not adopt mobile banking despite its convenience and cost-effectiveness is limited and seems to be an area that is still being explored.

The next Chapter presents the theoretical review of the study. The theory forms the basis of the study from which the constructs are identified in order to examine the factors that are perceived to affect the adoption of mobile banking among rural South Africans.

CHAPTER THREE
META-THEORETICAL FRAMEWORK

3.1 Introduction

In this Chapter, as a preamble to the literature review of the study, a meta-theoretical perspective is provided. This meta-theoretical perspective, which is based on the systems theory, provides a background and perspective on the choice of theory used in this study due to its philosophical underpinning. The worldview which encompasses the ontology, epistemology and the quantitative worldview is briefly discussed, with reference to their role in the social sciences. This is followed by a discussion of the positivist paradigm and the specifics of the academic discipline of communication management and information communication technology. The rationale for the use of the meta-theory and the subsequent worldview provides perspective for the reader about the study's philosophical theoretical underpinning.

3.2. Meta-theoretical framework

When researchers are able to have an understanding of the meta-theoretical positioning of a study, more clarity is obtained on the nature of the research objectives and the research itself. Also, the philosophies that underlie the theories that are used in a study offers perspective to the solutions based on the theories and that of the literature examined.

Meta-theory is often understood by researchers and scholars as the philosophy behind the theory, and ideas about how certain phenomena in a particular field should be thought about and researched (Wagner & Berger, 1985; Vakkari, 1997 in Bates, 2005:2). The concept of a meta-theory tends to be used similarly with the term 'paradigm' which was given its modern understanding in science by Thomas Kuhn in 1962. Kuhn considered a paradigm to be the meta-theory, the theory, the methodology, and the ethos, all combined, of a discipline or specialty (Bates, 2005:2). While a paradigm would have a broader meaning than a meta-theory, a

meta-theory is considered core to any paradigm, and it defines a paradigm (Bates, 2005:2).

Hjørland (1998:607) considers meta-theories to be broader than theories and less specific. The author considers meta-theories to be about the description, investigation, analysis or criticism of the theories in a domain. As such, meta-theories are internal to a domain which may also sometimes be termed ‘paradigms’, ‘traditions’ or ‘schools’. For Hjørland (1998:607), meta-theories are conscious or unconscious assumptions behind theoretical, empirical and practical work and their assumptions are often linked to philosophical views which are part of interdisciplinary trends (Hjørland 1998:607).

Some researchers argue that paradigms precede methods in a research. For example Guba and Lincoln (2005:198) found that a paradigm is a belief system or worldview that guides a researcher in the ontology and epistemology of the study and also in the choice of methods adopted. There are variations of hierarchies in the use of meta-theories and paradigms in relation to methods of studies. For example, Shields and Dervin (2005) places meta-theory before methodology and method. They consider that methodology connects the broad high-level assumptions to that of the method which is used in implementing the research such as the procedures in data collection and analyses and interpretation of data (Shields & Dervin, 2005).

Another research hierarchy follows the route of paradigm (positivist, interpretivist), research methodology (qualitative or quantitative), research method (survey, case study, etc.), research technique and instrument (questionnaire, experiment, and interview) (Saunders, Lewis & Thornhill, 2012:130). Further to this, Saunders, Lewis and Thornhill, (2012:130-140) indicate that there are five meta-theoretical assumptions that are relevant to any study and these are: epistemology, ontology, objectivity-subjectivity orientation to research, axiology and typology.

In this study, the hierarchy of research is guided by the meta-theory, worldview, paradigm and primary domain, followed by specific theories. This is illustrated in Table 1 below and elaborated on in the section that follows.

Table 1: Meta-theoretical framework

Meta theory	Systems theory	
Worldview	Objectivist/realist ontology Quantitative worldview	
Paradigm	Positivist	
Primary domain	Social Science	
Academic discipline/field	Communication management Media ecology	Information Communication Technology Digital communication
Theories	Diffusion of innovation theory	Technology acceptance model
Concepts	Adoption of technology/innovation	Mobile banking
Constructs	Relative advantage	Perceived usefulness
	Complexity	Perceived costs
	Trialability	Trust
	Observability	

3.2.1 Systems theory

Systems theory is considered the meta-theory for this study as it is effective in understanding both the human-constructed and natural worlds (Chen & Stroup, 1993:449). The theory was introduced in main stream science by Von Bertalanffy (1973) in 1950, where it first became known as General System Theory (GST). GST focuses on the relationships between elements of a system and its environment (Conradie, 2013). Monge (1977:22) defines a system as the whole of a number of integrated parts with interdependent functions.

Friendman and Allen (2011) in Conradie (2013) define it as an organised whole which comprise elements that interact and endure over time. When applying the systems perspective to communication and the diffusion of technology, one is able to obtain a broad overarching perspective of the tools and channels of communication and the complexity surrounding it (Littlejohn, 1983 in Conradie, 2013). For example,

all the elements of a communication process such as the communicator, messages, meanings, channels, mediums and feedback, are micro-systems of unified interdependent parts that need to function in a macro-system of interactions between members of a societal system. Systems theory, examines the relationship between various elements in a social system and how one influences the other.

A system contains key elements which play a role in the development of an innovation. Some elements of a system include the banks, mobile network operators and customers. In this study the most important element of the system is the rural user or customer of mobile banking. The rural areas represent the system and the technology of mobile banking influences or affects the system. Technologies have the potential to affect change in a social system in the form of communication, changing the environment and affecting individuals in it. Therefore considering that technology may influence change in an environment, systems theory is considered appropriate to use as a meta-theory.

Similarly Roper, *et al*. (2011) in Khan and Mir (2016:3) found that technologies used by individuals and their relationships with those technologies can be understood as a system which behaves non-linearly. The interaction of individuals, where each individual is an actor within a system makes the system non-linear. Actors behave differently and behaviour may change with time and the conditions of the environment.

In this study, the mobile phone as the technology (the means) is an input to the system, and mobile banking adoption is the output. Various factors and elements play a role in the adoption of an innovation (or mobile banking in this case) and each of these influences the other. Having an understanding of the social context is just as important as understanding how innovations fit within a social system/context (environment/rural context in this study) and whether the changes affect individuals and society. Bearing in mind also that the innovation/technology itself can also be affected by society (for example the potential lack of adoption of the technology due to the profile of the social system).

3.2.2 Research paradigm /worldview

The term paradigm which was proposed by Thomas Kuhn in 1962 refers to a cluster or disciplinary matrix of problems, methods, theoretical principles, metaphysical assumptions, concepts, and evaluative standards that are present to some degree or other in the concrete, definitive scientific achievement. A disciplinary matrix is considered to be the framework within which scientists conduct their research. Basic assumptions about how research should be conducted in a discipline form part of the framework as well as what constitutes a good scientific explanation (Orman 2016:49). Saunders *et al.* (2012:140-141) define a paradigm as the examination of social phenomena from which certain understandings of these phenomena can be achieved and explained.

According to Lather (1986) (in Antwi and Hamza, 2015:218), a research paradigm reflects one's beliefs about the world one lives in and wants to live in. In most natural sciences, a predominant paradigm forms the basis out of which researchers identify and test research questions. As such, meta-theories about the nature of research and the preferred methods for each discipline are found in those paradigms (Bates, 2005:5).

In social sciences, it is common to have a general paradigm for a field, which describes the domain of interest for that discipline. It is also observed that several meta-theories may continue to be used alongside each other while at the same time some may cease to continue while others may evolve as research grows (Bates, 2005:6). Research paradigms are considered to be inclusive systems of connected practice and thinking that define the nature of enquiry along three dimensions, i.e. ontology, epistemology and methodology (Terreblanche & Durrheim, 1999 in Antwi & Hamza, 2015:218).

i. Ontology and epistemology

The term ontology refers to questioning the existence of phenomena that researchers are interested in and whether these phenomena are independent from what one knows and perceives it to be. Ontology is the study of being or reality. In the

ontological dimension of social sciences, research is concerned with the reality that is being investigated, which is also referred to as the research domain of the social sciences. In the social science research domain are domain assumptions and beliefs about the nature, structure and status of social phenomena (Saunders *et al.,* 2012:130-131). Neuman (2003:94) suggests that the social world is created by our knowing of it and that the researcher's role is not an accidental one.

The ontological assumption is that reality is independent of the observer (dualism), while a positivist epistemology is based on the fact that the investigator or researcher is detached from the object of study and therefore can assume an objective position towards a research study (objectivism) (Neuman, 2003:94). According to Neuman (2003:97), positivist researchers remain detached from what they research and do not consider that they are variables in the research. Researchers in this sense use quantitative methodologies to discover phenomena by objective means and therefore apply statistics and numbers to qualify the outcome of the research (Fekede, 2010:101).

ii. Positivist paradigm and quantitative worldview

Epistemology refers to questioning the nature of knowledge and the relationship between the knower and what would be known (Antwi & Hamza, 2015:219). A researcher's epistemological position is often related to ontological assumptions. Mertons (1968) argues that it is not possible to maintain independence as a researcher in a study and therefore the awareness of the researchers' limitations is heightened. This is enhanced through the use and application of methods that prevent bias from a researcher that could possibly influence the outcome of a study (Merton, 1968).

Researchers in the social sciences often debate whether the social world can be studied on the same principles as the natural sciences, and the purpose of quantitative data analysis is questioned (Bryman & Cramer, 2005:2). According to Cohen, Manion and Morrison (2000) (in Fekede, 2010:105), researchers obtain clarity about their theoretical frameworks based on their different worldviews about

the nature of knowledge and reality. Perspectives can vary among researchers and two predominant research worldviews considered by researchers are the positivist paradigm and interpretive paradigm (Fekede, 2010:105).

The positivist paradigm is based on uncovering truth and presenting it by empirical means (Henning, Van Rensburg & Smit, 2004 in Antwi & Hamza, 2015:218). According to Neuman (2003:97), for positivists, social science is considered to be an organised method of combining deductive logic with precise empirical observations of individual behavior. This is done in order to discover and confirm a set of probabilistic causal laws that can be used to predict patterns of activity and behaviour.

For positivists, the nature of social reality is that pragmatic and realistic facts are separate from the researcher's ideas or thoughts. These are governed by laws of cause and effect and patterns of social reality that are stable and knowledge of them is additive (Neuman, 2003:98). The basic conjecture of this paradigm is that science must develop the most objective methods to get the closest estimate of reality. These explanations are developed and tested by researchers through the use of multivariate analysis and techniques for statistical prediction. The positivist framework maintains that reliable knowledge is based on direct observation or manipulation of natural phenomena through empirical, often experimental means (Neuman, 2003:97). Standardised tools such as close-ended questionnaires with precisely worded questions for data collection are often used by positivist researchers.

The positivist research paradigm that underpins the quantitative methodology due to its deductive nature, together with the realist ontology and empiricist epistemology involves a research methodology that is objective and detached since the emphasis is on measuring variables and testing hypotheses that are linked to general causal explanations (Marczyk, DeMatteo & Festinger, 2005).

Often researchers applying the quantitative approach make use of questionnaires and survey in order to gather data which is then tabulated in numbers (Schulze, 2003:12). Theories and hypotheses are also tested by identifying variables and the

relationship between the variables by using correlations and differences between means through the statistical analysis process (Schulze, 2003:12). For this study the following variables were identified in the theories and literature: relative advantage, trust, complexity, cost, usefulness and trialability. The relationships between the variables were tested in order to identify the most common factors that are perceived to affect the adoption of mobile banking.

This study makes use of the realist/ objectivist ontology and empiricist epistemology which is contained in the positivist paradigm whereby the research method is an objective one and the emphasis is on testing hypotheses and measuring variables that link to causal explanations. The testing of hypotheses (null hypotheses) that were developed in conjunction with theories characterises this approach. When the null hypothesis is rejected then the hypothesis itself is confirmed and the obverse occurs if the null hypothesis is accepted.

3.2.3 Disciplines

A variety of disciplines can be considered when researching the phenomena of technology innovation such as that of mobile banking and the factors that affect its adoption among rural South Africans.

i. Academic discipline and field – Communication Management and Media Ecology

Media ecology is considered by Postman (1970) to be the understanding and study of media as environment whereby it is important to understand how human perception, understanding, feeling, value and interaction with media affect one's chances of survival (Stephens, 2014:2033-4). Ecology in this case implies the environment which comprises technologies, machines, information systems, symbols and tools and its structure, content, and impact on people. According to Scolari (2013:1419), media ecology can be interpreted in two complementary ways that is: the media as environment, or the media as species that interact with each other. In the case of the former, Scolari (2013:1420) says that researchers tend to examine how technologies create environments that in turn affect the people who use them.

The effects of technology alter the perception patterns of people without resistance (McLuhan, 2003 in Stephens, 2014:2034).

In this study, the consideration of media ecology is based on the study of media, technology and communication and the effects of these on the environment. Especially mobile phones in the context of this study (and its use for mobile banking (which is a form of communication that has transformed peoples' lives), is a relatively new technological disruption. The field is therefore considered fit for this study as it is necessary to understand the new communication medium (mobile banking) in the media ecosystem and its dynamics as it relates to its consumption in the ecology (that is the environment in which it is used).

ii. Academic discipline and field – Information Communication Technology (ICT) and Digital Communication

The concept of information and communication technology (ICT) can be considered as the use of technology in order to acquire and process information in support of human purposes (March & Smith, 1995 in Göransson & Söderberg, 2005:203-2044).

According to Weber (2003) (in Göransson and Söderberg, 2005:206), ICT can be divided into non-digital based and digital based or into other technologies. New information and communication technologies offer opportunities for users such as that of service innovations that originate in developing countries that have an impact on the financial service landscape. For example, mobile banking brings financial services closer to people in rural areas (Sundén & Wicander, 2006:16).

Qureshi (2013:1) considers the term ICTs to depict how technologies affect people's daily lives. The types of technologies that are considered as part of this term are the access and use of the internet, mobile phones, and telephone land lines. According to Qureshi (2013:1-4), the "Communication" in ICT is often carried out using mobile phones that offer voice, text, and other communication services that the internet may support. The term ICT evolves with the consumption and development of new technologies.

Substantial amounts of information are accessed using multiple technological platforms as they are communicated through several devices and infrastructure that support the devices. ICT innovations are capable of overcoming challenges, such as access to finance, food, water, healthcare, education, and those of limited resources leading to poverty (Qureshi, 2013:1-4).

Since the advent of the mobile phone is considered to be the most widely used information and communication technology, especially among poor marginalised communities located in remote rural areas, the field of digital communication and the discipline of information communication technology were considered appropriate in understanding this technology. Research shows that mobile banking lies at the intersection of the concepts of digital inclusion and financial inclusion. Also mobile banking is part of the social context and its use is based on the ability of the rural people (especially the poor) to address the barriers to its usage and adoption. Having an understanding of the factors that affect its usage and adoption through the technology acceptance model (TAM) which is an ICT theory, can assist in addressing the adoption barriers too.

3.2.4 Theories

For this study, the concept of theories is of significance and as such the Technology Acceptance Model (TAM) and the Diffusion of Innovation (DOI) Theory have been used to determine concepts and constructs that were applied in the study. A theory is a set of assumptions, principles, and relationships that is used to explain phenomena. Theories are often based on an implicit meta-theory and methodology which can be considered as a body of generalizations and principles that are developed for a specific field (Hjørland, 1998:608). Theories provide a set of explanatory variables which can be used to predict a particular phenomenon (Samaradiwakara & Gunawardena, 2014:22).

Although the rate of adoption of mobile technology is high in many regions of the world, this has not necessarily translated into the adoption of mobile banking nor has it created financial access for those individuals particularly living in remote areas.

Through the theories that were examined and the literature that were reviewed for this study, several constructs were determined that are relevant to the factors that are perceived to affect the adoption of mobile banking among rural South Africans.

For the purpose of this study, syntheses of theories were reviewed to eventually arrive at the use of two theories, which are the DOI theory and the TAM. Since the study attempted to understand the factors that are perceived to affect the adoption of mobile banking among rural South Africans, these two theories were considered most appropriate as evidence shows that they are often used in studies on mobile banking and mobile technology at societal level. Scholars and researchers have developed many theories relevant to studies on information communication technology adoption. The theories were used in various contexts and based on the outcome of studies they were expanded to include new constructs. As such new modified theories were created.

The theories that are commonly used and seem to be popular in studies related to diffusion of technology, technology adoption and mobile banking, are; the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen (1975), the Technology Acceptance Model (TAM) by Davis, (1989), and the Extended Technology Acceptance model (TAM2) by Venkatesh and Davis, (2000). Other extended theories are the Theory of Planned Behaviour (TPB) by Ajzen (1991), the Diffusion of Innovation (DOI) theory by Rogers (1992) and the Unified Technology Acceptance User Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003:428-430).

The DOI theory has been extensively used as a theory related to mobile technology usage and therefore is considered appropriate by many researchers for studies on mobile technology at societal level. The theory is also popular in attempting to explore factors that affect that affect the adoption of an innovation or new technology by individuals (Al-Jabri & Sohail, 2012:380). The DOI theory also attempts to explain the reasons behind the rate of spread and adoption of any technological innovation.

The Technology Acceptance Model (TAM) as a theory is also useful in attempting to examine the rate of adoption of a new technology or innovation. The Model which

was developed by Fred Davis and Richard Bagozzi examines the inclination of a user to use or not to use a new technology. This is determined by one's attitude which is influenced by two beliefs, that is, perceived usefulness and perceived ease-of-use (Davis, 1989:320). The theory asserts that an individual's decision to adopt a new technology or innovation is driven by one's intention, which is further determined by one's trust in the technology (Behl & Pal, 2016:2).

i. Diffusion of Innovation Theory

The diffusion of innovation (DOI) theory was first introduced by the American scholar Everett Rogers. Rogers defines diffusion as a process whereby innovations are communicated via certain channels over time among the members of a social system (Rogers 2003:5). Rogers (2003:6) considered diffusion to be a type of social change whereby alterations occur in the structure and function of a social system. Some of these alterations could be in the form of a new invention or idea that is diffused adopted or rejected leading to changes in the social system.

Through the process of diffusion of an innovation or technology, the resulting effect is the acceptance or penetration of a new idea and or behaviour. Based on sociological research in agrarian societies, Rogers (2003:11) showed how innovations are spread through society using various channels. Although the theory shows that mass media plays an important role in spreading awareness of new technologies, personal communication is likely to also influence the awareness of new technology. The theory examines why and at what rate new technology spreads through social systems (Pearce, 2013:77-78).

An innovation is an idea, practice, or object which is perceived as new by an individual or group of people. The diffusion of innovations is considered a social process whereby information about new ideas is subjectively perceived by individuals and is communicated from person-to-person (Rogers, 2003:12). The adoption of an innovation is the result of a decision process within the process of diffusion of innovations (Sundén & Wicander, 2006:30).

Research has shown that diffusion research on a variety of innovations is conducted in multidisciplinary fields such as anthropology, communication, education, geography and sociology. The most plausible reason for this is the innovations and its diffusion contributes to social change which is an important human process in society (Sundén & Wicander, 2006:87).

Rogers (2003:11) found that social systems, communication channels, time and innovation are the factors that play a role in the adoption of new technology. Rogers (2003:206) found that although mass media plays a major role in creating awareness of new possibilities and practices, personal communication tends to be far more influential when one needs to make a decision on whether to adopt or not adopt a technology. Rogers (2003:55-56) indicated that the adoption and diffusion processes entail moving from a traditional way of life to a different, more technically developed and rapidly changing way of life.

According to Rogers (2002:22), the diffusion and adoption of innovation follows a systematic and planned process. Innovators, early adopters, early majority, late majority, and laggards are the five categories of adopters, based on the times of adoption as identified by Rogers. Rogers was also of the view that diffusion of innovation is a communication process where people influence each other on new ideas. The adoption or rejection of innovation and technology results in change in communities. Rogers (2003:25) found that information is important in any innovation diffusion process which relates to its dissemination through channels of communication to members of the social system.

Rogers (2003:16) argue that it is the attributes of an innovation that enhance its rate of adoption where people gather information about it and form their opinion and perception about it. It is these perceptions about the innovation that results in the adoption or rejection of the innovation. According to Rogers (2003:18), individuals move through a process of having basic knowledge or awareness and then make a decision on whether the technology is favourable or unfavourable for adoption. Individuals also tend to seek support and affirmation for their decision to adopt a

technology or they may change their minds about the innovation after they have started using it.

The DOI theory also considers how, why, and at what rate new ideas and technology spread through social systems (Rogers, 2003:16). Furthermore, there are five categories of attributes of innovations that influence the rate at which individuals adopt technology. These attributes of innovation which are critical in determining adoption behaviour are relative advantage, complexity, compatibility, trialability, and observability (Rogers, 2003:16).

For Rogers (2003:17), the innovation-diffusion process is 'an uncertainty reduction process' and the attributes of the innovation or technology itself can assist one in alleviating any uncertainty one experiences about an innovation. Rogers (2003:15) found that how individuals perceive the characteristics of the innovation will influence the rate of adoption of innovation in society.

Rogers (2003:16) defined the attributes that influence the adoption of new technologies whereby:

- Relative advantage is the extent to which an innovation is perceived as being better than what preceded it. What matters here is whether an individual perceives an innovation to be advantageous.
- Compatibility is the degree to which an innovation is perceived as being consistent with a user's values, experiences and whether it meets the needs of the user or potential adopter. An idea that is not aligned or is not consistent with society's norms and values will not be easily adopted.
- Complexity is whether the user and potential adopter perceives an innovation as relatively difficult to understand and use. New ideas and innovations that are easy to understand are easily adopted than those that require more understanding and skill.
- Trialability refers to the degree to which an innovation may be experimented with or tested on a limited basis. An innovation that provides a user the opportunity to be tested, presents less uncertainty to a potential user than that which cannot be tested.

- Observability is the extent to which innovations are visible to others and is also considered the extent of awareness of an innovation.

Therefore, Rogers (2003:16) proposed that innovations that offer a relative advantage, compatibility, simplicity, trialability, and observability will be adopted much faster than others. Further to this, through the process of communication, which entails creating and sharing information, individuals are able to make decisions about an innovation. Rogers (2003:18) classified communication channels into two, namely: mass media and interpersonal communication which he believed could influence the adoption of technology.

The diffusion of innovation theory seems to be well-suited for research studies on mobile banking and communication media in developing countries due to the value it adds for studying technology and its application at individual and societal level. Its benefit lies in being able to use it to understand individual perceptions of the technology and understanding how technology is diffused in communities through the processes it outlines as part of the communication diffusion process.

For example Pearce (2013:77-79) found that the DOI theory is useful in understanding the misunderstood individual-society interactions in developing countries. Other studies have also found that interpersonal channels are powerful tools in order to change strong attitudes that are held by individuals. For example, Putzer and Park (2010:6) in support of this view found that social interactions play a major role in ones' acceptance of mobile wireless technologies.

There is substantial literature about the diffusion of mobile technology (Cheung, Chang and Lai, 2000; Tiwari and Buse, 2007; Dash *et al.*, 2014; Elogie, 2015) amongst others, which is elaborated on later in this Chapter under the respective constructs of the study. Whereas some studies examine the diffusion of mobile technology on a general level, others focus only on the diffusion of mobile phones as a technology, or communication technology. For example, some studies examine mobile technology in the context of a country or region (Lee, Lee & Kim, 2007:3). Suoranta (2003:63-67) examined the five DOI attributes of technology on the

adoption of mobile banking in Finland. The study found that relative advantage, compatibility, trialability and observability significantly influence the adoption of mobile banking. The study further found that compatibility had the most influence on an individual's decision to adopt mobile banking. Dash *et al.* (2014:19) carried out a study on mobile banking in India using the DOI theory. They found that attributes of technology such as trialability and compatibility significantly influenced people to adopt mobile banking in India.

Wei (2006) conducted a study in China where it was found that peoples' social status was a motivating factor that influenced their adoption of mobile phones. The study found that lifestyle variables and the need to be Western, as opposed to demographic variables were determining factors of peoples' decisions to use mobile phones.

A number of studies that have used the diffusion of innovation theory as a theoretical orientation for mobile banking have often concluded that it is the attributes of the technology that affect the adoption of it. These attributes are expanded on later in this Chapter with supporting empirical research to indicate which attributes are most commonly significant in some studies and contexts as opposed to others.

In this study, under the DOI theory, the attributes of relative advantage, complexity, trialability and observability were considered.

The section that follows outlines the second theory used in this study, which is the Technology Acceptance Model (TAM).

ii. Technology Acceptance Model

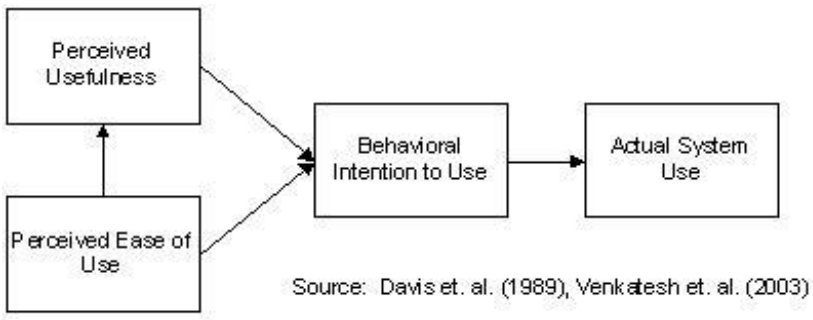
The Technology Acceptance Model (TAM) was developed by Fred Davis and Richard Bagozzi who propose that the decision to use a technology is determined by an individual's attitude towards the technology, their reaction to a new technology, and their adoption of and behaviour towards the technology. It is popularly known for its explanation of the adoption of and use of technology. The TAM is an adaptation

from the Theory of Reasoned Action which was developed by Fishbein and Ajzen (1975) and the Theory of Planned Behaviour (TPB) by Ajzen (1991) which explains individuals' behavioural intention towards a technology and their behaviour towards the technology as attitude and subjective norm (Behl & Pal, 2016:2).

The TAM is used to explain and predict ICT usage behaviour, that is, what influences individuals to accept or reject the use of information technology (Korpelainen, 2011:1). According to Louho, Kalliojaand and Oittinen (2006) (in Samaradiwakara and Gunawardena, 2014:24), technology acceptance is about how people accept and adopt technology for use noting that technology has no value unless it is accepted and used (Oye, Iahad & Ab-Rahim 2012 in Samaradiwakara & Gunawardena, 2014:25).

The TAM is based on an individual's perceived usefulness, ease-of-use, attitude or perception towards technology and their behaviour intention which influences the usage behaviour of the technology (Davis, 1989:322). Davis (1989:325) further indicates that the readiness of an individual to use or not to use a new technology is determined by one's attitude which is in turn influenced by perceived usefulness (PU) and perceived ease-of-use (PEOU) of that technology. PU is regarded as the degree to which a person believes that using a particular system or technology will enhance his or her job performance and PEOU is understood to be the degree to which the person believes that using the system will be free of effort.

Figure 1: Technology Acceptance Model



The TAM also considers how external variables influence one's decision to use new technology and it goes a step further by showing that users develop perceptions about the technologies which lead to its adoption. According to Davis (1989:330), if a technology is found to be easy to use by a user and is considered useful, it will have a positive influence on the user which in turn will influence future decisions on whether to adopt new innovation and technology.

Although the TAM is premised on two main beliefs, that is, the perceived usefulness and perceived ease-of-use of a technology, after several studies, many scholars found that perceived usefulness and perceived ease-of-use are not the only two determinants that influence an individual to adopt technology. Therefore this model was enhanced and expanded and researchers included other variables such as trust and cost. Therefore, this study uses the variables trust and cost with perceived usefulness.

Beyond attitude, there are several other factors that contribute to one's decision to adopt and use a new technology which are; age, gender, experience, and voluntariness of use among individuals (Davis, 1989:330). The model is therefore useful in providing insight into the adoption of new technology.

The TAM model was initially used by the information system research community and was mostly based on technologies that were used or introduced into organisations. It was much later accepted by other researchers and only recently has the TAM as a theory been used for research on mobile technology and mobile telecommunication (Shi, 2011:3).

There is substantial literature to illustrate the impact of the TAM and its influence as a commonly used theory on the adoption of mobile banking.

The TAM has often been used in studies on mobile banking adoption in different contexts and environments be it rural or urban (Ali & Ismail, 2014; Laforet & Li, 2005; Bhatti, 2007; Tobbin, 2012; Puschel, *et al*., 2010; Makanyeza, 2017; Abdinoor & Mbamba, 2017). Some studies conducted in South Africa include those by Wentzel

et al. (2013) and Ismail and Masinge (2011) who used TAM to focus on the uptake of mobile banking at the bottom-of-the-pyramid (BoP). However no study has been found in the literature that used TAM in the context of rural South Africans and the factors that influence their adoption of mobile banking. Behl and Pal (2016:2) found that few studies have focused on the acceptance and adoption of new technology in a rural context, therefore stressing its importance in the financial services supply chain.

Researchers believe that TAM can be a framework to examine how end-users accept information systems. Shi's (2011) study found that the constructs of perceived usefulness and perceived ease-of-use are important in determining users' intention to adopt certain technologies. Mohammadi (2015) applied the TAM in a study on mobile banking in Iran. A study by Jeong and Yoon (2013:36) that used the TAM found that perceived ease-of-use and perceived self-efficacy influenced mobile banking adoption and use in Singapore. Wessels and Drennan (2010) used it in their study in Australia on mobile banking adoption, while Tobbin (2012) used it in Ghana to study the adoption of mobile banking by the un-banked. In a study conducted by Riquelme and Rios (2010) in Kuwait, the TAM was used to understand the effect of gender in the adoption of mobile banking.

The indirect influence of external variables on attitude and user beliefs has also been advanced in the TAM (Davis, 1989:325-327). Therefore, the inclusion of perceived cost and trust variables emanating from the extended Technology Acceptance Model (TAM2) as proposed by Venkatesh and Davis (2000) are used as they were considered suitable in this study. As the discussion on the TAM model unfolds in this section, the rationale for the use of the variables usefulness, cost and trust will be discussed and perspective will be given on its usage.

i. Perceived Usefulness (PU)

Perceived usefulness is regarded as the extent to which using a technology would enhance one's job performance (Davis, 1989:325). It has been known to influence the behaviour of individuals and as such influences their intention to adopt or use a

technology which eventually leads to their reaction to the use of the technology. Therefore if an individual perceives the technology as useful, satisfying and convenient, then they are likely to accept and adopt the technology (Davis, 2008:326).

ii. Perceived Cost (C)

Perceived cost is regarded as the extent to which a person believes that using mobile banking would cost money (Luarn & Lin 2005:873-879). Some of the perceived associated costs include bank charges, network charges and mobile device costs (Mallat, 2007:8). Cruz *et al.* (2010:363) in their study found that fees related to subscription and service for accessing mobile banking services significantly influence users' acceptance of mobile banking. Cost was therefore found to have a negative effect on the adoption of mobile banking services.

iii. Trust

According to Davis (1989:330), trust refers to the behavioural intention of an individual that is centred on another individual. Trust and security play an important role in a user's intention to adopt new technology. For example a study by Kim *et al.* (2009:297), found trust to be a belief that a trusted party will not behave in an unprincipled manner. They also indicated that individuals have an inherent feeling of security and willingness to depend on someone or something.

The above discussion of the TAM indicates that the Model has been extended by the inclusion of other variables or constructs by many researchers. The research indicates that these have been tested over a wide range of contexts and studies, and have been proven to be reliable and valid constructs. Although perceived ease-of-use (PEOU) and perceived usefulness (PU) are the two key constructs upon which the TAM is based, this study includes other attitudinal belief constructs to enhance the research model and with the consideration that it would be best suited for the context of this particular study. Therefore, other attitudinal dimensions such as

perceived cost (PC) and perceived trust (PT), were added to perceived usefulness and perceived ease-of-use.

3.3 Conclusion

This Chapter presented the meta-theoretical perspective of the study. The systems theory underpins the meta-theory. The ontology, epistemology and the quantitative worldview were discussed which was followed by a discussion of the positivist paradigm and the academic discipline of communication management and information communication technology. The basis and motivation for the use of the meta-theory and worldview were also provided. The philosophical underpinning of the meta-theory provides a background of the choice of theory used in this study. The constructs that are identified from the theory were presented.

The next Chapter provides an in-depth review of the literature used in this study. The literature is presented in relation to the theories and constructs that have been identified. The literature illustrates similar studies that have applied the theories used in this study, and their findings, which are significant in understanding whether these are relevant in this context and study.

CHAPTER FOUR
LITERATURE REVIEW

4.1 Introduction

This Chapter presents the literature review that is relevant to the theories employed in the research. Various studies are reviewed that are relevant to the adoption and use of mobile banking. The literature is guided by the constructs/variables that are determined by the theories and these are reviewed according to their relevance to this study in terms of the attributes selected below.

For the purpose of this study, under the DOI theory, the attributes of relative advantage, complexity, observability and trialability are examined in order to establish whether they affect the adoption of mobile banking amongst rural South Africans. These attributes, once understood by an individual, helps one make a decision on whether to adopt an innovation or not. Under the TAM, the constructs of perceived usefulness are examined together with additional determinants such as perceived cost and trust.

4.2 Conceptualisation

The next section presents the literature that is relevant to the concept of mobile banking, and the constructs, that were determined by the theories.

4.2.1 Relative advantage

Relative advantage is the degree to which an innovation is perceived as better than the innovation it supersedes. Relative advantage of a new technology can increase efficiency amongst users, leading to economic benefits and also enhancing one's

status (Rogers, 2003:233*).* When individuals perceive that a technology provides more benefits than its predecessor, it is regarded as having relative advantage (Moore & Benbasat, 1991:195*).* Studies have found that there is a positive correlation between the relative advantage of a technology and the rate of adoption of it (Moore & Benbasat 1991:195). It has been observed by researchers that when users perceive the relative advantage or usefulness of a new technology over an old one, they tend to adopt it (McCloskey, 2006 & Rogers, 2003:233-234). For example McCloskey's (2006) study of online consumers found similar results to studies of mobile banking adoption whereby, although consumers were older, if they found the technology easy to use and understand, they tended to use it. Mobile banking offers many benefits of convenience of mobility which are not offered by traditional banking and non-mobile banking. A study in South Africa showed that relative advantage significantly affected the adoption of mobile banking, and the authors argued that the greater the perceived relative advantage the more likely mobile banking would be adopted (Brown, Zaheeda, Douglas & Shaun, 2003:391).

Howcroft, Robert & Hewer (2002:119) in their study conducted in the United Kingdom on bank delivery channels concluded that the factors that would influence the use of home-based banking would be lower fees and improved levels of service. They also found that the factors that make individuals hesitant to use such forms of banking were trust and security concerns, including a lack of awareness of online services offered by banks, fraud and banking scams, all of which are considered to negatively affect the advantages of mobile banking. As a result these factors lead to low adoption rates. Lin's (2011) study in Taiwan found that consumers perceived the relative advantages of products and services to provide benefits such as immediacy, convenience and affordability (Lin, 2011).

Often, before people adopt a new technology, they want to understand whether the technology is better than what was before or the old one (Elogie, 2015:5). Laukkanen's (2007) study in Finland on cellphone banking found that convenience and efficiency were considered important factors that influence the adoption of banking channels. Laukkanen (2007) also found that relative advantage weighed positively on one's behavioural intention to adopt mobile money. Studies by

Riquelme and Rios (2010:337) done in Singapore and Taiwan found that relative advantage significantly influence the adoption of mobile banking. Oluoch's (2012) study in Kenya concluded that people were able to accomplish tasks more quickly with mobile banking thus leading to improvements in their quality of lives, resulting in higher adoption rates. Therefore when people found the relative advantages of mobile banking it influenced its adoption.

According to Chaipoopirutana, Combs, Chatchawanwan and Vij (2009:29), customers have a positive attitude towards adopting mobile banking services if they believe that mobile banking offers them relative advantages. These findings are similar to that of Deans and Gray (2010:53) who found that relative advantage is significant in determining individuals' decisions to adopt mobile banking. Also, a study of mobile banking in Brazil showed relative advantages as some of the main reasons for individuals' decision and intention to use mobile banking (Puschel *et al.*, 2010:402).

Khraim, Shoubaki and Khraim (2011:101) in their study on mobile banking services in Jordan, found that relative advantage has significant positive effects on mobile banking adoption. Agwu and Carter (2014:65) in their study in Nigeria found that consumers' perceived mobile banking positively and they derived numerous benefits from it such as the reduced reliance on bank branches and the low cost associated with its usage. The study also found that customers found banking secure and they were comfortable with using mobile banking (Agwu & Carter, 2014:65). Zollmann's (2014) study in Kenya found that consumers will use a product if it offers them greater net value than the available alternatives. Therefore, once an individual uses a product for the first time, a decision on whether to use the product on a long-term sustained basis is determined by the benefit one derives from the product in relation to alternatives to the product itself.

Based on the theory and the literature reviewed, the following hypotheses are proposed for the construct of relative advantage:

H1. There is a relationship between the perceived advantages of mobile banking and its perceived usefulness.

H2. There is a relationship between the perceived advantages of mobile banking and its perceived trust.

H3. There is a relationship between the perceived advantages of mobile banking and its perceived cost.

H4. There is a relationship between the perceived advantages of mobile banking and its perceived complexity.

H5. There is a relationship between the perceived advantages of mobile banking and its perceived awareness**.**

The next section provides an overview of the literature reviewed for the construct complexity.

4.2.2 Complexity

According to Rogers (2003:258) complexity refers to the degree to which an innovation is perceived by individuals as relatively difficult to understand and use. Rogers (2003:258) concluded that adopters of innovation and technology consider the complexity of a technology and whether it is more difficult to understand and use than an existing one. He suggested that when a technology is considered complex to use by an individual, then the potential adoption of the technology will be hampered.

Technical complexity refers to the level of task complexity related to an innovation and research has shown that there is a negative relationship between the complexity of a technology and its successful implementation (Cooper & Zmud, 1990:129). Complexity is defined by Cheung, Chang and Lai (2000:90) as the extent to which an innovation can be considered relatively difficult to understand and use. Although their study was based on internet usage, it is still relevant in this study as the construct of complexity can also be applied to the technology of mobile banking. They found that complexity negatively influences the adoption of internet usage.

Studies have found that in the case of mobile service, a high level of task complexity acts as inhibitors in the successful implementation process of any innovation and technology (Shi, 2011:55). Lin (2011) found that users of mobile banking services find the service easy to use if they have user-friendly interfaces and therefore tend to develop a positive attitude towards them. Users find mobile banking complex to use, if the technical infrastructure and design of the technology is not user friendly. These therefore act as barriers to use and users will be reluctant to use mobile banking if they find that it requires more mental effort, and if it is time-consuming or frustrating.

According to Rogers (2003:257), functional barriers, which are also considered to be usage barriers, do influence whether people adopt mobile banking. Functional barriers refer to usage barriers, value barriers and risk associated barriers, while usage barriers are those innovations that require more effort in order to understand and use. Users who find technology complex consider limited advantages of the technology if it does not fit in with their lifestyles. In South Africa, according to FinScope (2014), despite the increase in the number of people using cellphones, only 24 percent of the adult population use cellphone banking. The FinScope study found that over one third of adults in South Africa find technology complicated to use for financial activities. A study in Lebanon by Koksal (2016:340) found that people were not confident in their ability when using mobile banking as it was not yet offered in that country.

A study by Prashansha (2015:4359) which applied the DOI theory in Sri Lanka found that complexity was a significant factor that influenced the adoption of mobile banking. Individuals felt that they did not receive sufficient guidance on how to use mobile banking and the malfunctioning of the service were factors that affected their reluctance to use it.

Bhatt (2016) carried out a study on the adoption of mobile banking in India and found that operational simplicity and ease of navigation affected the adoption rates. The study found that mid-way through operating mobile banking, people quit and referred to a bank branch. Therefore, congruent to other studies, it seems that complexity

does affect the adoption rates and the less complex people find mobile banking they would be more inclined to adopt it.

Moon and Kim (2001:226) indicated that individuals consider technology less complex or tedious to use if they find that technology is easy and less threatening. Some services on a mobile device were found to be tedious, especially browsing internet-like interfaces. Mobile phones with small screen sizes were also found to inhibit the viewing of information, which lead to typing errors during transactions which unfavourably affect the overall mobile banking experience. Kim, Shin and Lee (2009:298) in their study also found that challenges were posed with regard to mobile devices with small screen sizes. Also limited screen resolution and unrecoverable key words made it difficult for some customers to use mobile banking.

Vrechoupoulos, Constantiou, Sideris, Doukidis and Mylonopoulos (2003:338) in their study found that complexity in use, and the design of technology are barriers to the adoption of mobile banking. These result in users feeling frustrated when they apply more mental effort when using technology and the use of the technology becomes time-consuming.

Similarly, Al-Jabri and Sohail (2012:387) found that complexity was insignificant in their study and that this had no bearing on the decision to adopt mobile banking. Their study comprised mostly young respondents (aged 18-25) and therefore they concluded that young individuals find technology less complicated to use.

Davis (1989:326) suggests that individuals will discard a technology if they perceive that the technology is difficult to use. The research done by Davis (1989:327-329) indicates that an innovative technological system that is less complex will be more likely accepted by potential users. This conclusion is still relevant even in research done in recent times as the literature has shown.

Venkatesh *et al*. (2003:469-470) noted that skills in technology usage are likely to create favourable perceptions and personal confidence about the use of technology.

Furthermore, they found that experience together with technical support and skills significantly influence the use of technology.

Contrary to most studies highlighted above, Achieng and Ingari (2015:11) in their study in Kenya found that respondents did not associate the low adoption rate of mobile banking with the complexity of use. The respondents in their study felt that it was easy to use mobile banking and therefore their study is contrary to most studies reviewed on complexity which indicate that complexity affects adoption. Therefore, Achieng and Ingari's (2015) study show that the adoption rate has nothing to do with the ease-of-use of the technology but rather other factors.

The above literature review of the construct complexity contributed to the development of the hypotheses below.

H6. There is a relationship between the perceived complexity of mobile banking and its perceived usefulness.

H7. There is a relationship between the perceived complexity of mobile banking and its perceived trust.

H8. There is a relationship between the perceived complexity of mobile banking and its perceived cost.

H9. There is a relationship between the perceived complexity of mobile banking and its perceived awareness.

The next section provides a review of the literature related to the construct awareness.

4.2.3 Observability/awareness

This section provides an outline of the construct observability through examining the literature about the construct. According to Rogers (2003:258), observability, which is

also considered awareness, refers to the visibility of an innovation to individuals and the extent to which the benefits of the innovation can be easily observed and communicated. When a consumer is aware of a product or service, the consumer will either adopt or reject the product based one ones' perception and awareness of the product. Rogers (2003:20) suggests that before consumers are ready to adopt a product or services, they go through a process of knowledge, persuasion, decision and confirmation. Also, if the result of the innovation is observable by others, then this will influence the rate of adoption of a technology or innovation (Rogers, 2003:21).

Rogers (2003:21) also found that although mass media may play an important role in influencing individuals to adopt a new technology, interacting with others and obtaining testimonies about an innovation my result in faster adoption or even confirm one's perception about an innovation. People need both factual and attitudinal information about an innovation or technology in order to reduce their uncertainties about it. Therefore, the more observable an innovation is the more inclined people would be to adopt the technology and therefore there would be a positive relationship between observability and the rate of adoption of technology (Elogie, 2015:5).

In a study conducted by Sathye (1999:330) in Australia regarding the adoption of the internet, it was deduced that awareness influences adoption and the study further confirmed that the higher the level of awareness of a technology, the higher the adoption rate. Sathye (1999:325) supports Rogers (2003:203) where it was found that consumers do in fact go through a process of obtaining knowledge about a technology which in turn persuades them to make a decision to adopt the technology. Therefore, the adoption or rejection of an innovation is influenced by the extent of awareness that an individual has about the technology.

Researchers such as Moore and Benbasat (1991:197) further segmented observability into two constructs, that is, visibility and result demonstrability. They found that in the context of mobile banking, observability is the ability to access banking services at any time and any location without any delay or queue. The user

also has the ability to see the effect of mobile banking transactions immediately, and convey the benefits to others. Through such exposure and information sharing, potential users gain knowledge about the technology and this influences them to adopt it. Laukkanen and Kiviniemi (2010:384) in their study in Finland pointed out that information and guidance offered by a bank has a significant effect on decreasing the usage barrier of mobile banking.

Tiwari, *et al.* (2007:66) found that mobile phones have the potential to act as service channels for banks by providing value-added, innovative services such as interactive voice service (IVR) which operates through pre-specified numbers that banks advertise to their customers and short messaging service (SMS). In so doing, banks use the SMS to disseminate information between the mobile banker and the bank regarding banking activities. This in itself as a communication channel is a mechanism of creating awareness and ensuring that the user is informed and aware of banking activities.

A FinScope (2014) survey conducted in Malawi showed that mobile money has the potential to enable financial inclusion. However, the lack of information (unawareness) of mobile money facilities poses a challenge. The survey indicated that the majority of adult Malawians are unaware of mobile money and those who claim to be aware do not have enough information to be able to use it (FinScope Malawi, 2014). The outcome of a workshop held in 2016 by Financial Sector Deepening Mozambique (FSDMoç) and CGAP on smallholder farming families in Pakistan, Tanzania and Mozambique found that the use of digital financial tools was limited in Tanzania, despite varying levels of awareness of and aspiration to use this financial tool (Anderson & Ahmed, 2016). A study by Bhanot *et al*. (2012:480) on the factors affecting financial inclusion of disadvantaged people in rural areas of northeast India found that the extent of financial information that is available to people from various channels do lead to financial inclusion. Some of these channels may cover information on the education on financial issues and as such create awareness. Individual awareness is not the only factor mentioned by the studies above. Bhanot, Bapat and Bera (2012:481) also discussed distance to the banks and government contribution as the factors influencing mobile banking adoption.

In a survey carried out by Mattila (2003), respondents claimed to obtain information of mobile banking services from banks' personnel via personal selling activities, and from marketing communication activities, such as advertisements. It was found that observability and compatibility have a positive effect on the adoption of technology and these were significant predictors of users' intentions towards using a smartphone. As a result this increased the adoption rates.

Studies carried out by Laforet and Li (2005:371) as well as Tobbin (2012:81) were similar in that they examined the awareness of individuals on the acceptance and adoption of mobile banking. The findings between the two studies were different but did have similarities in that they found that the behavioural characteristics of individuals influence their adoption of technology together with education. It would seem that education leads to awareness in this instance. Similarly Chen's (2013:428) study conducted in Taiwan found that behavioural characteristics of individuals contribute to their adoption of mobile banking. They found that individuals with different behavioural patterns have different perceptions about mobile banking and that brand awareness and image was most important to individuals which inherently influenced their adoption decisions.

Ammar, Ahmed and McMillan's (2016:15) study in Sudan found that people in the microfinance sector were not aware of mobile banking services and their results found that people cited 'lack of knowledge' of the service. Although there were more people with mobile phones than bank accounts, they did not use mobile banking.

The literature examined above indicates that the awareness or observability of mobile banking and technology influences the rate of adoption among individuals irrespective of their context and environment.

Based on the literature reviewed, the following hypotheses are proposed below.

H10. There is a relationship between the perceived awareness of mobile banking and its perceived usefulness.

H11. There is a relationship between the perceived awareness of mobile banking and its perceived trust.

H12. There is a relationship between the perceived awareness of mobile banking and its perceived cost.

Trialability is the next construct that is discussed which is presented through examining literature on the construct.

4.2.4 Trialability

Trialability refers to the ability to experiment with, and use an innovation before its adoption (Rogers, 2003:16-17). Potential adopters that have the opportunity to test new innovations and technology have a positive experience with the technology and it further reduces the uncertainties associated with the adoption (Rogers, 2003:16). Agarwal and Prasad (1998:214) and Rogers (2003:16) found that individuals are more likely to adopt an innovation when they are allowed to experiment with it which in turn will lead to them feeling comfortable with the innovation.

Dash and Bhusan (2014:19) found that trialability had a significant effect on mobile banking adoption in their study. Brown and Molla (2005:27) conducted a study to identify the factors influencing cellphone and internet banking adoption in South Africa. In their study they found that trialability was a significant factor influencing adoption. Their study showed that potential adopters who can experiment with a technology are more inclined to adopt it. Similarly, Tan and Teo (2000:35) indicated that customers will adopt an innovation if they are given a chance to try it and minimise their fears about the innovation. They found that fears about mobile banking can be minimised if banks provide assistance and demonstrations about mobile banking usage which will motivate potential adopters to use mobile banking.

Shambare's (2013:37) study in South Africa also found that innovations that are tried and tested first tend to be adopted as opposed to those that are not. Karjaluoto *et al.*

(2002:88) in their study in Finland indicated that prior experience with technologies influenced one's attitude and behaviour towards that technology. Khraim, Shoubaki and Khraim (2011:104) in a study in Jordan found a significant positive correlation between trialability and the adoption of mobile banking.

A study by Koksal (2016:341) on Lebanon revealed that trialablity influences the adoption rate of mobile banking. It was found that since mobile banking is relatively new in Lebanon, people prefer to test it first in order to fully understand it and what services it can offer before adopting the technology. Al-Jabri and Sohail (2012:387) found that trialability had an insignificant effect on the adoption of mobile banking in Saudi Arabia. Their study concluded that perhaps people trust mobile banking and therefore do not find it necessary to try it. Also, on the contrary they indicated that it is possible that banks do not share sufficient information on mobile banking and therefore customers do not see the benefit and hence do not try it out (Al-Jabri & Sohail, 2012:387).

Dash *et al.* (2014:19-20) in their study in India concluded that trialability amongst other variables had a significant influence on individuals' intention to adopt mobile banking. Elogie (2015:7) also found that when a potential adopter experiments with an innovation, they develop an opinion about it and therefore they are likely to make a decision on whether or not to adopt it. Trialability was also found to be a major factor in Suoranta's (2003:65) study in Finland on the adoption of mobile banking. The study also showed that there is a greater chance of adopting a technology when individuals have the opportunity to experiment with it.

Similarly, a study by Iddris (2013:366-367), in Ghana found that the experience of using and testing a mobile phone influences one's attitude and intention to use it and perhaps to make a decision to adopt the technology. The study found that trialability had a strong significant influence on the adoption of mobile banking. Prashansha's (2015:4359) study in Sri Lanka found that people were eager to try out new technology and they were enthusiastic about technology in general.

The following hypotheses are proposed through an examination of the theory and the supporting literature that was reviewed above.

H16. There is a relationship between the trialability of mobile banking and its perceived usefulness.

H17. There is a relationship between the trialability of mobile banking and its perceived trust.

H18. There is a relationship between the trialability of mobile banking and its perceived cost.

The next construct considered for this study is perceived usefulness which is discussed below together with an overview of the literature supporting this construct.

4.2.5 Perceived Usefulness

Perceived usefulness is understood to be the extent to which a person is of the view that using a technology would enhance or improve one's job performance (Davis, 1989:328). It has been found to influence an individuals' behavioural intention, which in turn affects a consumer's reaction to the use of the system. Consumers are likely to accept or adopt a technology if they believe that the technology is useful to them, and convenient to use for mobile banking. It is regarded as the extent to which a person believes that using a particular system will enhance his/her performance, (Davis, 1989:329).

The adoption behaviour of individuals is usually centred on whether individuals find the innovation desirable in terms of its usefulness to the consumer. The perceptions of consumers' expectations and the perceived performance of a product or service are important as customers are most likely to view a service positively if it exceeds their expectations and therefore they are likely to adopt the innovation or technology (Chau & Hu, 2002:226). Meuter, Ostrom, Roundtree and Bitner (2000:61) found that

if the performance of an innovation or technology exceeds the consumer's expectations, it has advantages over interpersonal service, and consumers are likely to adopt the technology without the need for interpersonal service. The researchers found that in difficult times, consumers are likely to evaluate the technology-based self-service and they are likely to be happy about using the product.

Research done on information system adoption concluded that if a system does not help people perform their jobs, it is not likely to be received favourably (Nysveen Pedersen & Thornbjørnsen, 2005:344). Venkatesh *et al*. (2003:469) view perceived usefulness which is also known as performance expectancy, as positively effecting individuals to use an innovation.

Many studies have been done that found perceived usefulness to be a significant factor in the adoption of mobile banking and technologies. For example, Al-Gahtani, (2003:67) found that perceived usefulness affects consumers decisions to adopt a product or technology. A study by Wentzel *et al.* (2013:670) in South Africa showed that usefulness was considered an important factor for the poor who adopt mobile banking as it enables them to access financial services easily. Juwaheer, Pudaruth and Ramdin (2012:233) in their study in Mauritius found that perceived usefulness influenced the adoption of internet banking. Ismail and Masinge (2011:28) in a study in South Africa found that perceived usefulness, amongst other variables, was a significant determinant of consumer adoption of mobile banking.

A study by Abdulkadir, Galoji and Razak (2013:156) which investigated mobile banking adoption in Malaysia found that usefulness was the main predictor of mobile banking adoption in that country. Amin, Baba and Muhammad (2007:7), in their study found that a positive relationship exists between the perceived usefulness of mobile banking and the intention to use and accept the technology. Koenig-Lewis, Palmer and Alexander (2010:421) found that perceived usefulness positively influenced the adoption of mobile banking among young consumers in Germany. In Parvin's (2013) study in Bangladesh, the researcher concluded that usefulness of mobile banking significantly influenced adoption rates, and that customers were at ease with new innovations. The finding of Thakur's (2014:639) study in India indicates that banks

need to enhance their mobile banking interfaces to increase the uptake of mobile banking services. Parijat's (2016:50) study in India found that usefulness is an important determinant of the adoption of mobile banking.

Other studies have also shown that a positive relationship exists between perceived usefulness and usage intention. For example, Luarn and Lin (2005:873-879) indicated that perceived usefulness has a significant impact on the willingness of individuals to use mobile banking. A study by Glavee-Geo, Shaikh and Karjaluoto (2017:14) in Pakistan, also found perceived usefulness to influence the decision of people to adopt mobile banking. Putzer and Park (2010:6) in their study found that one's intention to use a smartphone was largely influenced by perceived usefulness and one's attitude towards using a smartphone.

A study by Ali and Ismail (2014:186) in Somalia showed that perceived usefulness was one of the factors that were statistically significant in affecting the adoption of mobile banking. A study by Shariq (2006) concluded that individuals' attitudes and perceptions positively influence their use and adoption of technology if they find that the product or technology is useful to their needs. Parijat and Saeed's (2016:50) study in India also found that usefulness positively affects one's intention to use mobile money services. Abdinoor and Mbamba's (2017:19) study in Tanzania found that perceived usefulness is positively related to the adoption of mobile banking

Kleijnen, Wetzels and Ruyter (2004:215) on the other hand found that although mobile banking is useful in facilitating transactions between banks and customers, perceived usefulness was not significant in the adoption of mobile banking services. Similarly, Sathye (1999:331) found that with regard to new technology acceptance, unless specific needs of consumers are fulfilled, they may not be prepared to change familiar ways of operating, such as traditional banking. A consumer's attitude to new technology will influence whether one adopts it or not.

The literature reviewed indicates that individuals will view technology positively and tend to adopt it if they find it useful and if it meets their needs. Therefore, it was found that using the construct of perceived usefulness in this study would be valuable in

determining whether rural people do in fact find mobile banking useful and what their perceptions are regarding mobile banking. The next section provides an overview of the construct perceived cost.

4.2.6 Perceived Cost

The construct of cost is presented in this section with supporting literature that shows its' use and relevance in other studies that have been done.

Cost is defined as a person's belief that using mobile banking would be costly for an individual (Luarn & Lin 2005:873-879). Some of these costs considered by individuals could range from the cost of the mobile device, network and transaction charges, bank costs, to data costs. According to Jenkins and Ishikawa (2010), poor rural people can benefit from mobile technology through the transfer and flow of money at lower transaction costs. Similarly Donner (2008:319) found that traditional banks are unable to service a large portion of poor people, particularly those in remote places, given the high expenses of maintaining bank branches. Therefore mobile banking plays an important role in the lives of the poor as it is less about convenience and more about accessibility and affordability (Donner, 2008:321).

Rashid and Elder (2009:1) found that while developing countries are lagging behind high-income countries in overall ICT usage, the mobile phone has still been regarded as an accessible and less expensive means to close the digital gap. Mobile phones have become increasingly affordable to the lower income segments of populations and can be used to ensure participation of these groups in the development process (Rashid & Elder, 2009:4).

Jeong and Yoon (2013:37) in their study in Singapore found that cost did not significantly affect the adoption of mobile banking in that country. Wu and Wang (2005:726) in their study in China found that perceived cost had no significance when it was compared to variables such as perceived risk, compatibility and perceived usefulness. They also further found that cost is a major concern only at the point of first introducing a new technology to the market. However, what was interesting in

their study is that in the case of an emergency or a sudden need that may arise, the benefits of a technology was found to outweigh the cost issues.

Studies conducted by Laukkanen (2007), Tiwari and Buse (2007:20) have shown that mobile banking offers the advantage of convenience in that it offers; cheap, fast, access to banking, irrespective of the location or time, thus making it efficient. It therefore results in costs being cut down as people do not need to travel to banks to do banking. Once people in remote rural areas start to see the benefit, it leads to accepting and adopting the technology. Crabbe, Standing, Standing and Karjaluoto (2009:539) found that mobile banking is regarded as cost-effective as a service and therefore provides banking at affordable rates as opposed to other banking channels.

Mallat, (2007:8) and Cruz *et al.* (2010:360) in their study found that cost has a negative influence on the adoption of mobile banking due to the subscription and services for accessing mobile banking. Hua (2009:9-11) concluded that mobile banking is important to reduce cost incurred through travelling and inconvenience costs, and it plays a role in minimising the risk that is associated with travelling with cash.

Wolverton (2002) found that individuals with low incomes at their disposal are price sensitive and therefore the perceived cost becomes a major factor in their decision to adopt technology. The poor tend to focus on meeting basic needs such as food, and therefore they do not spend on technology as these are considered luxury items. Perceived cost therefore is a factor that influences the adoption of mobile banking.

Wessels and Drennan (2010:552) also indicated that cost determines the adoption of mobile banking in their study. Similarly, Abdinoor and Mbamba (2017:17) found that cost significantly affects the adoption of mobile banking in Tanzania and that if service providers want to increase mobile banking users, then they should consider the cost factor.

On the other hand, Koksal's (2016:341) study found that cost was not associated with the adoption of mobile banking in Lebanon. This finding was attributed to the

fact the mobile banking is new in Lebanon and people could not compare the price against anything else as there were no competitors at the time of carrying out the study.

Therefore, from the aforementioned literature, cost is significant in determining whether individuals adopt mobile banking or not. This construct is therefore appropriate to use and test in this study on rural South Africans in order to establish the perception of cost in the adoption of mobile banking.

The hypothesis below is proposed after a review of theory and literature relevant to the construct cost:

H15. There is a relationship between the perceived cost of mobile banking and the perceived usefulness

The construct of trust is discussed below with supporting literature and research that have found the construct useful in some studies.

4.2.7 Trust

In this section, the construct of trust will be outlined through the review of literature indicating its use and relevance to the adoption of mobile banking in many contexts. Many researchers have indicated the importance of trust and security as important and central to the decision on whether to adopt mobile banking. Trust is defined as a behavioural intention centred upon the expectations of another person (Davis, 1989:325). According to the TAM theory, trust and security play an important role in consumers' adoption of a new technology which is often linked to the perceived usefulness of the technology and its ultimate adoption.

In a study by Kim, Shin and Lee (2009:297) which examined the effect of trust on the adoption of mobile banking, trust was considered to be a belief that a trusted party will not behave unscrupulously so that an individual will feel safe enough to depend

on someone or something. They went on to further make a distinction between initial trust and experience or knowledge-based trust whereby initial trust refers to when an individual has no experience with the use of mobile banking. Similarly Gefen (2000) views trust as the belief that the other party will behave responsibly so as to fulfil the expectations of the user without any form of exploitation.

Ba and Pavlou (2002:250) define trust as economic and social interactions in which there is the presence of uncertainty. According to them, practically all transactions require an element of trust which can in turn be linked to the aspect of security. A study by Siau and Shen (2003) classified trust as; trust of technology and trust of mobile banking service providers. Lee, Lee and Kim (2007:7) proposed three dimensions of trust as: trust in bank, trust in mobile network provider and trust in wireless infrastructure. Ismail and Masinge (2011:29) in a study in South Africa found that it was equally important for individuals to trust the service providers of mobile banking and mobile network operators and that trust in mobile banking increased customer loyalty.

Research has shown that factors such as customers' certainty about the privacy of their information, security, protection and integrity of their banking information and details, system reliability and information quality are likely to influence whether customers adapt to mobile banking. If users believe that using a technology will be free of risk, then this is referred to as perceived security and a consumer will adopt mobile banking if it is found to be free of any security risk (Ba & Pavlou, 2002:255). Kolodinsky, Hogarth and Hilgert (2004) raised concerns about password integrity, privacy, data-encryption, hacking, and the protection of personal information in their study in the US.

Siau and Shen (2003) indicated that mobile banking is vulnerable leading to information and transaction eavesdropping risks, similar to other e-commerce applications such as internet banking.

Research by Ivatury and Pickens (2006:4) and Porteous (2006:40) have found that trust plays a significant role in the use of mobile banking in South Africa. For

example, users feel more comfortable with at least some face-to-face contact and assistance as opposed to mobile banking (Ivatury & Pickens, 2006:6). Therefore it seems that there exists a significant relationship between perceived trust and the adoption of mobile banking adoption.

Trust is mostly dependent on whether the user accepts technologies for financial transactions and whether they recognise the reliability of a financial institution. Wang, Lin and Luarn (2006:176) indicate that trust in mobile banking suggests that a customer has confidence in the ability, integrity, and benevolence of a bank that is providing the mobile banking service. Leishman (2009) found that the use of mobile money brings un-banked customers operating in a cash economy into the formal sector and once customers develop trust in mobile money services, they start to explore and demand traditional forms of financial services such as savings accounts. Therefore, trust has a positive influence on customers to reduce the perception of risk of mobile banking which could result in the adoption of mobile banking.

Omwansa, Lule, and Waema (2015:14) conducted a study in Kenya on mobile banking adoption and they found that trust and risk significantly determined the use of mobile money transfer and therefore trust moderates the risk in the adoption of mobile banking. Kim, Shin, and Lee (2009:298) also found that people have less trust in mobile banking services which played a role in the initial usage in mobile banking.

Zhou's (2011:535) study found that assurance and information quality are important factors affecting initial trust in mobile banking and this in turn affects the perceived usefulness which leads to adoption of mobile banking. Joubert and Van Belle (2013:36) in a study in South Africa suggested that there is the need to build trust when one makes a choice to use mobile banking, as uncertainty and risk are part of the technology since the mobile banking system is under the control of mobile banking technology service providers.

Maroofi, Kahrarian, and Dehghani (2013:400) in their study in Iran indicated that initial trust has an influence on whether customers adopt mobile banking. Gu, Lee and Suh (2009:614) confirmed the effect of trust in their study and they found that

potential risk and fraudulent activity incentivises consumers to obtain dependable and trustworthy services. They also found that in order to increase trust in mobile banking, there is the need for banks to make users free from fear when they transact using mobile banking. Also, in order to place individuals at ease and reduce fraud, banks need to develop structural assurances (Gu, Lee & Suh, 2009:614). Benamati and Serva (2007:171) suggest that consumers are forced to consider concerns about password integrity, privacy, data encryption, hacking, and the protection of personal information when they decide to adopt electronic banking services.

According to Kuisma, Laukkanen and Hiltunen (2007:80) individuals fear the loss of pin codes which may pose security concerns and in some instances users fear hackers may access their bank accounts. Research has also found that some users may fear loss or theft of a mobile device with stored data. Coursaris *et al*. (2003) in Hanafizadeh, Behboudi, Khoshksaray, and Shirkhani Tabar, (2014) in their study in Iran, and Ramdhony and Munien (2013) in their study in Mauritius, found similar results whereby customers were concerned that their money and personal information might be transferred to others through mobile banking without consent. The study by Hanafizadeh *et al.* (2014:76) also revealed that people felt that banks needed to be more trustworthy than the mobile network service providers and telecommunication companies. Bhatti (2007), Sadi and Noordin (2011) in Nayak, Nath and Goel (2014:220) in their studies found trust to be an important factor and should be taken into consideration by service providers. They found that if consumers feel insecure about the credibility and safety of mobile banking, they would be reluctant to use the services.

Kaasinen (2005:71) added the component of trust to the TAM theory in a study and found that trust is an important factor that influences the acceptance of mobile banking services. A study by Laforet and Li (2005:373) in China found risk, which is an aspect of trust, to be a significant determinant of consumer adoption of mobile banking among Chinese. The reasons found were the lack of skills in technology and the cash-carrying culture of the Chinese.

A FinScope Seychelles (2016) study found that the majority of adults trust mobile money providers and yet only a small percentage use mobile money services. This suggests that trust is not necessarily the key factor when making decisions and perhaps a lack of understanding could contribute to the low uptake and usage in this country (FinScope Seychelles, 2016).

A study by Gu *et al.* (2009) showed that trust perceptions influence the perceived usefulness in cellphone banking and they found that trust has a positive influence on the perceived usefulness of mobile banking.

A vast amount of research has been done on the construct trust with reference to the adoption of mobile banking and new technology related to banking. The literature above showed that despite the benefits of mobile banking, the ability of consumers to overcome trust is a major concern and challenge to the adoption of mobile banking. Therefore, it would be interesting to examine the extent to which trust is perceived to affect the adoption of mobile banking among rural South Africans, and hence the construct was included in the TAM model for examination in this study. The following hypotheses were determined for the construct trust from the theories examined and literature reviewed:

H13. There is a relationship between the perceived trust of mobile banking and the perceived cost.

H14. There is a relationship between the perceived trust of mobile banking and the perceived usefulness.

The next section provides an overview of demographics and the extent to which literature shows that demographics influence the adoption of mobile banking.

4.2.9 Demographic factors

Further to the attributes discussed above, demographic factors such as age, employment status, education levels, gender and marital status also play a role in the adoption of mobile banking as indicated in many studies that were reviewed. Many studies refer to the demographic profile and characteristics of individuals in order to understand their usage and adoption of technology. Some of these characteristics are gender, age, marital status, educations level, employment status, income levels, amongst others. Although many studies have examined attributes of variables in their studies of adoption of mobile banking and other technology, they have also included the demographic element in their studies.

This study intended to understand whether demographic characteristics influence the adoption of mobile banking and what aspects of demographics would influence the adoption of mobile banking. A request for demographic information such as age, gender, employment status, marital status and education level, was included in the survey instrument.

Several studies have investigated the relationship between demographics and the adoption of mobile banking and other technologies. Rogers (2003:289) claimed that the educational level and occupational status of individuals affect their decisions to adopt new technologies. He found that early adopters have more years of formal education, they are literate and have higher social status and occupations (Rogers, 2003:289). Laukkanen and Pasanen (2005) also suggested that education, income levels and occupation affect the adoption of electronic banking services.

Many other researchers reviewed in this study such as Karjaluoto *et al.* (2002); Mattila *et al.* (2003), found that individuals with high education levels have access to technology and the internet and therefore they are more adept and comfortable to use self-service technologies due to their education levels. They found that the high education levels provide access to resources and therefore individuals are able to experiment and adopt new technologies. The level of education of an individual is found to be directly related to their access to resources,

and hence their ability to experiment with and adopt new technological innovations (Detenber, Lee, Chia & Li, 2006; Van den Bulte, 2007).

Goldstuck's (2009) study found that income levels influence cellphone banking. However, the effect of income and age on innovativeness found mixed results. Studies also found that gender plays a significant role in the adoption of technology (Gefen & Straub, 1997; Morris & Venkatesh, 2000 in Elogie, 2015:11). Some studies found that men are task oriented compared to women and are more receptive to technological innovation such as mobile banking. These were found in studies carried out by Cruz *et al.* (2010); Laforet & Li, (2005); Laukkanen (2016) and Mattila (2003). These studies found that the perceived usefulness of technology was a major factor that influenced men to use technology, while women were influenced by technology that was easy to use.

Age was also found to be a factor that influences the adoption behaviour. Studies by Cruz *et al.* (2010); Laforet and Li (2005); Laukkanen *et al.* (2007); Laukkanen (2016) and Meuter *et al.* (2000), amongst others, found similarities in their studies whereby the rate of adoption decreases amongst individuals in the older age categories. They found that older consumers are generally resistant to new technologies and mobile banking. Laukkanen and Pasanen (2005) in their study found that age and gender were the main factors affecting adoption of mobile banking.

Suoranta (2003:64) found that educated individuals, aged between 25 and 34 and earning an income use cellphone banking. Therefore, age and education were found to be important to the adoption of mobile banking in Suoranta's (2003:64) study. Munnukka (2007:729) also found that age, income and education are good determinants of the adoption of mobile banking. Other studies conducted by Iddris (2013:368); Munnukka, (2007) and Suoranta (2003:66) found that marital status, significantly affected the adoption of mobile banking.

Although many studies collect demographic data as a mere process in their studies, it is often found to have conflicting results and sometimes tend to be less significant.

However, in view of the literature reviewed the following hypotheses were considered for this study.

H19. Females and males differ with regard to the adoption of mobile banking.

H20. Age groups differ with regard to the adoption of mobile banking.

H21. People with different education levels differ with regard to their perception of mobile banking.

H22. People with different employment statuses differ with regard to the adoption of mobile banking.

H23. People with different marital statuses differ with regard to the adoption of mobile banking.

4.3 Conclusion

The review of the literature in this Chapter illustrates that there are various factors that contribute to the adoption of mobile banking. It is evident that mobile banking services do offer advantages related to accessibility to banking anywhere, anytime and at a far lower cost, especially for communities that are located in remote areas. The literature shows that mobile banking services in developing countries promote access to financial services and enhance the financial inclusion of the poor. Despite the highlighted benefits of using mobile banking, some researchers have raised a number of limitations and concerns with regard to the technology.

On the other hand, in some instances, the high uptake of mobile technology in many regions does not necessarily translate into access to financial services through mobile banking. There are also various factors that lead to the poor uptake of mobile banking such as; risk, trust issues, and unawareness to mention a few.

It has also been found that not many studies exist in Africa and South Africa on mobile banking and those that do exist, do not examine the perceptions and attitudes of the poor as it relates to mobile banking usage. Furthermore, the literature did not present any studies on mobile banking done in rural South Africa.

The literature showed that attitude and perception are important in determining the adoption of technology. The theories used by different researchers have been applied in various domains such as mobile communication, marketing management and information technology. The theories have also been expanded in some studies by including various variables.

The literature on the TAM has shown that the PU and PEOU are key determinants for an individual to adopt a technology. Many researchers have also extended the two determinants of TAM to include variables of trust, risk, and cost, amongst others. It was also found that there are some overlaps in definition of some variables in the TAM to that of the DOI theory. However, the literature does demonstrate that attitude plays a central role in the adoption of mobile banking and an individual's intention to use a new technology.

The next Chapter provides an in-depth discussion on the research design and methodology employed in this research.

CHAPTER FIVE
RESEARCH DESIGN AND METHODOLOGY

5.1 Introduction

This Chapter presents the operational elements of the research. Research is often guided by underlying philosophical assumptions about its validity and the methods that are considered appropriate for a given study. Knowing the assumptions of research at the outset of a study is important in order to conduct and evaluate research. In this Chapter the research design and methodology that are adopted by the researcher in order to realise the objectives of the study are discussed. The Chapter elaborates on the data instrument that was used by the researcher, the data collection and analysis methods, and it further provides reasons for the choice of the particular method used. The practicalities of the data collection process and the analysis of the data are also presented. The research objectives are examined in-depth and the researcher explains the process that was followed in developing them. The Chapter also discusses the sampling method adopted and closes by outlining the limitations of the study.

In this study, the data were collected using a questionnaire in the format of a survey. The questionnaire was categorised into three sections which comprised items that measured the constructs that were determined in the study, and included demographic related questions. A pre-test was conducted before the final survey was implemented in order to ensure that the questionnaire was accurate and understandable as part of ensuring the validity of the instrument. The analysis of the data comprised two statistical techniques whereby the preliminary data were analysed using the Statistical Package for the Social Sciences (SPSS) through a descriptive analysis to obtain the means, standard deviations and frequencies of the data. Exploratory factor analysis was carried out followed by Structural Equation Modelling (SEM using AMOS v24).

5.2 Research design and paradigm

A research design is often considered as the rationale, plan or blueprint of a research study that informs the approach that is to be used in conducting a study. It illustrates how all the major aspects of the research that is, the samples, areas, measures, amongst others, work together in order to address the research questions or the objectives that are set out in the research (Mouton, 2001:55). The research design sets out the procedures in a logical step or framework which ensures that the validity of the data and the research problem that is under study is optimised. According to Mouton (2001:55-57) the research design is a structured plan in order to execute the research to maximize the validity of the research findings. It also provides direction to the research study and data collection and analysis process that is based on underlying philosophical assumptions.

Mouton (2001:144) and Saunders *et al.* (2012:15*9)* add that a research design is an action plan for moving from one point to the next or from *here* to *there*. In this instance, *here* may be from the point of the questions that need to be answered or the objectives that need to be addressed, to *there,* which may be the conclusion or answers to the questions or the objectives and research problem that are raised in the study. Saunders *et al.* (2012:159) suggests that when a researcher adopts the process of first designing the research study, it adds value to the plan and the implementation phase such that it assists with obtaining the intended results, and increases the chance of obtaining information about the real situation and the problem under study.

According to Jankowicz (1991) a research design is a plan and structure of investigation that is conceived in order to obtain answers to research questions. For Malhotra (1993), a research design is a framework or blueprint for conducting the research project where the details of the procedures are documented that are necessary for obtaining the information that is needed to solve the research problem.

Before beginning any research, one needs to have an understanding of the phenomena to be investigated which form the basis for what one wants to

investigate. The research philosophies of positivism and interpretivist, for example, influence the methodology one uses in a study and is an integral aspect of any research process.

The positivist philosophy explains causal relationships between two or more variables. It entails hypothesis testing, identifying constructs and examining existing theory. This type of approach is deductive in nature and uses quantitative data, comprising large sample sizes with which to make generalisations from the sample to the broader population. The findings of such studies may either confirm or refute the theories that the study was based on (Saunders *et al.,* 2012:134).

On the other hand, interpretivist is concerned with finding meaning rather than measurement, and researchers are mainly focused on the viewpoints of people, and what they are thinking and feeling. It is inductive and uses qualitative data with small sample sizes from which theories are generated and generalised. Interpretivist comes from the tradition of phenomenology which refers to how humans make sense of the world and how these interpretations adjust individual's meanings and actions (Saunders *et al.*, 2012:137).

Saunders *et al.* (2012:173) consider a research strategy to be important in order to provide a basic guideline or picture about how the research question(s) will be answered. The strategy should outline the source for data collection and challenges or hindrances that could potentially be faced during the research. For example, limitations that are faced by the researcher during the research, overall limitations of the study, data collection challenges and constraints, time constraints and perhaps ethical issues are some of the challenges that could potentially be encountered. Saunders *et al.* (2012:173-174) further explain that the strategy in a research study is mainly concerned with the overall approach that one adopts, while the tactics involve the details in the research process, such as, data collection methods (questionnaire, interviews, published data) and analysis methods.

Therefore, there are several strategies that one can adopt for research, that is, the deductive or inductive, approach. Two methods of reasoning referred to by Trochim, (2007) are the inductive and deductive approaches, where induction refers to moving

from the specific to the general, while deduction begins with the general and concludes with the specific. Trochim (2007) indicates that arguments that are based on observations and experience which are highly subjective are ideally expressed and presented inductively, while arguments that are based on guidelines, rules, parameters or other widely accepted principles can be best expressed deductively.

The manner in which research has evolved over the years has dramatically changed how researchers approach a subject under study and as a result various research methods and approaches have emerged to suit the complexity of current landscapes. O'Leary (2004), claim that phenomena have become much more difficult to describe and define today as opposed to many years ago. Therefore some researchers argue that the nature of the research is in fact influenced by the theory that one identifies at the beginning of the research and this determines whether the research approach should be inductive or deductive. An inductive approach entails the collection of data first, which is followed by developing a theory based on the analysis of the data while with a deductive approach, the theory is developed first followed by the data collection and analysis (Saunders *et al.,* 2012:145-146).

Researchers using the deductive approach develop the theory first and the hypotheses whereby the design of the research strategy is intended to test the hypotheses. Leedy and Ormrod (2005), suggest that the deductive approach is one of theory testing where there is an established theory and the researcher tries to validate the theory in the context of the outcome of the study and in the context of instances. Saunders *et al.* (2012:146), also indicate that the theory and hypothesis (or hypotheses) are developed in a deductive approach followed by designing a research strategy to test the hypothesis. This test will either confirm or refute the theory or propose whether there is the need for the theory to be modified.

The approach taken in this research is deductive. It is deductive in that it used a combination of established tested theories that are suitable for studies related to innovation and technology and the use of the technology by the general population. A few theories were examined first, and through this process relevant constructs were determined from a combination of theories that were suitable for the context of this study. A survey is well suited for this approach, as in a survey the questions are

formulated according to the constructs that are determined from the theories, in order to test the relationship between the variables and constructs.

A survey is typically used to explain and interpret quantitative results, and provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. From the results of the sample in the study, the researcher generalises or makes claims about the population (Creswell, 2009:146). Therefore, for the purpose of this study, the survey was conducted to provide the necessary numeric description of the factors that are perceived to affect the adoption of mobile banking of rural South Africans.

A large amount of data is required in a survey in order to determine the relationship between the constructs that have been identified in the literature review. According to Saunders *et al.* (2012:176) surveys allow for the collection of data in a cost-effective way. Surveys are mostly done in the form of a questionnaire, as this instrument is capable of providing standardised data which makes it easy for comparison and analysis. However, for surveys to illicit the best possible response with minimum interpretation challenges to the questions, it is important that questions are drafted with much thought and time. Therefore, the process of questionnaire development is a time-consuming and perhaps can be a limitation in a study. In this study, the questionnaire was self-developed. There were several iterations to the process after consulting the literature and empirical studies that have been done on this subject under study. Surveys are also dependent on respondents to answer survey questionnaires which come with many challenges.

There are also constraints on the length of the questionnaire and the number of questions that can be included in a questionnaire and these constraints are mostly from the perspective of respondents. Therefore if a study requires robust and high quality responses from respondents, it is important that cognisance be taken of these factors when drafting a questionnaire. In this study, these factors were considered and will be explained in Section 5.6.1.

Leedy and Ormrod (2005), find that when questionnaires are self-administered whereby respondents fill them out on their own, the response rate is generally poor resulting in biased data due to many factors, some of which relate to the level of understanding of the respondents and lack of interest in sincerely answering the questions or perhaps completing the questionnaire hastily. Cooper and Schindler (2003:244) on the other hand find that surveys have a draw-back in that they are limited in offering the researcher a thorough understanding of what respondents' opinions are, without room for substantiating or providing clarification.

Saunders *et al*. (2012:190) further indicate that a research study can be cross-sectional or longitudinal. A longitudinal study is carried out over a long period of time, where the researcher conducts follow-ups on the samples. In this type of study, the outcome of the study is not immediately realised, deeming this process far more reliable from the perspective of analysing the cause and effect pathway. However, it is time consuming.

In cross-sectional research, a certain phenomenon is studied at a particular point in time. Although the process of sampling in this approach can take long due to the number of people required for the statistical analysis, the research occurs over a short period of time. Surveys are preferred and often employed in cross-sectional studies (Saunders *et al*., 2012:190). This study was cross-sectional, in that the data were gathered at one specific point in time. The sample was not followed over a period of time and neither was there any follow-up nor post-testing of the questionnaire.

5.3 Methodological orientation

A research method is known to be a strategy of enquiry, whereby the researcher begins with assumptions about phenomena to be studied and proceeds to formulate a research design, then collect data and finally analyse the data so as to answer the research question or problem under study (Myers, 2009). Leedy and Ormrod (2005) together with Babbie and Mouton (2008:74) view research methodology as the general approach that the researcher uses in carrying out the research. In a research

study, the methodology focuses on the process of research and the required tools, procedures and measures to be used (Mouton, 2001:56). The researcher begins with the data collection, followed by individual steps in the research process ensuring that objective processes are employed during research.

Sarantakos (2013:28) views research methodology as a process that comprises theoretical principles and guidelines on how research is done while considering the context of a paradigm. Ontological and epistemological principles are translated into guidelines through a research strategy to illustrate the process of how research is to be conducted. The researcher, through a practical process, finds out what is believed to be known, what can be known and what can be regarded as acceptable knowledge. Antwi and Hamza (2015:219) define epistemology as the relationship that exists between the researcher, often referred to as the knower, and knowledge and understanding that can be acquired through different means of inquiry and investigation.

According to Creswell (2009:99) there are several factors that must be considered when selecting the correct research method for one's study. At the outset, the type of research problem that is identified often serves as an indication of what type of research methodology is to be used in the investigation. The researcher's own experience, worldview and the external environment, that is, the stakeholders or audience to whom the research results will be disseminated are also factors that must be considered. Research methods are most often classified into qualitative, quantitative and mixed methods which refer to the ways in which data are collected and analysed, and the type of generalisations and outcomes that can be derived from the data (Creswell, 2009:100).

5.3.1 Quantitative method

Quantitative research approaches which stem from philosophical thinking are termed the traditional, positivist, experimental, or empiricist paradigm (Creswell, 2009:16). A quantitative research method is concerned with quantifying social phenomena and collecting and analysing numerical data. For Creswell, (2009:151), in a quantitative

approach, the theory is examined by gathering diverse measures together with numbers and this is analysed using statistical procedures to determine if the generalisations of the theory that are predicted are factual.

Aliaga and Gunderson (2002) define quantitative research as a process of collecting numerical data and analysing them by using mathematically based methods. Furthermore, Winter (2000) describes quantitative research as the ability to segment and delineate phenomena into categories that are measurable and can be applied to a wide range of similar situations.

Questionnaires, surveys and experiments are used to gather data and these are characterised using statistical analysis (Winter, 2000). Researchers are able to measure variables on a sample of subjects and identify the relationship between variables using effective statistical processes such as correlations and frequencies, amongst others. These processes inherently focus on testing theory which requires the development of hypotheses before the research can begin.

In quantitative research, responses are summarised in a measurable way (quantified), and inferences are made using mathematical modelling and statistical analysis to present statistical results in the form of numerical or statistical data. In quantitative research, collecting and analysing data require an understanding of the relationships among variables using either descriptive or inferential statistics. Through descriptive statistics, inferences are drawn about the population. Since inferential statistics are based on the outcome of the descriptive statistics, the assumptions can be generalised to a larger population from a selected sample (Trochim, 2007).

Most often, closed questions are used in questionnaires as the research is structured so as to ensure the precise answering of the questions with minimum deviations allowed. With such types of questions, there is no room for the respondents to provide unnecessary responses that are not relevant to the study (Saunders *et al.,* 2012:163).

The benefit of quantitative studies is that it generates factual and reliable data that are linked to a larger population. However, there is inadequate room to obtain information about peoples' attitudes and motivation (Gorard, 2003). Maxwell (1992) also found that the quantitative approach allows the researcher to generalise the outcomes of the study to a sample that is similar and with similar circumstances. Therefore, generalisability, which is a test for validity, makes quantitative approaches attractive in its possibility for the research to be applied to a larger population (Winter, 2000).

Some researchers have criticised the quantitative approach - for example Muijs (2004:3) believes that measuring the true reality objectively is not always possible and accurate through this approach and that the researcher cannot completely detach oneself from the research process and phenomena under study. Muijs (2004:3-4) believes that considering that individuals are part of the world under observation, research is therefore bound to be influenced by the beliefs of individuals and the political and social climate under which the research is conducted. It has also been criticised for being repetitive and producing contradictory results without considering the context of human values, behaviours and issues.

However, researchers such as Bryman and Burgess (1999:43-46) have acknowledged that these approaches are not necessarily in competition with one another and neither is one better than the other. The decision to adopt an approach is based on the context of the study and its purpose. Some studies combine the approaches through a mixed method approach where researchers find that they can leverage the benefits of both.

This study adopted the quantitative approach whereby the relationships between variables (relative advantage, awareness, cost, complexity, trialability and trust) that have been determined from the theory were tested. The quantitative approach does not explore unknown variables and only the cause and effect or relationships between known variables identified in this study were tested, making this approach suitable for this study. A structured questionnaire was used to gather data which were analysed numerically and presented using tables and graphs. This study also

identified factors through the exploratory factor analysis process. Creswell, (2009:151) suggests that where there is the need to identify factors that impact the outcome of a study, the quantitative approach is best suited. Therefore the quantitative approach was used in this study, which identified the factors that are perceived to affect the adoption of mobile banking amongst the rural people in South Africa.

5.4 Sampling strategy

The population that is to be considered in a study is important, and how one locates the appropriate population to provide the necessary information, and answer the research objectives in order to test the hypotheses in the study is just as crucial (Creswell, 2009:133). Where the population is large and the researcher cannot access it, a part of the population is used as a representation of the population. This is referred to as sampling (Saunders *et al*., 2012:260-262).

Bryman and Cramer (2005:122) define the population in a research study as a group of individuals who share similar distinct characteristics that are of interest to the researcher. Since it is not possible for many researchers to access an entire population due to time and financial constraints, a sample is considered a viable option as the researcher is able to select a sample that is accessible and within reach to the researcher (Bryman & Cramer, 2005:125-127).

Saunders *et al.* (2012:260) consider sampling as a process of selecting units (e.g., people, organisations) from a population of interest. By studying and understanding the sample, the researcher may generalise the results to the population from which the sample was chosen.

Two major types of sampling methods, that is, probabilistic or random sampling and non-random or non-probabilistic sampling have been identified in the literature. In non-probabilistic sampling, there is no random selection and one may or may not represent a population accurately as here the sample is pre-selected by the researcher based on specific characteristics (Saunders *et al.,* 2012:281).

In probabilistic sampling, a random selection is possible and the researcher knows the probability of representing the population well and confidence intervals for the statistical analysis can be easily estimated. In this method, the respondents are randomly selected in such a way that each individual in that population has an equal probability of being selected (Bryman & Bell, 2007:189). Although probabilistic or random sampling methods are often preferred by researchers due to their accuracy and rigorous nature, it is not necessarily practical. This method can pose challenges in obtaining responses to the survey (Saunders *et al.,* 2012:262-263). However, although this may be time-consuming; it is not impossible. Probability sampling entails techniques such as; random, stratified, systematic and cluster sampling (Bryman & Bell, 2007: 190). Random sampling is a process of selecting respondents with no criteria in mind, while stratified sampling is when the researcher selects the sample randomly with one or more attributes from the respondent identified and considered. Systematic sampling entails randomly selecting respondents from a list at intervals as decided by the researcher based on the research requirements. When the population is scattered over a wide geographic area, the researcher splits the population into clusters in terms of areas, boundaries, households, clinics, schools, hospitals etc. from where respondents are randomly selected (Bryman & Bell 2007:186).

On the other hand there are non-probabilistic methods such as convenience and purposive sampling. Although in convenience sampling the sample is selected based on accessibility and convenience, the sample cannot be generalised to the broader population of that area.

The choice of the right sampling method depends on the objectives of the study, the theory, context and feasibility of the research in terms of time and cost. In this study, the researcher adopted the random sampling technique using a stratified sampling process. The respondents were identified based on a few criteria required in the study. Respondents had to be 18 years old and beyond, with or without a bank account and own a cellphone. The random sampling method was chosen as this was considered most feasible for the researcher to obtain responses to the survey

questions. The sampling technique ensured that equal proportions of males and females were selected in the sample.

5.4.1 Study population and sample size

Cohen *et al.* (2000) indicate that populations in a research study represent the subjects that conform to specifications that comprise the entire group that is of interest to a researcher and to whom the results of the research can be generalised. According to Cohen *et al.* (2000) the size of the sample in a research study is based on the heterogeneity of a population. For a heterogeneous (diverse) population, there is the need for a larger sample, together with other factors such as the purpose of the research. Cohen *et al.* (2000) argued that the size of the sample must be large enough so that the researcher is confident to generalise the study to the population and to satisfy the needs of the study.

For this study, a sample size of 211 was selected from rural areas in small farming towns in the Free State province. The sample was selected in order to obtain an adequate response rate and to ensure that the research had a representative sample. The sample had equal proportions of similar criteria, or profiles; that is, aged 18 years and older from previously disadvantaged backgrounds, having access to a cellphone, based in a rural area (small-scale farm or former home-land) and were financially included and financially excluded. Financially included denotes access to financial services and products, while financial exclusion denotes the unavailability or lack of access to financial services due to no income or low income.

The areas selected for this study were rural farming areas located in the Free State province. All the areas that were selected were located at an average distance of 77 km to a nearest bank branch. The areas were Dealesville, Soutpan, Edenburg and Boshof from which a minimum of 50 respondents were selected per area.

Although an equal sample size was required for this study, with equal numbers of males and females for each area sampled; the survey yielded 54 responses from Edenburg (with 27 males and 27 females), 52 from Soutpan (26 males and 26

females), 54 from Dealesville (with 27 males and 27 females) and 51 (24%) from Boshof (25 males and 26 females). The survey ultimately received 211 (100%) complete responses.

The Free State has one metropolitan municipality (Mangaung Metropolitan Municipality) and four district municipalities, which are further subdivided into 18 local municipalities. The areas from which the samples were surveyed for this study present the following profiles:

Soutpan is a small rural mining town that is part of the Lejweleputswa District Municipality which is located 45 km west of Brandfort and 50km north of Bloemfontein. The Lejweleputswa District Municipality is situated in the north-western part of the Free State. The district makes up almost a third of the province. Soutpan does not have any bank branches with the exception of Automatic Teller Machines (ATMs). The nearest bank branch is located 60 km away.

Dealesville is a small farming town that is also situated in the Lejweleputswa region in the Free State, 60km from Bloemfontein. It is surrounded by salt pans and the town was proclaimed a township in 1899. The nearest bank branch is located 60km away.

Edenburg, a small sheep and cattle farming town is part of the Kopanong Local Muinicipality that is located 80 km south of Bloemfontein. Basic agricultural products are exported from the area for processing and re-imported into the area as consumer products. The nearest bank branch is located 80 km away.

Boshof is a small rural farming town in the west of the Free State province, and is located 55 km north-east of Kimberley and 118 km from Bloemfontein. It is part of the Tokologo Local Municipality which is located within the Lejweleputswa District in the western Free State Province. The nearest bank branch is 118km away.

5.5 Data collection process

According to Saunders *et al.* (2012:304), data refer to all the information that the researcher is practically able to gather for the study. Two types of data collection processes are identified, namely: primary data collection and secondary data collection. Primary data refer to the information that a researcher obtains from the field, that is, from the respondents in the sample. Secondary data refer to the information a researcher obtains from research articles, books, reports and journals. In this study, only primary data were used and analysed.

5.5.1 Data collection

Primary data collection refers to the data collected directly from the field which involves observation, questionnaires/surveys and interviews (Dawson, 2002:40). A survey as a form of data collection allows for large samples of a population to be considered in research for the purpose of descriptive statistical interpretation and analysis (Dawson, 2002:87-89). Although different approaches to data collection are used in research, two common considerations are between questionnaires or interviews. Questionnaires allow for easier response rates from a large number of people where the data can reveal findings that can possibly be generalised to the broader population (Dawson, 2002:88-91).

For the purpose of this study, primary data were obtained through a survey by means of a questionnaire. This type of data was important to the research as it obtained responses directly from those concerned with the problem under study. The confidentiality of respondents was considered during the interview. The primary data were collected between the periods 18 to 27 March 2018. The fieldwork was carried out over 10 days, whereby the researcher carried out the survey over at least two days per area under study.

This study made use of field assistants to administer the survey questionnaire. The assistants were employees of organisations who offered their services over weekends and public holidays. Bryman and Bell (2007:200) suggest that there is

value in using contacts and networks, including family, friends, fellow students and work colleagues when carrying out a survey as it assists in obtaining a good response rate. In this study, field assistants were recommended and identified due to their familiarity with the areas under study and their ability to speak the local languages most commonly used in the research areas.

The benefit of using the field assistants was that in some areas where the field work was carried out, their knowledge presented opportunities to access areas and individuals via important prominent individuals. This served as a motivation for respondents to cooperate during the surveys as a sense of trust was created and clarity about the purpose of the survey was given in a local understandable language. The researcher accompanied the field assistants during field work at all times to ensure availability in cases where clarity was required and to also assist with the administering of the questionnaire to individuals who understood English. The field assistants also translated the questionnaire in instances where there was a need. The structured questionnaires were personally administered by the researcher and the field assistants directly to the respondents by reading out the questions to the respondents, who in turn provided answers which were then recorded in the appropriate space on the questionnaire.

Prior to the collection of the data the field assistants were trained on how to administer the questionnaire and to obtain an understanding of the questionnaire. They were briefed on the objectives of the research and the requirements for the field work. This exercise proved beneficial as it helped with the proper administration of the survey instrument and the capturing of responses.

5.6 Data collection instrument

The following section provides an explanation of the survey instrument that was used in this study and the process that was followed to develop the instrument. The section also briefly outlines how the research instrument was used during the data collection phase.

Questionnaires are considered useful in its ability to gather responses from a large number of people that are located in scattered remote locations. They are typically used in surveys to profile a population (Rowley, 2014:309). A questionnaire is a form of data collection instrument in which all the respondents are asked the same set of questions in a pre-set order. The respondents are expected to interpret the questionnaire in the same manner so as to ensure the reliability of the data that is collected. Questionnaires that are worded correctly require minimum effort to administer during the survey (Rowley, 2014:310).

Questionnaires are often considered the appropriate tool to use for studies that require quantitative data collection due to their nature and ability to pose a variety of closed-questions during interviews. This leads to the collection of numerical data and the subsequent statistical analysis of the data. Depending on the need and design of the research study, interviews can be structured, unstructured, and semi-structured and can be carried out with individuals on a one-on-one basis.

According to Preece, Rogers, and Sharp (2002:239), structured interviews have a place, and are considered appropriate when the goals of the study are clearly understood and specific questions can be identified. In structured interviews, a set of predetermined questions are used that are phrased clearly and concisely. The questions are closed which allows no room for deviation and precise answers are required. The options for the answers are most often provided from which the respondents select an option. Interviews that use such type of questions are easy to conduct as the same questions are put to all respondents in a study. The approach in this interviewing technique and the questionnaire type is well suited for testing and proving hypotheses (Leedy & Ormrod, 2005).

The data collection instrument that was used in this study was a closed structured questionnaire, employed as a survey in order to collect the data. The questionnaire was standardised for the entire sample. The structured nature of the questionnaire did not allow respondents to deviate and provide answers beyond what was specified as set by the parameters of the questions. This was achieved through requesting that

the respondents select the most appropriate answer of their choice from a list of options that were provided.

5.6.1 Questionnaire design

Questionnaires are widely used as a means of data collection in survey type research. It is often assumed that questionnaires are easy to develop and administer. However this is not the case as a great deal of time and effort goes into developing a questionnaire that is capable of collecting the data to answer the research questions and also to obtain a high response rate that is reliable. Saunders *et al.* (2012:420) suggest that in descriptive research, questionnaires are not considered effective as this type of research requires the answering of open-ended questions. On the other hand, questionnaires are suited for research that is predictive and analytical, such as the current study, where the purpose was to understand the relationships between variables. Questionnaires are also useful for research that develops and tests measurement scales, where the researcher develops a number of statements that can be used to measure the variables (Rowley, 2014:311).

Ideally all respondents should have a similar interpretation of the questionnaire so that the data that are collected is reliable. According to Rowley (2014:314) when questions in a questionnaire are worded correctly, it alleviates the effort that is required during the administering of the questionnaire. It is also easy to overlook mistakes and ambiguities in the questions, and the layout of the questionnaire during the development stage.

Several authors such as Rowley (2014:314), Delport and Roestenburg (2011:93), for example suggest that the design of a questionnaire affects the response rate, the reliability and validity of the data that are collected and therefore these can be maximised by giving careful thought to the type of questions and the context of the study. They suggest that the researcher should factor in some of the following considerations when compiling the questionnaire:

- Categorise the questions into open and closed questions. In closed questions, scale type of questions can be used with a different number of options and a range of scales with contrasting concepts and words at opposite end of the numerical spectrum (Rowley, 2014:315). The Likert scale type can also be used where respondents are asked to indicate how strongly they agree or disagree with a series of statements.
- Carefully design individual questions and ensure that they are phrased correctly.
- Consider the layout of the questionnaire such that questions are structured thematically, per section, or individually with no duplications or that no questions have two questions within it.
- Consider the length of the questionnaire and time that it would take to answer each question.
- Explain the purpose of the questionnaire.
- Carry out pilot testing.

The questionnaire that was used in this study comprise of questions that were developed in line with the objectives of the study. These questions were developed with guidance from the literature that was reviewed and the theories that were examined. The concepts and constructs that were identified in the literature and theories also served as a platform for the development of the questionnaire.

In line with the suggestions proposed by the authors indicated above, this study considered several principles during the process of the questionnaire development. In so doing, cognizance was taken of the following:

- The questionnaire was developed using the theories and literature as a guideline and the aims and purpose of the study were also considered.
- Each section of the questionnaire had clear instructions in order to guide the respondent on what was expected.
- The questionnaire had an easy-to-follow layout with a professional appearance.
- The questions were categorised thematically into sections and assumed a methodical format.
- The questionnaire was structured such that the length and duration of time to answer the questions were considered. At the same time, it was ensured that the

responses would not be compromised and that the respondents would answer the required questions in the shortest possible time. As such the questionnaire was designed so that it took respondents approximately 5 minutes to answer, with the assistance of an interpreter.

The researcher used a survey questionnaire as it offered advantages of asking closed-ended questions related to the factors under study and it was not time consuming to complete. The questionnaire was structured in such a way that demographic questions were only asked at the end of the interview process and a brief overview and description of the study were given at the beginning in order to explain the purpose of the survey and to advise the respondents about confidentiality.

The questionnaire was divided into the following three parts:

Section A (Use of cellphone for financial services)

This section of the questionnaire comprised questions that relate to whether respondents use cellphones for financial service purposes. It attempted to obtain information on how often individuals use mobile banking and the reasons for non-usage.

Section B (Attributes of innovation that influence adoption)

In this section, the questions relate to the perceptions of respondents about mobile banking and the factors that are perceived affect the adoption of mobile banking. The questions mainly comprised the concept of mobile banking and the constructs that were identified from the theories and the literature reviewed. The questions were structured so that the relationships between the variables (awareness, cost, trust, complexity, usefulness, relative advantage and trialability) were demonstrated. This section of the questionnaire is categorised into the seven constructs with five items per construct which were tested using a six-point Likert scale. There were a total of 35 items in this section of the questionnaire.

Section C (Demographic profile)

The general profile and demographic information about respondents, such as their age, education level, gender, marital and employment status was requested in this section of the questionnaire. During the drafting phase of the questionnaire, the researcher considered the technique to be used to record the responses to the questionnaire. Therefore, a Likert-scale rating was used in order to ensure that the quantification and analysis of the data were done with minimum challenges. The Likert-scale rating requires respondents to specify the degree of agreement to a particular question item on a given continuum or range. Researchers often use the Likert-scale rating for the purpose of the evaluation of data in a research survey.

The questionnaire is presented next.

Questionnaire

Student Name: Nitha Ramnath **Student Number: 15197001**

Questionnaire number _____

INSTRUCTION:

Kindly note that in order to complete this questionnaire, you must be a regular user of a cellphone

SECTION A - USING A CELLPHONE FOR FINANCIAL SERVICES

Mobile banking is described as the use of a cellular phone to view account balances, transfer funds between accounts, pay accounts and top up airtime. Mobile banking can therefore be defined as the delivery of financial services with mobile devices such as cellular phones and portable data assistants (PDA).

Cellphones are being used for more and more things in daily life. We would like to ask you some questions about using your cellphone for financial activities in particular.

1. Do you use a mobile banking service?

Please tick the appropriate box below

Yes (If yes, please continue to Question 2)	
No (If no, please continue to Question 3)	

2. If Yes, how often do you use a mobile banking service? Select your answer from the options below.

Rarely	
Sometimes	
Often	
Always	

.

3. If No, please indicate why not by selecting one answer from the options below

I don't have my own phone	
I am not aware of mobile banking services	
I don't like mobile banking services	
I'll register sometime later	
I don't understand mobile banking services	

SECTION B: ADOPTION OF MOBILE BANKING

The following questions relate to your feelings/perception of using a cellphone for **mobile banking** and the services it offers. Rate the items below by indicating your level of agreement with one of the five options next to each of the statements, where 1=strongly disagree and 4=strongly agree. If you do not know, then select the 'don't know' option.

Section B	Strongly disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly agree 5	Don't know 6
AWARENESS						
1. I am aware that I can do banking on my cellphone						
2. I am aware that I can send and receive money using my cellphone						
3. I am aware that I can receive immediate notification about my transactions through mobile banking						
4. I know where to obtain information about mobile banking						
5. I use mobile banking because I have seen someone else use it						
COMPLEXITY						
6. Mobile banking is easy to use						
7. Mobile banking requires a lot of mental effort						
8. Mobile banking requires technical skills						
9. Mobile banking requires training						
10. Mobile banking makes me feel nervous/tense						
RELATIVE ADVANTAGE						
11. Mobile banking allows me to bank anytime .						
12. Mobile banking allows me to save time						
13. Mobile banking allows me to bank anywhere						
14. I do not have to stand in queues through using mobile banking						
15. Mobile banking allows me to have control over my finances and banking services						
USEFULNESS						
16.Mobile banking is convenient to use						
17. Mobile banking has improved my life						
18. Mobile banking can be frustrating to use						

19. Mobile banking prevents the risk of carrying cash around						
20. Using mobile banking prevents the necessity to travel to a traditional bank						
TRUST						
21. I am concerned that people would access my account through mobile banking						
22. Mobile banking is reliable						
23. Mobile banking is safe to use						
24. I prefer to go to a bank to do banking for security reasons						
25. I am concerned that I will lose my money through mobile banking						
COST						
26. Mobile banking is affordable to use						
27. Mobile banking allows me to save money						
28. The cost to do mobile banking is cheaper than going to a bank						
29. I would still use mobile banking if there were further charges introduced						
30. The data that I need to do mobile banking makes it expensive to use						
TRIALABILITY						
31. I have had the opportunity to try out mobile banking						
32. I would consider mobile banking if I could try it out for at least one month						
33. I like testing new innovations in banking and technology						
34. I would change my bank if I have to in order to do mobile banking						
35. I do not think it is necessary to try out mobile banking first in order to use it						

Section C – BACKGROUND INFORMATION

Questions in the following section relate to your background. Please place a tick in the space provided next to the option that you select.

1. Your Gender Male _____ Female_____

2. Age group

18-25	
26-35	
36-45	
46-55	
55+	

3. Your highest level of education

Have no schooling	
Some Primary schooling completed	
Some secondary schooling completed	
Grade 12/matric	
Post grade 12/matric certificate	
Post grade 12/matric diploma	
Degree	
Post graduate degree	

4. Employment status

Unemployed	
Part-time employed	
Full-time employed	
Self employed	

5. Marital status

Single	
Married	
Living together	
Divorced	
Widower/Widow	

THANK YOU FOR PARTICIPATING IN THIS SURVEY.

In this study, the literature that was reviewed indicated the use of various scales by various researchers. A six-point Likert scale was used in this study to enable scores of either low or high values to represent the extent of the perceived understanding, awareness, and knowledge, of the respondents with regard to the adoption of mobile banking. In this study, each question was given a scale from strongly disagree (1) to don't know (6) as indicated below.

	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Don't know 6

5.6.2 Reliability and validity in data collection

Saunders *et al*. (2012:429) highlights the aspects of validity, reliability and generalisability as key in data collection and in quantitative research. In quantitative research it is important to consider the reliability and validity of measures which are applicable to formative and summative validity (Venketash, Brown & Bala, 2012-2013).

i. Reliability

According to Hair (2006), reliability refers to the degree to which measures are free from error and therefore obtain results that are consistent. It refers to consistency of the measure of a concept and may include internal reliability or external reliability. In Likert-scale type questionnaires reliability is considered important, as in such a situation there are many variables and relationships between the variables that test the concept. A questionnaire is considered reliable if it yields similar results when administered a few times (Hair, 2006).

Straub *et al.* (2004) in Taherdoost (2016:33-34) indicate that reliability is a precondition for validity of quantitative research and is related to the quality of measurement. Similarly, they also suggest that if a measure yields the same results over again, then it is considered reliable. A quantitative study is considered invalid should the measures be unreliable (Straub *et al*., 2004 in Taherdoost, 2016:33-34).

According to Delport and Roestenburg (2011:96), reliability refers to what is being measured. During research, some element of error occurs which is referred to as measurement error. Reliability therefore considers the extent to which test scores are free of measurement error (Delport & Roestenburg, 2011:96).

Reliability of the questionnaire refers to consistency and is concerned with the robustness of the questionnaire and whether or not it will produce consistent findings at different times and under different conditions (Saunders *et al.,* 2012:430). To ensure this, Mitchell (1996) in Saunders *et al.* (2012:430) recommends that the questionnaire be answered twice by the respondent at differing times. They suggest that the responses to the questions should be checked for consistency. In this study, the reliability of the questionnaire was tested by means of statistics using the Cronbach's alpha.

ii. Validity

Validity refers to the extent to which a question measures what it was intended to measure. Validation is important and forms the basis of research in social sciences, as it demonstrates the quality and rigor of a study or research (Shadish, Cook & Campbell, 2002:464). Validity refers to the extent to which research findings are really about what they profess to be about, whereas reliability which is concerned with consistency establishes the extent to which the data collection techniques or analysis procedures will yield consistent results (Saunders *et al.,* 2007). There are three aspects to validity which are; if the survey was done again, would the same results be found; equivalence, that is can it be done elsewhere, and internal consistency, which refers to whether the answers in one section can be confirmed by another (Bryman & Cramer, 2005:76-78).

Validity is concerned with accuracy and whether a method can provide a correct answer, that is, the integrity of the conclusions. Validity further builds on the foundation of reliability. Some of the elements of validity are:

- Does the research fit into an expected pattern?
- Criterion validity, whereby the accuracy of the findings are established by using another method.
- Internal validity, whereby causal relationships are found in relation to the identified variables (Bryman & Cramer, 2005:76-77).

Cook, Campbell and Shadish *et al.* (2002:465) indicate that there are three broad types of validity in quantitative research which are:

- Measurement validity which ensures that the content and constructs determined in the study are validated against the theories.
- Design validity whereby the questionnaire is checked for internal and external consistency through a validation process.
- Inferential validity, which is ultimately the statistical analysis which provides the outcome of the study.

Muijs (2004:66) further elaborates on validity in asking the question: are we measuring what we want to measure? For example, certain concepts such as self-concept, attitude, self-esteem and satisfaction cannot be measured directly. Therefore, according to Muijs (2004:67) there is the need to develop instruments to indirectly measure these concepts, for example, by using a questionnaire.

Saunders *et al.* (2012:429-430) indicate that pilot testing should be done to ensure the validity of the questionnaire and the reliability of the data when a questionnaire is used. Saunders *et al.* (2012:429-430) recommend validating a questionnaire which can be done by testing the questionnaire for comprehensibility of the content and the logic of the questions. Validating the questionnaire is done to ensure that the response and motive for each question are relevant.

Pre-testing or pilot testing is a process that determines if the research designs that have been adopted and the questionnaire are able to meet the desired objectives of the study. Piloting a questionnaire gives an indication of whether the questions are direct and whether the questionnaire is easy to complete and comprehend (Rowley, 2014:316). In such a process, validity testing of the questionnaire can be achieved in order to reduce the possibility of bias in a study. Baker and Foy (2008) suggest that

the benefits of pilot tests are that they are able to identify variations in meaning in the questionnaire, respondent interest and attention and timing. They suggest that researchers should test the questionnaire with friends and colleagues, and that at least a few questionnaires should be completed by individuals of the selected population that is targeted. Thereafter they advise that the questionnaire should be revised to address problems that emerge from the pilot study.

In this study, in order to ensure the validity of the questionnaire, pre-testing was carried out before the main fieldwork to ensure the internal reliability and validity of the research instrument. The questionnaire was tested on five individuals on separate occasions in order to ensure that the items in the questionnaire were understandable and that there were no ambiguities. The pre-test was administered to individuals under conditions that were comparable to the study. The individuals that participated in the pre-test had similar profiles as that of the sample of the study.

The process of pre-testing proved useful as the questionnaire had to be modified in certain areas to reframe the items in the questionnaire in preparation for the fieldwork. Also, certain issues that emerged pertaining to the questioning technique were addressed and these was considered and remedied during the final survey process.

The pre-test was conducted in February 2018.

iii. The Cronbach's alpha coefficient

According to Sekaran (2003:311), the degree to which a measurement is trusted and is deemed consistent over time and across items on a measuring instrument is referred to as the reliability of a measure. In this study, the Cronbach's alpha which is the most commonly used indicator of internal consistency in research was used to measure the internal consistency of the scales in the study. It is considered a reliable technique to illustrate the extent to which various items of a measuring construct in a questionnaire are correlated to one another and to check the internal consistency of a questionnaire (Sekaran, 2003:327). When an instrument is reliable, it is known to

produce the same results irrespective of who administers it and whether the conditions change (Sekaran, 2003:203).

A guideline was proposed by DeVellis (1991) to establish what would be considered an acceptable level of reliability for a measuring instrument that represents an entire population. The Cronbach's alpha is able to illustrate that items that are strongly correlated with each other will have high internal consistency with an alpha coefficient close to one. On the other hand, poorly formulated items on a questionnaire which do not correlate will have an alpha coefficient close to zero. The following are widely accepted guidelines for the interpretation of Cronbach's alpha coefficient which are generally accepted by researchers such as DeVillis (1991):

- 0.90-high reliability
- 0.80-moderate reliability
- 0.70-low reliability

5.6.3 Ethical considerations

In any research process, ethical considerations are essential and must factor in the research process (Bryman & Bell, 2007:130). Ethical considerations can be considered an important part of the research process. Mouton (2001:238) views the ethics of science as considering right from wrong when conducting research. Saunders *et al.* (2012:226) view ethics as the standard of behaviour that guides a researcher's conduct in relation to the rights of the subjects of the research or those who are directly affected by the research. Ethical issues in research mainly concern consent to carry out research, participation of respondents, the community and public, and the process that has been used to analyse the data. Researchers are therefore subjected to ethical considerations irrespective of the type of research that is to be conducted in terms of its design, method and sampling technique.

According to Bryman and Belle (2007:47-80) some of the key points to consider when carrying out research are:

- Consent must be obtained from respondents before proceeding with the study.
- Respondents should be free of harm and danger.
- The privacy of respondents must be ensured.
- Confidentiality of the data must be ensured.
- The anonymity of respondents and organisations must be ensured and maintained.
- The dignity of respondents must be maintained.
- The purpose and aims of the study must be clearly explained by the researcher and understood by the respondent.
- Conflict of interest in the study related to affiliations and funding must be declared.
- There should be no misleading information or exaggeration of information about the purpose of the study.
- The representation of data should not be biased.

The aspect of informed consent has the potential to raise issues related to anonymity and confidentiality. Informed consent is important as it provides the respondent information about the research which may be relevant to the decision that they make regarding participation. The respondent has the freedom of choice to participate in the study or not, or to remove oneself from the process and during the process. In this study, a cover letter was attached to each questionnaire which contained information on the purpose of the research, some background information on the researcher and what is expected of the respondent. The letter contained information about the institution that the researcher is registered with, and the contact information of the institution. During the survey process, the researcher ensured that the respondent understood the information that was contained in the letter and always informed respondents that they were not forced to participate in the research and that their anonymity and the confidentiality of their responses will be maintained.

Over and above the primary ethical considerations related to consent above, the following considerations were adhered to in this research:

- A detailed application was submitted to the research ethics committee of the University of Pretoria for approval to conduct the research. This was done in September 2017 and approval was obtained in November 2017.
- Letters of consent and approval were attached to each questionnaire in order to obtain approval from respondents for participating in the survey.
- The researcher ensured the anonymity of the respondents.
- Questionnaires were administered to individuals separately and not in groups so as to provide privacy, and maintain confidentiality of the information shared by respondents. It was also done to ensure that the respondents felt comfortable and not self-conscious when responding to the questionnaire items.
- The research was conducted in agreement with the ethical requirement to report the findings of the research in a comprehensive and honest way.

5.7 Data analysis

This section details the approach taken by the researcher during the data analysis phase of the study and presents the various techniques and methods that were used for data analysis.

Data analysis follows the data collection process in order to make sense of the study and to arrive at certain findings. Any research that is undertaken often contains numerical data or data that could usefully be quantified to help the researcher answer the research questions and to meet the objectives of the research. The data are referred to as quantitative data and can range from simple counts such as the frequency of occurrences to more complex data such as test scores, prices or sales costs, etc. (Saunders, Lewis & Thornhill, 2012:474-475). Since this study used cross-sectional data that were derived at one point in time through a survey using a questionnaire, this could be analysed using the quantitative method that is identified in the literature.

Quantitative data that is neither processed nor analysed is considered to be raw data. Raw data convey limited meaning and therefore needs to be processed in order to be translated into useful understandable information.

For the data to be useful, it needs to be analysed and interpreted by using quantitative analysis techniques and presented using graphs, charts and simple tables or diagrams that illustrate the frequency of occurrences and to enable comparisons. Through this process, a researcher is able to also demonstrate statistical relationships between variables (Saunders *et al.,* 2012:488).

For this study the data that were collected were first coded and then inputted into an SPSS (Statistical Packages for Social Sciences) tool for analysis which enables the analysis of large datasets. Further quantitative analysis was carried out using the SPSS statistical package. In this study, based on the literature reviewed, and the theories examined, the items that were identified to be measured were the independent variables (awareness, complexity, relative advantage, usefulness, trust, cost, trialibility), which were subjected to the analysis. The dependant variable is the adoption of mobile banking.

Quantitative data can be separated into categorical and numerical data. Categorical data refer to values that cannot be measured numerically. This type of data can be classified into sets (categories) according to the characteristic of the variables that have been identified or placed in rank order (Saunders, Lewis & Thornhill, 2012:475).

Statistics can be divided into two groups, that is; descriptive and inferential statistics which can be used to analyse quantitative data. Descriptive statistics involve the use of statistical methods that describe the data set, while inferential statistics allow the researcher to determine the relationships among variables (Field, 2009:675).

The data in this study were analysed and presented in the chronology as they appear in the questionnaire. Hussey and Hussey (1997:204) agree that an important and useful step at the outset of the analysis process of quantitative data is to examine the frequency distribution for each variable in order to ascertain the numerical value,

which represents the total number of responses for a variable under study. In this study, frequency distribution was undertaken throughout the analysis of the questionnaire and its findings. The frequency distributions of the data were obtained in order to ascertain the number of responses per variable under study and the trends and views of respondents. The results, which are descriptive in nature, are presented by means of frequency tables, pie charts and bar charts and shown in percentages.

Factor analysis was also conducted in order to determine the perceived effects of the seven factors (awareness, complexity, relative advantage, usefulness, trust, cost, trialibility) on the adoption of mobile banking among rural South Africans. In this study, the literature and theories reviewed identified certain key factors and attributes of technology that could be perceived to affect the adoption of mobile banking by rural South Africans. Other studies on the adoption of technology have used the factor analysis approach. For example, Suoranta (2003:63), Behl and Pal (2016), amongst others, used the factor analysis approach in their studies, therefore making this approach relevant and applicable to this study. For the context of this research, factors that emanated from other studies that were conducted on the adoption of technology suggested that this method is applicable and provides a basis for the South African environment.

Before proceeding with the factor analysis, two tests were performed to ensure that the data was suitable for factor analysis. These tests were the Kaiser-Meyer-Olkin (KMO) measure for sampling adequacy and the Bartlett‘s test of sphericity. These tests are important to confirm whether it is advisable to proceed with a factor analysis. A reliability test was therefore firstly done, using the Cronbach's alpha test in order to ensure the internal consistency of the data and its validity for factor analysis. Further to this, the data validity and sampling consistency were also tested by using the Kaiser-Meyer-Olkin (KMO) and Bartlett's test. The KMO value between 0.5 and 0.7 is considered low, and excellent if it is above 0.90 (Field, 2009:676). Factors are retained if they have an eigenvalue of 1 or greater (Field, 2009:673). In this research, exploratory factor analysis was applied by using principal component analysis with varimax rotation in order to reduce and analyse the data.

The first phase of the factor analysis entailed the Exploratory Factor Analysis (EFA) measurement, which was carried out to establish the number of factors and their correlations. The factor analysis was conducted in order to determine the effects of the factors; awareness, complexity, relative advantage, usefulness, trust, cost, and trialibility on the adoption of mobile banking and their scales. Following the EFA, an inferential analysis was conducted in order to test the hypotheses and obtain inferences about the sample under study by correlation methods, the analysis of variance (ANOVA), and t-tests.

The SEM was developed in order to confirm the hypotheses with path analysis diagrams in order to illustrate and represent the variables and factors and to test the fitness of the model identified by the EFA. The model that contained factors with the most impact on the adoption of mobile banking by rural people was identified from the exploratory factor analysis as a first step. This was followed by the second step whereby the fitness of the model was tested. Before implementing the final SEM, the data was tested for regularity and uniformity to ensure the validity. Ultimately this process was intended to develop a potential theoretical model and to establish whether the latent variables or constructs affect the dependent variable.

This study therefore used Statistical Package for Social Sciences (SPSS) in order to analyse the initial data, and AMOS for the Structural Equation Modelling (SEM) to test the hypothesized model.

5.7.1 Factor analysis

Hair (2006) indicates that the process of factor analysis is used to provide the tools for analysing the interrelationships (correlations) between large numbers of variables and to identify the sets of variables that are highly interrelated, which are known as factors. For Cooper and Schindler (2003:546-7), factor analysis is used for specific computational techniques and the factors which are referred to as latent variables, aim to measure attitudes and feelings that are generally difficult to measure.

A factor analysis is useful in order to condense the data to be more manageable and convenient without losing vital data and material in order to make it easier to test theories. This is done in order to explain the relationships among variables and by combining them into smaller factors. Many questions are first used in the scales which are reduced to a smaller number by using factor analysis. The reduced results are then used for analyses such as multiple regression analysis (Pallant, 2010:182).

A factor is usually labelled such if it has at least three variables, although this depends on the design of the study (Tabachnick & Fidell, 2007). The two main factor analysis techniques are Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA).

Exploratory factor analysis is a process that is used to find the number of factors that explain the correlations; while with confirmatory factor analysis the researcher envisages and predicts the number of factors with specific loadings (Field, 2009:673). EFA is usually used when a researcher wants to identify the number of factors that influence variables and wants to establish which variables group or load together. Common factors affect more than one of the surface attributes and specific factors are those which only affect a particular variable. Surface attributes are known as dependent variables with underlying factors known as internal attributes (Field, 2009:674).

Zikmund, Babin and Griffin (2010:597) indicate that factor loadings are important to consider when performing factor analysis. Factor loadings are the correlations of the variables with the factor and clear loadings result in easy interpretation of the factors. Some variables tend to have a loading or correlation with more than one factor. Factor rotation is a mathematical technique that is used for simplifying the results of the factor analysis. The principal component is the most common method of factor analysis while the varimax rotation is considered the most common method of factor rotation (Zikmund *et al.,* 2010:597-598). The principal component technique is used to examine the correlation of different variables in order to reveal the relationships between them. Thereafter, the variables are reduced by summarising or combining them into a few factors under common themes (Tabachnick & Fidell, 2007). Factor

rotation is a method that is used to interpret the factors by showing the variables that group together (Pallant, 2007:183-184).

5.7.2 Inferential analysis

Inferential analysis is a process of statistical analysis that is done after the description of data to provide conclusive results of the study (Mertler & Vannatta, 2011:9). In order to obtain conclusive results, the hypotheses which were formulated were tested using statistical techniques. This was done in order to establish whether the hypotheses could be accepted or rejected. Inferential analysis is also concerned with the precision and reliability of the inference and helps a researcher to reach a conclusion through evaluating the data. This study conducted the inferential analysis by using methods such as correlation, t-tests, analysis of variance (ANOVA), amongst others, in order to draw inferences about the sample under study. These tests were also conducted to analyse the data and to test the hypotheses.

i. Anova

The Analysis of Variance (ANOVA) is a statistical test that is used to determine whether the value of a single dependent variable differs significantly among three or more levels of an independent variable (Mertler & Vannatta, 2011:15). Several types of ANOVA tests are used in statistical analysis, which include the one-way ANOVA, two-way ANOVA, and nested ANOVA (McDonald, 2009). The one-way ANOVA is an extension of the independent two-sample t-test. If the results of an ANOVA test show a significant difference between the groups, this suggests that at least two of the groups are different from each other (Mertler & Vannatta, 2011:15). Post-hoc t-tests were performed in this study to determine which groups differ from which.

In this study, the ANOVA statistical test was carried out which was followed by the t-test. The analysis of variance (ANOVA) was conducted in order to examine whether any discrepancy was prevalent among different groups of respondents which were categorised demographically by age, education level and employment status. A one-way ANOVA was conducted for each of the select demographic categories. The procedure in the ANOVA was to extract two different estimates of population

variances from the data, followed by calculating a statistic from the ratio of the two estimates, ie. between groups and within the groups variance.

ii. Independent sample t-test

A t-test analysis was done which was used to establish the significance of difference between the means of two independent samples. In this study, the two independent samples that were considered were male (n=105) and female (n=106). The independent samples t-test was used to compare the awareness, relative advantage, complexity, observability, usefulness, trust and cost with males and females.

iii. Correlation

Correlation is a statistical technique that is used to determine whether there is a statistically significant relationship between two variables. When one variable is related to another, a correlation is known to exist between two variables (Triola, 2001:517). The results of this technique are used to determine the strength of the relationship (weak or strong), and the direction of the relationship. In this study, the Spearman Rho rank-order correlation coefficient was used for this purpose. This is a non-parametric test that measures the strength and direction of association between two variables that are measured on an ordinal or continuous scale (Triola, 2001:518).

In this study the Spearman Rho correlation coefficient was computed to evaluate the strength and statistical significance of the relationships between the variables; awareness, relative advantage, complexity, usefulness, trust and cost. At the outset of the study, the hypotheses for the variable trialability were also proposed. However, this variable was eventually excluded in further analysis due to the weak factor loadings which indicated that it could not form a factor that was reliable. However, the statements and items of the variable trialability were used separately in all correlations and inferential analysis done for the study.

5.7.3 Structural equation modelling

Structural Equation Modelling (SEM) is a process that is used for multivariate correlational analysis. It is considered suitable for quantitative analysis and was therefore used in this study (Child, 2006).

Schumacker and Lomax (2010:2-3) indicate that SEM is useful in studies that adopt quantitative analysis and in the testing of theoretical models. Therefore, since this study required the testing of theoretical models, the application of the SEM was considered appropriate as it was conducted to test the fitness of the hypothesized model and determine the structural path coefficients, thereby enabling the testing of the postulated hypotheses. According to Schumacker and Lomax (2010:6), the SEM as a modelling technique is able to provide valuable information of convergent and discriminate validity of theoretical constructs used in a study. Convergent validity is shown by indicators that are theoretically similar with overlapping constructs that are strongly related. The results of discriminate validity on the other hand show that indicators with theoretically distinct constructs are not correlated.

As a result of the analyses that were carried out in this study, an interim hypothetical model was developed based on the interactions of the factors in the exploratory factor analysis. The hypothetical model was further analysed using the SEM analysis in order to establish whether the theoretical model was supported by the data. This process was put through a few iterations which did not deviate much from the hypothetical model that was initially developed. Through the various iterations, the significance values and fit indices were observed and noted. Eventually, after the process the researcher arrived at a tailored model that contained fit indices and significant associations between the constructs.

According to Schumacker and Lomax (2004:75), a model fit refers to the degree to which the sample variance and covariance data fit the structural equation model. They indicate that the standard that one can use in order to ensure a model fit is through the statistical significance of the individual parameter estimates for the paths

that appear in the model. The significance level is evaluated at the 0.05 level of significance (Schumacker & Lomax 2004:76).

The SEM diagrams for this study are presented in Chapter 6.

5.8. Conclusion

This Chapter described several stages involved in the design and development processes of the study. It outlined the research methodologies, strategies and design used in the study. The data collection techniques and processes were explained and a summary of the data analysis method was outlined. The research design for this study was deductive whereby data is analysed through quantitative methods mainly using descriptive statistics.

The next Chapter presents the results of the study.

CHAPTER SIX
PRESENTATION OF RESULTS

6.1 Introduction

This Chapter presents the results of the study through the analysis of the data collected for the study. The analysis of data includes two parts: firstly, the demographic data of the respondents are provided which is followed by the descriptive analysis. This begins with the profile and main characteristics of the respondents, followed by an outline of the trends of their opinions obtained from their responses to the questionnaire. These are presented in percentages and illustrated using graphs, charts and tables.

Factor analysis then follows which is the first phase of the analysis process. An exploratory factor analysis was conducted to determine if the items that were identified to represent each area of influence on the adoption of mobile banking amongst rural South Africans, can be represented as one factor i.e. a unidimensional construct.

The descriptive statistics for the set of the identified factors were studied for normality, a prerequisite for the inferential analysis. This was followed by correlation analysis, the t-test and ANOVA to test for statistically significant differences in order to answer the research objectives. Lastly, a Structural Equation Model (SEM) was used to test a conceptual model of the relationships between the components representing the factors influencing mobile banking adoption.

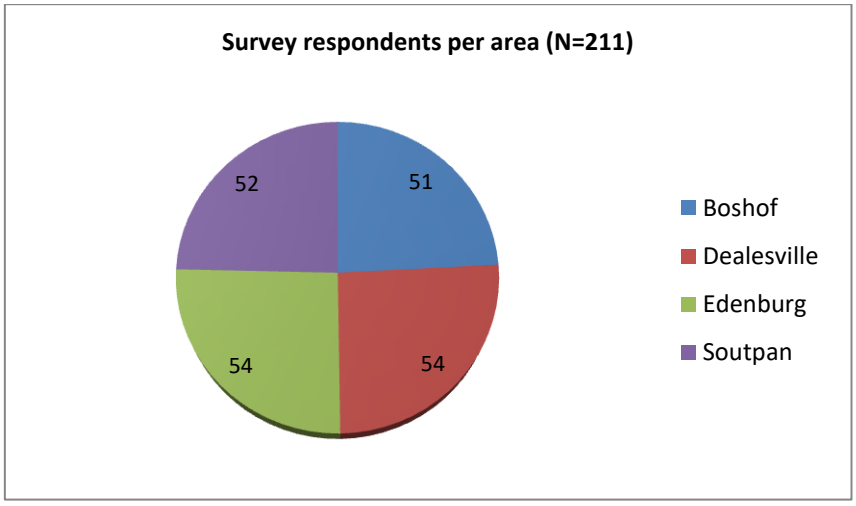
6.2 Demographic profile of respondents

The demographic data is presented and analysed in the next section. This includes: the sample size; use of cellphone for financial services; profile of respondents pertaining to; gender, age, education, employment and marital status.

6.2.1 Sample size

The sample size as discussed in Chapter Five was estimated at 200 respondents. A total of 211 responses were completed during the survey that was administered. The percentage (%) distribution per area is shown in Figure 2 below. Thus, 211 completed responses were used in the data analysis which was beyond the sample size initially planned for the study.

Figure 2: Survey response output per area



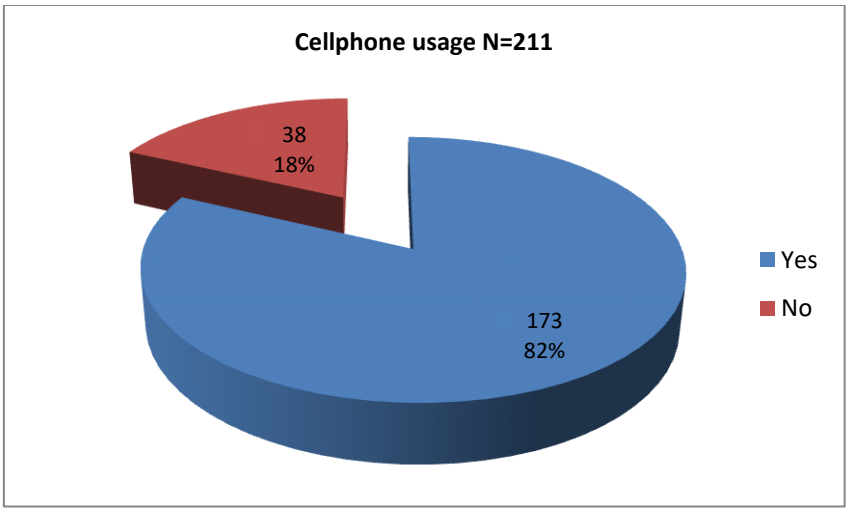
6.2.2 Cellphone usage for financial services

This section presents the results on the use of cellphones for banking purposes, followed by the frequency of use, and reasons for not using cellphones for banking purposes.

i. Cellphone usage

From the 211 respondents interviewed, the majority 173 (82%) indicated that they use cellphones in order to carry out their banking activities, while 38 (18%) indicated that they do not use cellphones for banking services. Figure 3 below provides an illustration of the rate of cellphone usage.

Figure 3: Cellphone usage for banking

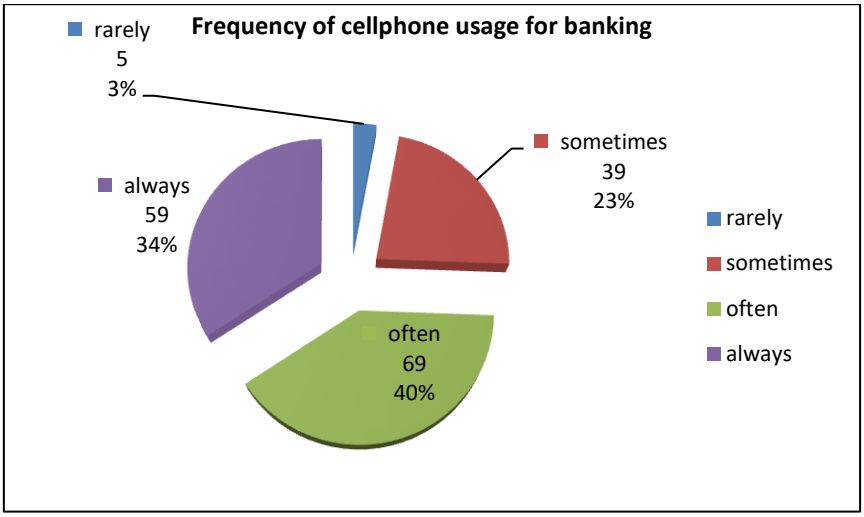


ii. Frequency of cellphone usage for banking purposes

Figure 4 below provides an illustration of the responses and shows that of the 211 respondents, 172 responses were received to these questions. This correlates with the preceding question which shows that 38 respondents do not use their cellphones for banking purposes. It thus indicates that one person that indicated yes in the previous question, did not answer this question.

When respondents were questioned about their frequency of usage of cellphones for banking purposes, almost three quarters of the respondents 128 (74%) indicated that they use the technology often or always; 39 (23%) indicated that they sometimes use cellphones for banking purposes, while only five (3%) of the respondents indicated that they rarely use the technology.

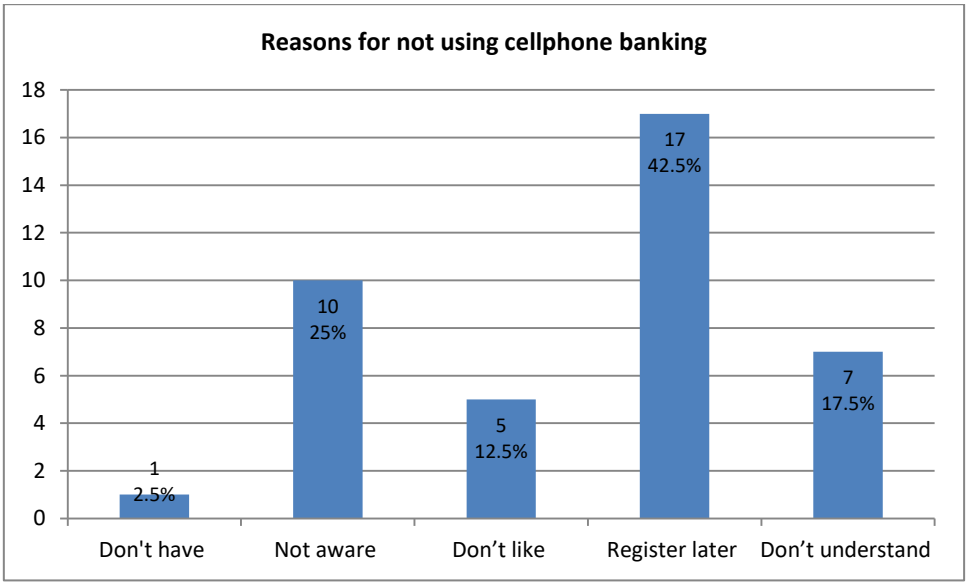
Figure 4: Frequency of cellphone usage



iii. Reasons for not using cellphone for banking purposes

The data show that a total of 40 respondents did not use cellphones for banking purposes. These responses show a close correlation with the responses received for the first preceding question whereby 38 respondents indicated non-usage for question one. As illustrated in Figure 5 below, the results show that of the 40 responses received for reasons for non-usage, one (2.5%) respondent claimed not to have a cellphone, ten (25%) respondents claimed that they were unaware of mobile banking services, and five (12.5%) respondents indicated that they do not like using cellphones for banking purposes. Furthermore, 17 (42.5%) respondents indicated that they would register later for the service, while seven (17.5%) claimed that they do not understand cellphone banking.

Figure 5: Reasons for not using cellphones for banking purposes



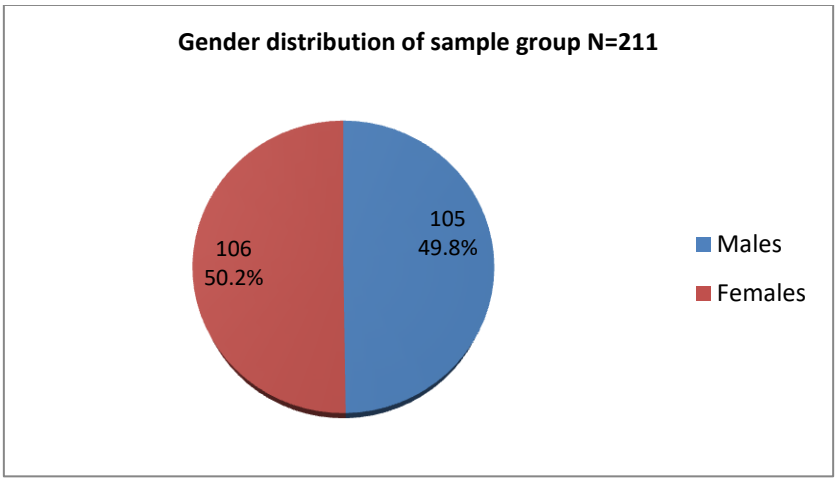
6.2.3 Profile of respondents

The results on the profile of respondents are presented below. This includes: gender; age; education; employment and marital status.

i. Gender profile

The sample comprised 211respondents, of which 105 (49.8%) were males and 106 (50.2%) were females, indicating an almost equal distribution between the genders. These are illustrated in Figure 6 below.

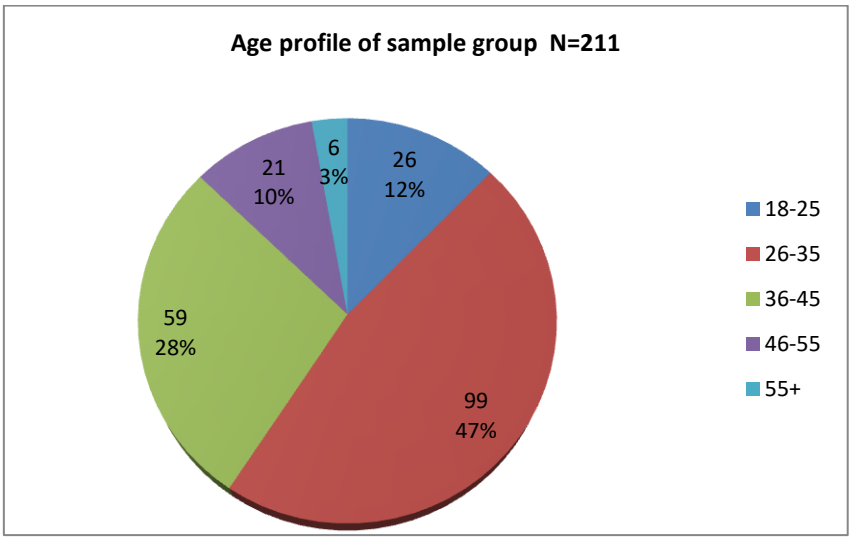
Figure 6: Gender distribution of sample group



ii. Age profile

Of the 211 respondents interviewed, 26 (12%) were in the age group 18-25, 99 (46.9%) were in the 26-35 age group, and 59 (28%) were between the ages 36-45. Those in the 46-55 age group category comprised 21 (10%) of the sample size, while those 55 years and over comprised six (3%). Figure 7 below provides an illustration of the age profile of respondents.

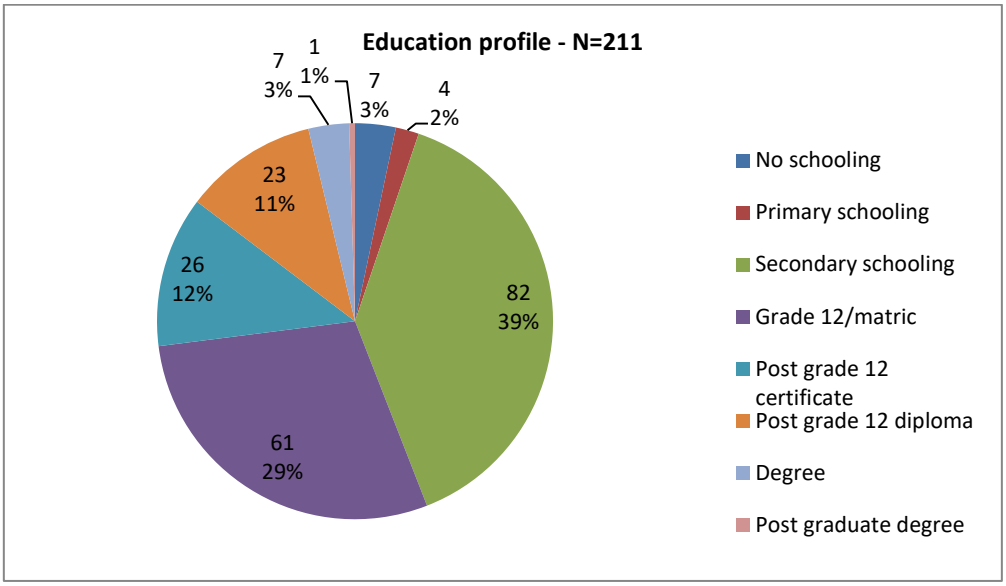
Figure 7: Age profile of sample group



iii. Education profile

From the 211 respondents who participated in the survey, 7(3%) have no schooling. The majority of the respondents, 82 (39%), were those who attended secondary school and 61 (29%) completed grade 12/matric. Just over a quarter, 57 (27%), have some tertiary education of which only seven (3%) have a university degree, and only one (1%) has a post-graduate degree.

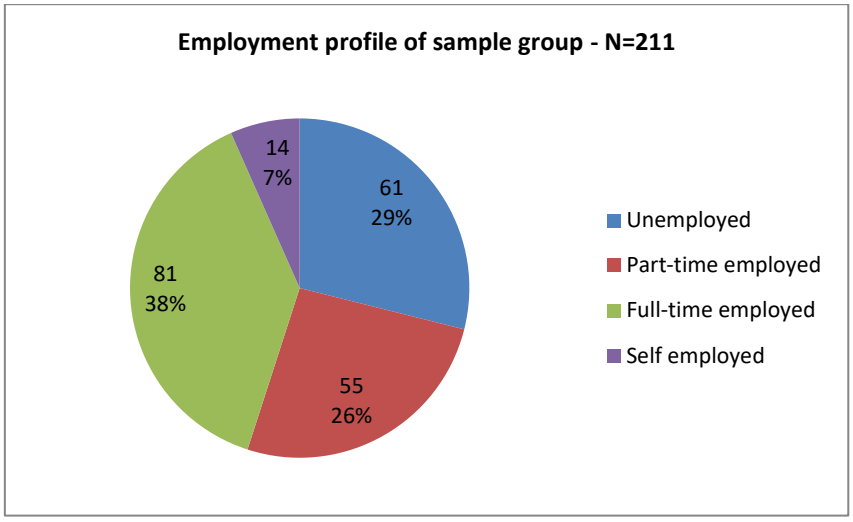
Figure 8: Education profile of sample group



iv. Employment profile

The survey found that of the 211 respondents surveyed, a majority, 150 (71%) indicated that they are employed (full-time, part-time, self-employed). However, a large proportion, almost a third, 61 (29%) were unemployed.

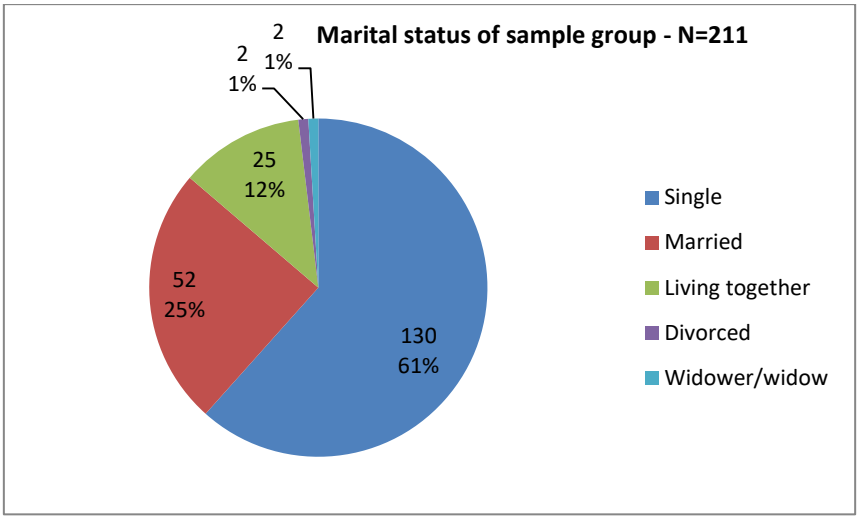
Figure 9: Employment profile of sample group



v. Marital status

The survey found that the majority of the respondents, 130 (61%), to be single. Those respondents who were widowed and divorced, comprised only two (1%) of the sample.

Figure 10: Marital status of sample group



6.3 Descriptive analysis

This section presents the results of the seven factors that were perceived to likely affect the adoption of mobile banking and these are; awareness complexity, relative advantage, usefulness, trust, cost and trialability.

6.3.1 Factors perceived to affect the adoption of mobile banking

The factors that were perceived to likely affect the adoption of mobile banking amongst rural South Africans were classified into seven groups and they are awareness, complexity, relative advantage, usefulness, trust, cost and trialability. In presenting the results in this section as stacked bar graphs, the researcher combined the responses for the scales strongly disagree and disagree to arrive at disagreement. The responses for strongly agree and agree were also merged to arrive at agreement, while neutral and don't know are presented on their own. The respondents expressed their views and their degrees of agreement or disagreement with the statements as follows:

i. Factor 1: Awareness of mobile banking

This section presents the level of agreement or disagreement of respondents with statements that relate to their awareness of mobile banking.

B1. I am aware that I can do banking on my cellphone.

The first statement tested whether respondents were aware that they could do banking on their cellphones. Most of the respondents, (93.9%), agreed that they are aware, while a few (3.3%) disagreed. Respondents who claimed not to know comprised 2.4% while 0.5% remained neutral.

B2. I am aware that I can send and receive money using my cellphone.

Respondents were then asked about whether they were aware that they can send and receive money using a cellphone. To this statement, the majority of respondents, (90.6%), agreed while only 4.2% disagreed. Only 5.2% respondents indicated that they did not know.

B3. I am aware that I can receive immediate notification about my transactions through mobile banking.

When respondents were tested on their awareness of receiving immediate notifications about transactions on their cellphones, 93.9% agreed that they were aware, while 2.8% disagreed with this statement. Respondents who indicated they don't know comprised 2.8% of the sample while only 0.5% remained neutral.

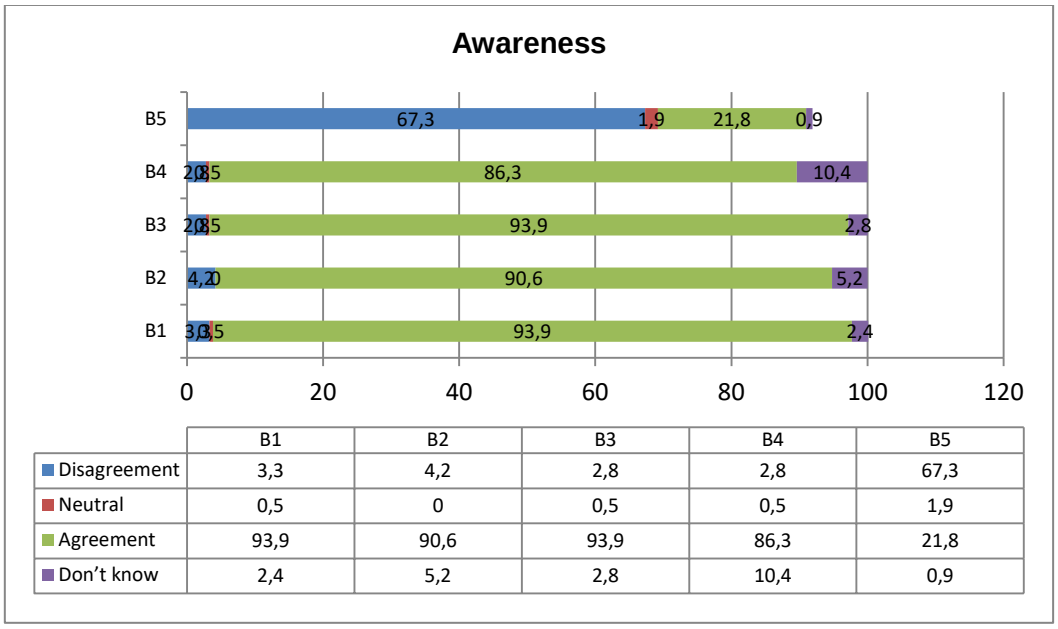
B4. I know where to obtain information about mobile banking.

When respondents were tested on whether they know where to obtain information about banking, the majority of respondents, (86.3%), agreed with the statement, while 2.8% disagreed. The respondents, who did not know, comprised 10.4%, while 0.5% remained neutral.

B5. I use mobile banking because I have seen someone else use it.

Respondents were then asked to respond to a statement on whether they used mobile banking because they have seen someone else use it. To this statement, 67.3% disagreed, and 21.8% agreed. Those who claimed they don't know comprised 0.9%, while 1.5% chose neutral.

Figure 11: .Awareness



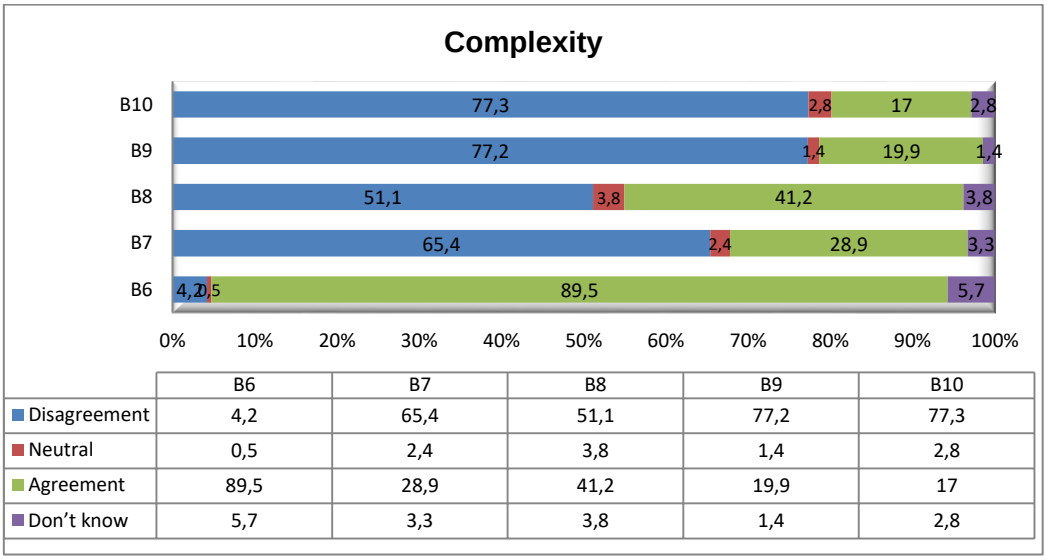
	B1	B2	B3	B4	B5
Disagreement	3,3	4,2	2,8	2,8	67,3
Neutral	0,5	0	0,5	0,5	1,9
Agreement	93,9	90,6	93,9	86,3	21,8
Don't know	2,4	5,2	2,8	10,4	0,9

Refer to section B of questionnaire for items B1 to B5 in Figure 11 above.

ii. Factor 2: Complexity

In this section, using statements, respondents were tested on their level of disagreement and agreement with the complexity of mobile banking.

Figure 12: Complexity



	B6	B7	B8	B9	B10
Disagreement	4,2	65,4	51,1	77,2	77,3
Neutral	0,5	2,4	3,8	1,4	2,8
Agreement	89,5	28,9	41,2	19,9	17
Don't know	5,7	3,3	3,8	1,4	2,8

Refer to section B of questionnaire for items B6 to B10 in Figure 12 above.

B6. Mobile banking is easy to use.

Respondents were firstly asked to respond to the statement on whether they found mobile banking easy to use. To this statement, 89.5% respondents agreed, and 4.2% disagreed. Only 0.5% respondents remained neutral, while 5.7% respondents claimed they don't know.

B7. Mobile banking requires a lot of mental effort.

This was followed by a statement on whether mobile banking requires mental effort, to which 65.4% respondents disagreed and 28.9% agreed, while 2.4% remained neutral and 3.3% claimed they don't know.

B8. Mobile banking requires technical skills.

Regarding the statement about whether mobile banking requires technical skills, 51.1% respondents disagreed, while 41.2% agreed. Respondents who claimed that they don't know, and those who remained neutral, comprised 3.8% respectively.

B9. Mobile banking requires training.

A statement was also posed about whether mobile banking requires training. To this this statement, 77.2% respondents disagreed, and 19.9% agreed. The respondents who remained neutral and those who said they don't know comprised 1.4% respectively.

B10. Mobile banking makes me feel nervous/tense

A statement about whether mobile banking makes one feel nervous/tense was also tested. To this statement, 77.3% respondents disagreed, and 17% agreed, while respondents who remained neutral and indicated that they don't know comprised six 2.8% respectively.

iii. Factor 3: Relative advantage

In this section, using statements, respondents were tested on their level of disagreement and agreement with the relative advantage of mobile banking.

B11. Mobile banking allows me to bank anytime.

Respondents were asked whether mobile banking allowed them to bank anytime. To this, 2.8% respondents disagreed and 92.4% agreed. No neutral responses were received and 4.7% indicated that they don't know.

B12. Mobile banking allows me to save time.

To the statement on whether mobile banking allows them to save time, 1.9% respondents disagreed, and 91.9% agreed. Respondents who indicated don't know comprised 5.2% and no neutral responses were received.

B13. Mobile banking allows me to bank anywhere.

Respondents were asked whether mobile banking allows them to bank anywhere. To this, 88.7% respondents agreed, while 2.8% disagreed. No neutral responses were received and 8.5% indicated don't know.

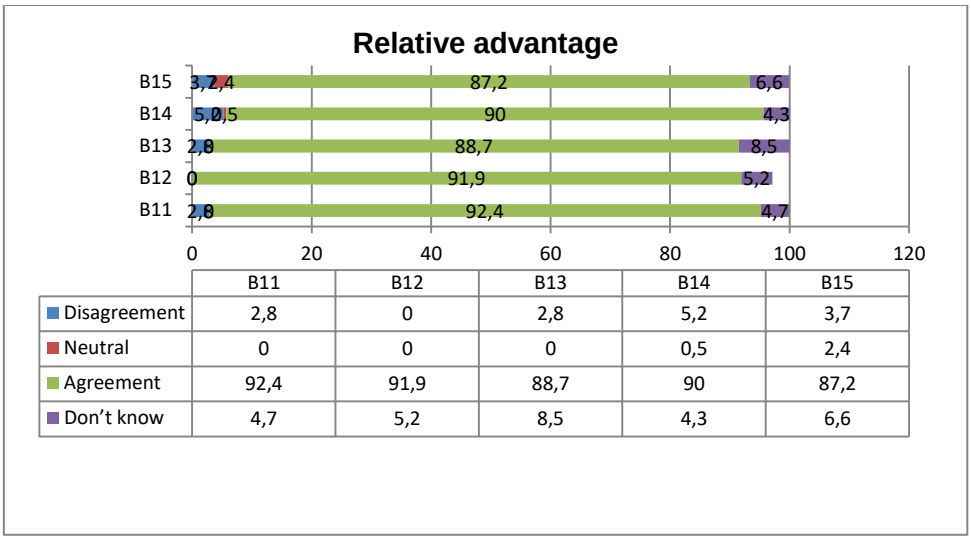
B14. I do not have to stand in queues through using mobile banking.

To the statement above, 90% of respondents agreed, and 5.2% disagreed. Only 0.5% remained neutral and 4.3% indicated that they don't know.

B15. Mobile banking allows me to have control over my finances and banking services.

To the statement above, 87.2% respondents agreed, and 03.7% disagreed. Only five 2.4% remained neutral and 6.6% indicated that they don't know.

Figure 13: Relative advantage



	B11	B12	B13	B14	B15
Disagreement	2,8	0	2,8	5,2	3,7
Neutral	0	0	0	0,5	2,4
Agreement	92,4	91,9	88,7	90	87,2
Don't know	4,7	5,2	8,5	4,3	6,6

Refer to section B of questionnaire for items B11 to B15 in Figure 13 above.

iv. Factor 4: Usefulness

In this section using statements, respondents were tested on their level of agreement and disagreement on the usefulness of mobile banking.

B16. Mobile banking is convenient to use.

The first statement tested whether respondents find mobile banking convenient to use. Most respondents, 89.1% agreed, while 3.3% disagreed with the statement. Only 0.9% respondents indicated neutral while 6.6% indicated that they don't know.

B17. Mobile banking has improved my life.

Respondents were thereafter posed a statement on whether mobile banking has improved their lives. To this statement 85.8% respondents agreed, and 2.9% disagreed, while 9% claimed that they don't know and only 2.4% remained neutral.

B18. Mobile banking can be frustrating to use.

Upon testing the statement on whether mobile banking can be frustrating to use, 70.1% respondents disagreed, and 15.6% agreed. Respondents who remained neutral were 4.3%, while 10% indicated that they don't know.

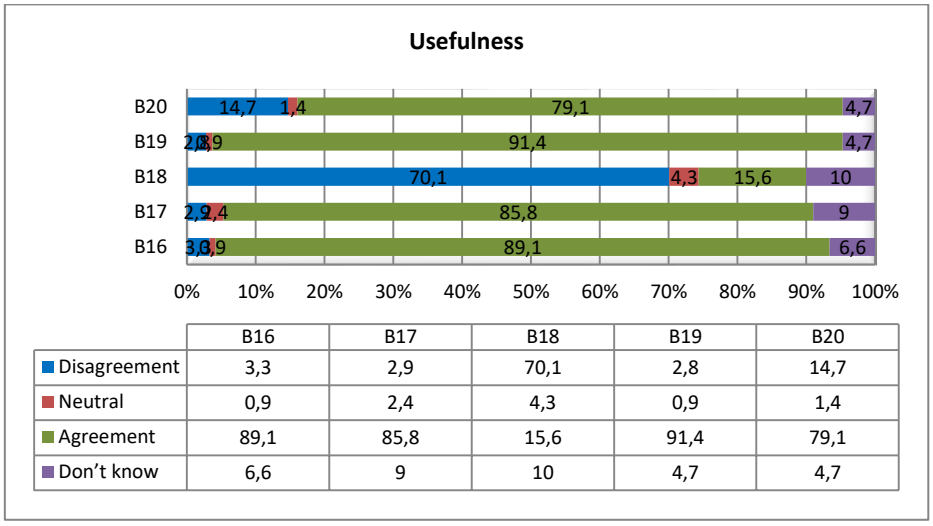
B19. Mobile banking prevents the risk of carrying cash around.

Regarding the statement on whether mobile banking prevents the risk of carrying cash, 91.4% respondents agreed and 2.8% disagreed. Respondents who remained neutral comprised 0.9% and 4.7% indicated that they don't know.

B20. Using mobile banking prevents the necessity to travel to a traditional bank.

Respondents were tested on whether mobile banking prevents the need for them to travel to a traditional bank. Here, 79.1% respondents agreed and 14.7% disagreed. Respondents who remained neutral comprised 1.4% and those who indicated that they don't know comprised 4.7%.

Figure 14: Usefulness



	B16	B17	B18	B19	B20
Disagreement	3,3	2,9	70,1	2,8	14,7
Neutral	0,9	2,4	4,3	0,9	1,4
Agreement	89,1	85,8	15,6	91,4	79,1
Don't know	6,6	9	10	4,7	4,7

Refer to section B of questionnaire for items B16 to B20 in Figure 14 above.

v. Factor 5: Trust

In this section, using statements, respondents were tested on their level of agreement and disagreement on their trust in mobile banking.

B21. I am concerned that people would access my account through mobile banking.

Respondents were asked to rate the statement on whether they are concerned that people would access their bank accounts through mobile banking. To this statement, 54% respondents agreed, and 38.4% disagreed. Respondents who remained neutral comprised 4.7% and 2.8% claimed that they don't know.

B22. Mobile banking is reliable.

Further to this, respondents were asked if they found mobile banking reliable. Many respondents (88.2%) agreed, and 6.1% disagreed. Respondents who selected the neutral scale comprised 1.4%, while 4.3% said they don't know.

B23. Mobile banking is safe to use.

When respondents were asked to rate whether they found mobile banking safe to use, 86.3% agreed, while 5.2% disagreed. Only 4.7% respondents were neutral and 3.8% said they don't know.

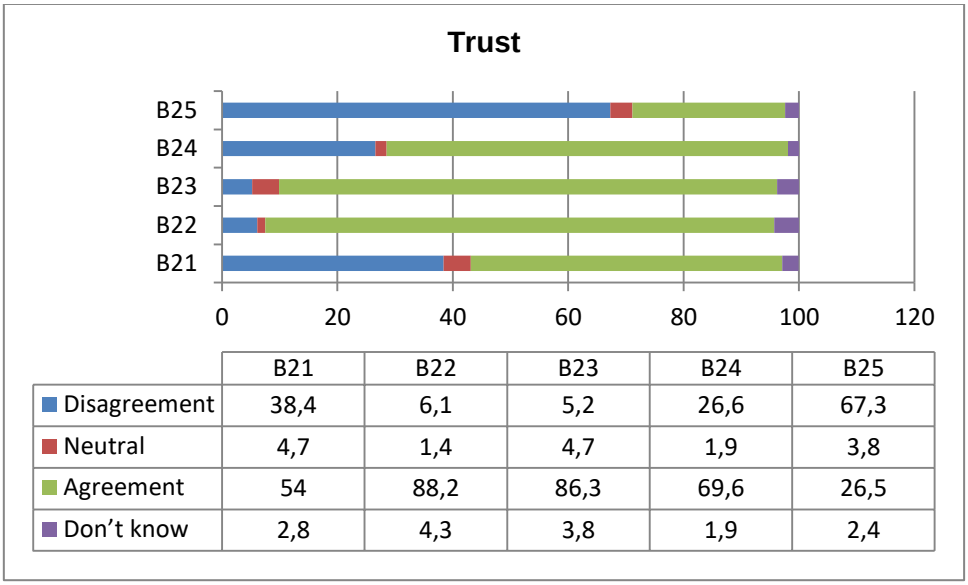
B24. I prefer to go to a bank to do banking for security reasons.

Respondents were also asked whether they prefer to go to a bank for security reasons. To this statement, 69.6% agreed and 26.6% disagreed, while 1.9% respondents remained neutral and said they don't know respectively.

B25. I am concerned that I will lose my money through mobile banking.

Respondents were asked about whether they are concerned that they will lose money through mobile banking. Respondents who disagreed comprised 67.3% while 26.5% agreed. Only 3.8% respondent remained neutral and 2.4% said they don't know.

Figure 15: Trust



	B21	B22	B23	B24	B25
Disagreement	38,4	6,1	5,2	26,6	67,3
Neutral	4,7	1,4	4,7	1,9	3,8
Agreement	54	88,2	86,3	69,6	26,5
Don't know	2,8	4,3	3,8	1,9	2,4

Refer to section B of questionnaire for items B21 to B25 in Figure 15 above.

vi. Factor 6: Cost

In this section using statements, respondents were tested on their level of agreement and disagreement on the cost of mobile banking.

B26. Mobile banking is affordable to use.

When respondents were asked whether mobile banking is affordable to use, 89.5% agreed with the statement, while 6.6% disagreed. Only 0.5% remained neutral while 3.3% indicated that they don't know.

B27. Mobile banking allows me to save money.

Respondents were also asked whether mobile banking allows them to save money, to which 92.4% agreed and 3.3% disagreed, while 3.8% indicated that they don't know and 0.5% chose neutral.

B28. The cost to do mobile banking is cheaper than going to a bank.

Regarding the statement on whether the cost to do mobile banking is cheaper than going to a bank, 90.5% respondents agreed and 2.9% disagreed. Respondents who indicated that they don't know comprised 6.2%, while 0.5% chose neutral.

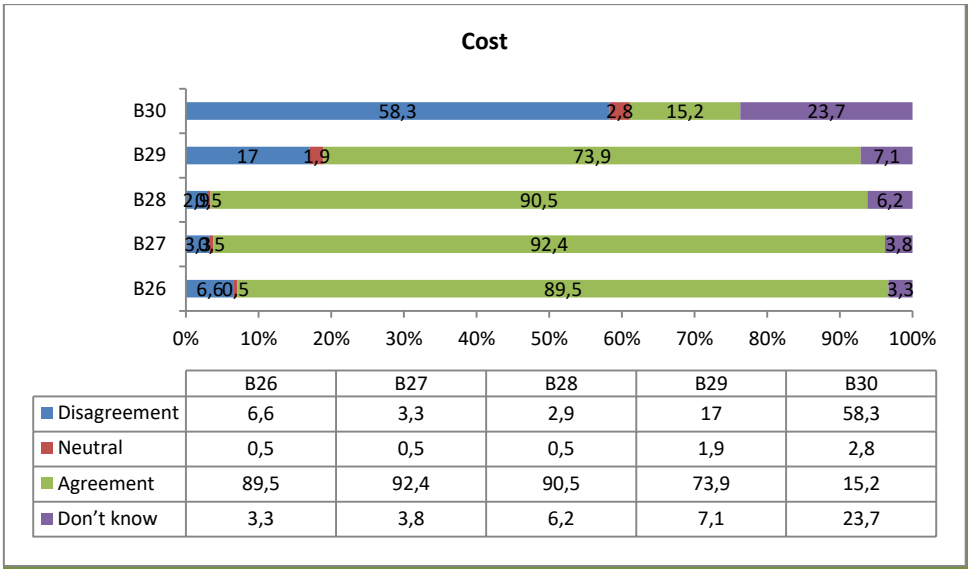
B29. I would still use mobile banking if there were further charges introduced.

Respondents were also tested on whether they would still use mobile banking if further charges were introduced. To this statement, 73.9% agreed and 17% disagreed. Some respondents (1.9%), were neutral and 7.1% indicated that they don't know.

B30. The data that I need to do mobile banking makes it expensive to use.

Furthermore, with regard to a statement on whether data charges are expensive to use, 58.3% of respondents disagreed and 15.2% agreed, while 23.7% respondents indicated that they don't know and 2.8% were neutral.

Figure 16: Cost



	B26	B27	B28	B29	B30
Disagreement	6,6	3,3	2,9	17	58,3
Neutral	0,5	0,5	0,5	1,9	2,8
Agreement	89,5	92,4	90,5	73,9	15,2
Don't know	3,3	3,8	6,2	7,1	23,7

Refer to section B of questionnaire for items B26 to B30 in Figure 16 above.

vii. Factor 7: Trialability

In this section, using statements, respondents were tested on their level of agreement and disagreement on the trialability of mobile banking.

B31. I have had the opportunity to try out mobile banking.

The first statement posed attempted to understand whether respondents have had the opportunity to try out mobile banking. Respondents who disagreed comprised

54.1% and 43.6% agreed. Respondents who were neutral were 1.4%, and 0.9% indicated that they don't know.

B32. I would consider mobile banking if I could try it out for at least one month.

Respondents were then asked about whether they would use mobile banking if they could try it out first for a month. Many respondents (80.1%) agreed and 10.9% disagreed. Some respondents, (6.2%), indicated that they don't know and 2.8% were neutral.

B33. I like testing new innovations in banking and technology.

When asked about whether respondents like testing new innovations in banking and technology, 79.2% respondents agreed and 12.3% disagreed. Respondents who were neutral comprised 2.4% and 6.2) indicated that they don't know.

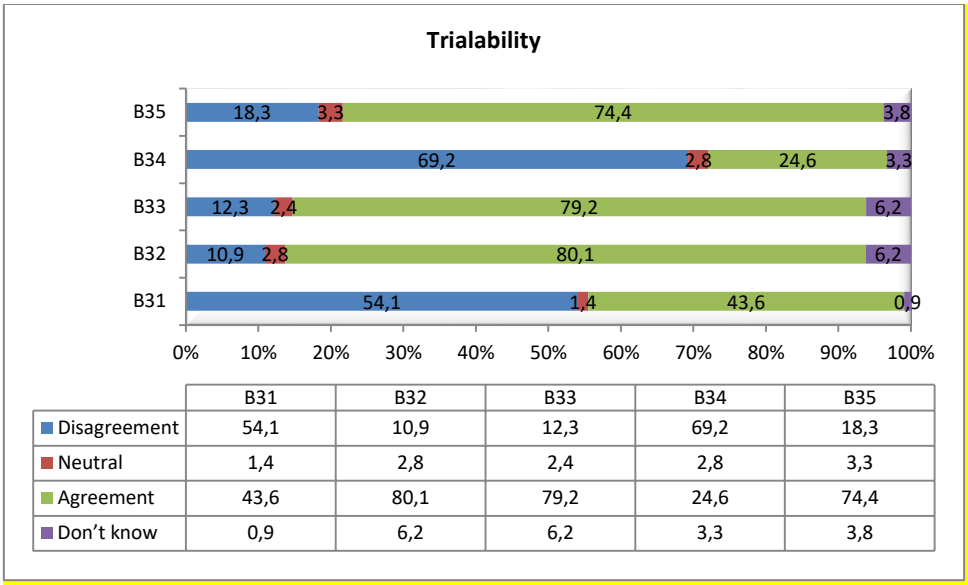
B34. I would change my bank if I have to in order to do mobile banking.

Respondents were also tested on whether they would change their bank in order to do mobile banking. Here the results show that 69.2% respondents disagreed, while 24.6% agreed. Respondents who were neutral comprised 2.8%, while 3.3% indicated that they don't know.

B35. I do not think it is necessary to try out mobile banking first in order to use it.

Regarding the statement on the necessity to try out mobile banking first before one uses it, 74.4% of respondents agreed and 18.3% disagreed. Respondents who indicated that they don't know comprised 3.8%, and 3.3% were neutral.

Figure 17: Trialability



	B31	B32	B33	B34	B35
Disagreement	54,1	10,9	12,3	69,2	18,3
Neutral	1,4	2,8	2,4	2,8	3,3
Agreement	43,6	80,1	79,2	24,6	74,4
Don't know	0,9	6,2	6,2	3,3	3,8

Refer to section B of questionnaire for items B31 to B35 in Figure 17 above.

6.4 Kaiser-Meyer-Olkin Measure and Bartlett's test of sphericity

A test for sampling adequacy and sphericity is essential before conducting a factor analysis. These tests are done in order to confirm whether it is worthwhile proceeding with a factor analysis (Hinton *et al.,* 2004 in Taherdoost, 2016:33). Therefore, in this study, before starting the exploratory factor analysis, the tests used were the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity.

The threshold value must be more than 0.5 in order to proceed with an adequate factor analysis (Hair & Anderson, 1998). As a measure of factorability, a KMO value of 0.5 is considered poor, 0.6 is acceptable and a value closer to 1 is better (Hinton *et al.,* 2004 in Taheerdoost, 2016:33).

Bartlett's test of sphericity is conducted for the purpose of confirming the relationship between the variables. If there is no relationship then it is irrelevant to undertake factor analysis. The statistical significance value for Bartlett's test of sphericity must be smaller than 0.05 to indicate that factor analysis is appropriate to conduct.

Awareness

The results show that the KMO is above the recommended acceptable level of 0.6 as the obtained value is 0.69 and the statistical significance of Bartlett's Test of Sphericity is f .000 (P<0.005). The data are therefore suitable for factor analysis.

Complexity

The results show that the KMO is above the recommended acceptable level of 0.6 as the obtained value is 0.697 and the statistical significance of Bartlett's Test of Sphericity is f .000 (P<0.005). The data are therefore suitable for factor analysis.

Relative advantage

The results show that the KMO is above the recommended acceptable level of 0.6 as the obtained value is 0.771 and the statistical significance of Bartlett's Test of Sphericity is f .000 (P<0.005). The data are therefore suitable for factor analysis.

Usefulness

The results show that the KMO is above the recommended acceptable level of 0.6 as the obtained value is 0.689 and the statistical significance of Bartlett's Test of Sphericity is f .000 (P<0.005). The data are therefore suitable for factor analysis.

Trust

The results show that the KMO is above the recommended acceptable level of 0.6 as the obtained value is 0.610 and the statistical significance of Bartlett's Test of Sphericity is f .000 (P<0.005). The data are therefore suitable for factor analysis.

Cost

The results show that the KMO is above the recommended acceptable level of 0.6 as the obtained value is 0.733 and the statistical significance of Bartlett's Test of Sphericity is f .000 (P<0.005). The data are therefore suitable for factor analysis.

Trialability

The results show that the KMO is above the recommended acceptable level of 0.6 as the obtained value is 0.607 and the statistical significance of Bartlett's Test of Sphericity is f .000 (P<0.005). The data are therefore suitable for factor analysis.

6.4.1 Reliability statistics and scale reliability results

The most commonly used measurement for internal consistency of a scale (a measure of reliability) is the Cronbach's alpha which enables a researcher to ensure that the items included in the scale are measuring the same underlying construct. This approach is mostly applied to Likert-scale type questions in surveys where the researcher wants to determine if the scale is reliable (Laerd Statistics, 2015c).

In this study, the Cronbach's alpha coefficient was calculated and applied for each construct and group of items in order to illustrate the internal consistency of the questionnaire and the following results were yielded for the sub-sections of the items.

This section presents the results from tests of reliability for each of the Likert scales considered in this study including: awareness, complexity, relative advantage, usefulness, trust, and cost.

Table 2: Cronbach's alpha for constructs

Constructs	**Cronbach's alpha coefficient**
Awareness	0.67
Complexity	0.66
Relative advantage	0.82
Usefulness	0.61
Trust	0.71
Cost	0.64

i. Awareness scale - reliability results

The Cronbach's alpha coefficient value of 0.676 is above the recommended threshold for exploratory analysis of 0.6 and is thus considered acceptable.

ii. Complexity scale - reliability results

The Cronbach's alpha coefficient value of 0.660 is above the recommended threshold of 0.6 and is thus considered acceptable.

iii. Relative advantage scale - reliability results

The Cronbach's alpha coefficient value of 0.823 is above the recommended threshold of 0.6 and is thus considered acceptable.

iv. Usefulness scale - reliability results

The Cronbach's alpha coefficient value of 0.613 is above the recommended threshold of 0.6 and is thus considered acceptable.

v. Trust scale - reliability results

The Cronbach's alpha coefficient value of 0.714 is above the recommended threshold of 0.6 and is thus considered acceptable.

vi. Cost scale - reliability results

The Cronbach's alpha coefficient value of 0.639 is above the recommended threshold for exploratory research of 0.6 and is thus considered acceptable.

6.5 Exploratory factor analysis

Exploratory factor analysis (EFA) is used to deduce the number of factors that affect the adoption of mobile banking among rural South Africans. The EFA was conducted to determine the underlying factor structure of the seven factors (awareness, complexity, relative advantage, usefulness, trust, cost, trialibility) represented by their associated set of items. The EFA was applied in the first phase to explore the existence of scientifically based factors to represent the seven original factors identified from literature. Construct validity and reliability were thus established through the use of the EFA.

Items that have the same characteristics were grouped together in order to identify and extract the factors have the most impact and therefore should remain in the model. Factors that have little or no impact were eliminated from the model, and accordingly a model of the most effective factors can be obtained (Henson & Roberts 2006 in Khaled, 2013).

The exploratory factor analysis used principal axis factoring as extraction method and promax as rotation method. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was above the recommended threshold of 0.5, and the Bartlett's Test of Sphericity which was statistically significant ($p<.000$) for all the items in all 7 constructs, indicated that a factor analysis was appropriate.

6.5.1 Eigenvalues

The tables below summarise the eigenvalues and explain the total variance for the extracted components. A general rule is that those factors that have an eigenvalue greater than one (I) should be considered important for analysis purposes and should be retained (Hinton *et al.,* 2004 & Straub *et al.,* 2004 in Taherdoost, 2016). The results presented in the tables below suggest that of the seven components included in the factor analysis, only six components contain eigenvalues greater than 1. The component with the lowest eigen value less than 1 is trialability and was therefore not retained.

i. Awareness

For the awareness construct, one factor has been identified based on the eigenvalue criterion greater than 1 which indicates that the *awareness* construct is unidimensional.

Table 3: Total variance explained for awareness

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.690	53.802	53.802	2.317	46.331	46.331
2	.945	18.910	72.711			
3	.806	16.120	88.831			
4	.356	7.118	95.949			
5	.203	4.051	100.000			

ii. Complexity

For the complexity construct, one factor has been identified based on the eigenvalue criterion greater than 1 which indicates that the *complexity* construct is unidimensional.

Table 4: Total variance explained for complexity

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.157	43.140	43.140	1.457	29.130	29.130
2	.861	17.213	60.354			
3	.778	15.562	75.916			
4	.715	14.298	90.214			
5	.489	9.786	100.000			

iii. Relative advantage

For the relative advantage construct, one factor has been identified based on the eigenvalue criterion greater than 1 which indicates that the *relative advantage* construct is unidimensional.

Table 5: Total variance explained for relative advantage

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.992	59.840	59.840	2.584	51.688	51.688
2	.872	17.446	77.285			
3	.529	10.581	87.867			
4	.419	8.386	96.253			
5	.187	3.747	100.000			

iv. Usefulness

For the usefulness construct, one factor has been identified based on the eigenvalue criterion greater than 1 which indicates that the *usefulness* construct is unidimensional.

Table 6: Total variance explained for usefulness

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	1.969	39.374	39.374	1.361	27.230	27.230
2	1.057	21.146	60.520	.264	5.288	32.518
3	.770	15.396	75.917			
4	.667	13.349	89.266			
5	.537	10.734	100.000			

v. Trust

For the trust construct, one factor has been identified based on the eigenvalue criterion greater than 1 which indicates that the *trust* construct is unidimensional.

Table 7: Total variance explained for trust

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.923	38.459	38.459	1.403	28.065	28.065
2	1.031	20.611	59.071	.363	7.266	35.331
3	.854	17.085	76.155			
4	.774	15.489	91.644			
5	.418	8.356	100.000			

vi. Cost

For the cost construct, one factor has been identified based on the eigenvalue criterion greater than 1 which indicates that the *cost* construct is unidimensional.

Table 8 :Total variance explained for cost

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.397	47.940	47.940	1.956	39.110	39.110
2	.912	18.242	66.182			
3	.856	17.113	83.295			
4	.535	10.708	94.003			
5	.300	5.997	100.000			

vii. Trialability

For the trialability construct, no factor has been identified based on the eigenvalue criterion greater than 1. Trialability therefore could not form a factor that is reliable and only the item statements B31 to B35 were used separately in all the correlation and inferential analysis.

Table 9: Total Variance Explained for trialability

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.587	31.733	31.733	.925	18.509	18.509
2	1.038	20.767	52.500	.292	5.841	24.350
3	.935	18.697	71.197			
4	.737	14.745	85.942			
5	.703	14.058	100.000			

The analysis identified 2 factors, based on the eigenvalue criterion of eigenvalues greater than one. The factors are labelled as follows:
Factor 1 - Convenience (Items B16, B17, B19, B20, B22, B23, B32, B33)
Factor 2 - (Items B18, B24, B25, B31)

The final factor loadings are shown in Table 10 below.

In this study, a factor analysis was conducted to determine the construct validity for each sub-section of the questionnaire. A reliability test was done, using the Cronbach's alpha to ensure the internal consistency of the data and its validity for factor analysis. In order to determine whether a factor analysis was appropriate for the study, the Kaiser's Measure of Sample Adequacy (MSA) was computed for each factor. Kaiser's Measure of Sample Adequacy provides an indication of the inter-correlations among variables. An MSA of 0.5 is an indication that the data are appropriate for factor analysis (Field, 2009:676). The results of the factor analysis and the final factor loadings are presented in the Table below.

Table 10: Pattern matrix

	Factor	
	1	2
B16 - Mobile banking is convenient to use	.632	
B17 - Mobile banking has improved my life	.608	
B18 - Mobile banking can be frustrating to use		.434
B19 - Mobile banking prevents the risk of carrying cash around	.593	
B20 - Mobile banking prevents the necessity to travel to a traditional bank	.490	
B22 - Mobile banking is reliable	.810	
B23 - Mobile banking is safe to use	.684	
B24 - I prefer to go to a bank to do banking for security reasons		.363
B25 - I am concerned that I will lose my money through mobile banking		.612
B31 - I have had the opportunity to try out mobile banking		.618
B32 - I would consider mobile banking if I could try it out for a month	.719	
B33 - I like testing new innovations in banking and technology	.345	

6.5.2 Descriptive statistics for the six factors

The mean, median, standard deviation, skewness and kurtosis of each of the identified components of the study are shown in Table 11 below. The Table indicates that normality cannot be assumed for 4 of the 5 constructs if the rule of skewness and kurtosis of between -2 and +2 are used. The constructs will not be transformed as the inferential statistics used are either robust to deviations from normality or they do not require the assumption of normality

Table 11: Descriptive statistics for the six factors

	Awareness	Relative Advantage	Complexity	Usefulness	Trust	Cost
Mean	3.9698	3.9960	2.4274	3.9770	3.9136	3.7882
Median	4.0000	4.0000	2.4000	4.0000	4.0000	3.8000
Std. Deviation	.40289	.40572	.58839	.42372	.51628	.45057
Skewness	-2.966	-2.824	.529	-1.144	-1.834	-.845
Kurtosis	20.925	21.067	1.454	11.521	5.944	5.952
Std. Error of Kurtosis	.333	.333	.333	.333	.333	.333
Minimum	1.00	1.00	1.00	1.00	2.00	1.20
Maximum	5.00	5.00	4.46	5.00	5.00	5.00

6.6 Inferential statistics

The section describes the inferential analysis of the data whereby the researcher uses inferential statistics to gather information about a population by formulating conclusions about the differences or relationships between the variables. Inferential statistics, unlike descriptive statistics, extracts the inferences about the phenomenon under study with regard to the selected sample. Methods such as correlation, t-test, analysis of variance (ANOVA) etc. are used by researchers to draw inferences about the sample under study. In this study, these tests were also conducted to analyse the data and to test the research hypotheses. A hypothesis is an assumption about relationships, causes and differences which is to be proved or disproved (Prasad, 2001). It can also be considered a tentative explanation of the research problem or an educated guess about the research outcome (Sarantakos, 1993 in Prasad, 2001).

Hypotheses are testable and consist of a null and alternative for each hypothesis tested. A null hypothesis which is the opposite of what is expected can be rejected or not rejected.

6.6.1 Research hypothesis testing

This section presents the results of the relationships for hypotheses H1 to H15. The relationships for these hypotheses were tested using non-parametric Spearman Rho correlation coefficient. This is followed by the statistical test results for hypotheses H16 to H19 which used the t-test, one-way analysis of variance (ANOVA) and tukey post hoc test.

i. Relationship testing for hypotheses H1-H15

The relationships as stated in hypotheses H1 to H15 were tested using the non-parametric Spearman Rho correlation coefficient and its associated significance level. The Spearman Rho correlation coefficient was used as it does not require the normality assumption. Pearson correlation coefficient, the parametric alternative, is known to be non-robust to deviations from normality. The Spearman Rho correlation coefficient indicated the strength and direction of the relationship between the variables awareness, relative advantage, complexity, usefulness, trust and cost.

The variable trialability was excluded in further analysis due to the weak factor loadings which indicated that it could not form one factor that is reliable. However, the statements and items of the variable trialability were used separately in all correlations and inferential analysis done for the study.

Null and alternative hypotheses

The following null and alternative hypotheses have been considered for this study:

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived usefulness.

$H1_a$. There is a relationship between the perceived relative advantages of mobile banking and its perceived usefulness.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived trust.

$H2_a$. There is a relationship between the perceived relative advantages of mobile banking and its perceived trust.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived cost.

$H3_a$. There is a relationship between the perceived relative advantages of mobile banking and its perceived cost.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived complexity.

$H4_a$. There is a relationship between the perceived relative advantages of mobile banking and its perceived complexity.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived awareness.

$H5_a$. There is a relationship between the perceived relative advantages of mobile banking and its perceived awareness.

$H_{0:}$ There is no relationship between the perceived complexity of mobile banking and its perceived usefulness.

$H6_b$. There is a relationship between the perceived complexity of mobile banking and its perceived usefulness.

H_0: There is no relationship between the perceived complexity of mobile banking and its perceived trust.

$H7_a$. There is a relationship between the perceived complexity of mobile banking and its perceived trust.

H_0: There is no relationship between the perceived complexity of mobile banking and its perceived cost.

$H8_a$. There is a relationship between the perceived complexity of mobile banking and its perceived cost.

H_0: There is no relationship between the perceived complexity of mobile banking and its perceived awareness.

$H9_a$. There is a relationship between the perceived complexity of mobile banking and its perceived awareness.

H_0: There is no relationship between the perceived awareness of mobile banking and its perceived usefulness.

$H10_a$. There is a relationship between the perceived awareness of mobile banking and its perceived usefulness.

H_0: There is no relationship between the perceived awareness of mobile banking and its perceived trust.

$H11_a$. There is a relationship between the perceived awareness of mobile banking and its perceived trust.

H_0: There is no relationship between the perceived awareness of mobile banking and its perceived cost.

$H12_a$. There is a relationship between the perceived awareness of mobile banking and its perceived cost.

H_0: There is no relationship between the perceived trust of mobile banking and the perceived cost.

$H13_a$. There is a relationship between the perceived trust of mobile banking and the perceived cost.

H_0: There is no relationship between the perceived trust of mobile banking and the perceived usefulness.

$H14_a$. There is a relationship between the perceived trust of mobile banking and the perceived usefulness.

H_0: There is no relationship between the perceived cost of mobile banking and the perceived usefulness.

$H15_a$. There is a relationship between the perceived cost of mobile banking and the perceived usefulness.

H_0: Females and males differ with regard to the adoption of mobile banking.

$H16_a$: Females and males do not differ with regard to the adoption of mobile banking.

H_0: Age groups differ with regard to the adoption of mobile banking.

$H17_a$: Age groups do not differ with regard to the adoption of mobile banking.

H_0: People with different education levels differ with regard to their perception of mobile banking.

$H18_a$: People with different education levels do not differ with regard to their perception of mobile banking.

H_0: People with different employment statuses differ with regard to the adoption of mobile banking.

$H19_a$: People with different employment statuses do not differ with regard to the adoption of mobile banking.

The correlation analysis results, relating to hypotheses 1 to 15 are summarised in the Table below.

Table 12: Spearman Rho correlation values for the factors awareness, relative advantage, complexity, usefulness, trust and cost

			Awareness	Relative Advantage	Complexity	Usefulness	Trust	Cost
Spearman's rho	Awareness	Correlation Coefficient	1,000	.280**	-.349**	.137*	.282**	.384**
		Sig. (2-tailed)		0,000	0,000	0,046	0,000	0,000
		N	211	211	211	211	211	211
	Relative Advantage	Correlation Coefficient	.280**	1,000	-.263**	.383**	.245**	.268**
		Sig. (2-tailed)	0,000		0,000	0,000	0,000	0,000
		N	211	211	211	211	211	211
	Complexity	Correlation Coefficient	-.349**	-.263**	1,000	-.184**	-.232**	-.393**
		Sig. (2-tailed)	0,000	0,000		0,007	0,001	0,000
		N	211	211	211	211	211	211
	Usefulness	Correlation Coefficient	.137*	.383**	-.184**	1,000	.269**	.218**
		Sig. (2-tailed)	0,046	0,000	0,007		0,000	0,001
		N	211	211	211	211	211	211
	Trust	Correlation Coefficient	.282**	.245**	-.232**	.269**	1,000	.272**
		Sig. (2-tailed)	0,000	0,000	0,001	0,000		0,000
		N	211	211	211	211	211	211
	Cost	Correlation Coefficient	.384**	.268**	-.393**	.218**	.272**	1,000
		Sig. (2-tailed)	0,000	0,000	0,000	0,001	0,000	
		N	211	211	211	211	211	211

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived usefulness.

$H1_a$: There is a relationship between the perceived relative advantages of mobile banking and its perceived usefulness.

The results show that there is a weak positive correlation between the perceived relative advantage of mobile banking and its perceived usefulness which is statistically significant (r=.383, N=211, p=0.000, i.e. < 0.001). Therefore the null hypothesis is rejected. Hence there is a relationship between the perceived relative advantage of mobile banking and its perceived usefulness.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived trust.
$H2_a$: There is a relationship between the perceived relative advantages of mobile banking and its perceived trust.

Here, the results indicate that there is a weak positive correlation between the perceived relative advantage of mobile banking and its perceived trust which is statistically significant (r= .245, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived relative advantages of mobile banking and its perceived trust.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived cost.
$H3_a$: There is a relationship between the perceived relative advantages of mobile banking and its perceived cost.

The results indicate that there is a weak positive correlation between the perceived relative advantage of mobile banking and its perceived cost which is statistically significant (r=.268, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived relative advantage of mobile banking and its perceived cost.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived complexity.

$H4_a$: There is a relationship between the perceived relative advantages of mobile banking and its perceived complexity.

The results show that a weak negative correlation exists between the perceived relative advantage of mobile banking and its perceived complexity which is statistically significant (r= -.263, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived relative advantage of mobile banking and its perceived complexity.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived awareness.
$H5_a$: There is a relationship between the perceived relative advantages of mobile banking and its perceived awareness.

A weak positive correlation exists between the perceived relative advantage of mobile banking and its perceived awareness which is statistically significant (r=.280, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived relative advantage of mobile banking and its perceived awareness.

$H_{0:}$. There is no relationship between the perceived complexity of mobile banking and its perceived usefulness.
$H6_a$: There is a relationship between the perceived complexity of mobile banking and its perceived usefulness.

The results show that a weak negative correlation exists between the perceived complexity of mobile banking and its perceived usefulness which is not statistically significant (r=-.184, N=211, p=0.007, i.e. > 0.001). Therefore, the null hypothesis is not rejected. Hence, there is no relationship between the perceived complexity of mobile banking and its perceived usefulness.

H_0: There is no relationship between the perceived complexity of mobile banking and its perceived trust.

$H7_a$: There is a relationship between the perceived complexity of mobile banking and its perceived trust.

The results show that there is a weak negative correlation between the perceived complexity of mobile banking and its perceived trust which is statistically significant (r= -.232, N=211, p=0.001, i.e. < 0.001). The null hypothesis is therefore rejected. Hence there is a relationship between the perceived complexity of mobile banking and its perceived trust

H_0: There is no relationship between the perceived complexity of mobile banking and its perceived cost.
$H8_a$: There is a relationship between the perceived complexity of mobile banking and its perceived cost.

The results show that there is a weak negative correlation between the perceived complexity of mobile banking and its perceived cost which is statistically significant (r= -.393, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is therefore a relationship between the perceived complexity of mobile banking and its perceived cost.

H_0: There is no relationship between the perceived complexity of mobile banking and its perceived awareness.
$H9_a$: There is a relationship between the perceived complexity of mobile banking and its perceived awareness.

There is a weak negative correlation between the perceived complexity of mobile banking and its perceived awareness which is statistically significant (r=-.349, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence there is a relationship between the perceived complexity of mobile banking and its perceived awareness.

H_0: There is no relationship between the perceived awareness of mobile banking and its perceived usefulness.
$H10_a$: There is a relationship between the perceived awareness of mobile banking and its perceived usefulness.

The results show that there is a weak positive correlation between the perceived awareness of mobile banking and its perceived usefulness, which is not statistically significant (r=.137, N=211, p=0.046, i.e. > 0.001). The null hypothesis is therefore not rejected. Hence, there is no relationship between the perceived awareness of mobile banking and its perceived usefulness.

H_0: There is no relationship between the perceived awareness of mobile banking and its perceived trust.
$H11_a$: There is a relationship between the perceived awareness of mobile banking and its perceived trust.

The results show that there is a weak positive correlation between the perceived awareness of mobile banking and its perceived trust which is statistically significant (r=.282, N = 211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived awareness of mobile banking and its perceived trust.

H_0: There is no relationship between the perceived awareness of mobile banking and its perceived cost.
$H12_a$: There is a relationship between the perceived awareness of mobile banking and its perceived cost.

The results show that there is a weak positive correlation between the perceived awareness of mobile banking and perceived cost which is statistically significant (r=.384, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived awareness of mobile banking and its perceived cost.

H_0: There is no relationship between the perceived trust of mobile banking and the perceived cost.
$H13_a$: There is a relationship between the perceived trust of mobile banking and the perceived cost.

The results show that there is a weak positive correlation between the perceived trust of mobile banking and perceived cost which is statistically significant (r=.272, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived trust of mobile banking and its perceived cost.

H_0: There is no relationship between the perceived trust of mobile banking and the perceived usefulness.
$H14_a$: There is a relationship between the perceived trust of mobile banking and the perceived usefulness.

The results show that there is a weak positive correlation between the perceived trust of mobile banking and perceived usefulness which is statistically significant (r=.269, N=211, p=0.000, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived trust of mobile banking and its perceived usefulness.

H_0: There is no relationship between the perceived cost of mobile banking and the perceived usefulness.
$H15_a$: There is a relationship between the perceived cost of mobile banking and the perceived usefulness.

The results show that there is a weak positive correlation between the perceived cost of mobile banking and perceived usefulness which is statistically significant (r=.218, N=211, p=0.001, i.e. < 0.001). The null hypothesis is therefore rejected. Hence, there is a relationship between the perceived cost of mobile banking and its perceived usefulness.

ii. Statistical testing for hypotheses H16-19

The statistical test results for hypotheses H16 to H19, related to gender, age, education and employment status is presented in the section below. The t-test, one-way analysis of variance (ANOVA) and tukey post hoc test were used in the statistical testing.

Gender

H_0: Females and males differ with regard to the adoption of mobile banking.

$H16_a$: Females and males do not differ with regard to the adoption of mobile banking

The student t-test is used to establish the significance of a difference between means of two independent samples with regard to a variable of interest. The t-test is robust in the case of non-normality of the data, especially in larger samples. In this study, the two independent samples considered are male (n=105) and female (n=106).

Table 13: Group statistics

	Gender	N	Mean	Std. Deviation
Awareness	M	105	3.9703	.42947
	F	106	3.9694	.37678
Relative Advantage	M	105	4.0093	.46524
	F	106	3.9827	.33833
Complexity	M	105	2.4201	.65032
	F	106	2.4346	.52288
Usefulness	M	105	3.9658	.52142
	F	106	3.9881	.29924
Trust	M	105	3.9067	.53348
	F	106	3.9205	.50111
Cost	M	105	3.8147	.50720
	F	106	3.7620	.38708

i. Awareness

The t-test shown in the Table below was done to compare the mean value of the variable awareness between male and female respondents. The result of the Levene test for the equality of variances is not rejected and therefore, the t-test value for equal variances could be used. The results show that there is no statistically significant difference in the scores for males (M=3.97, SD=.42) and for females (M=3.96, SD=.37) with regard to their awareness of mobile banking: t=0.016, p= 0.987. The null hypothesis is therefore rejected.

ii. Relative advantage

The t-test shown in the Table below was done to compare the mean value of the variable relative advantage between male and female respondents. The result of the Levene test for the equality of variances is not rejected and therefore, the t-test value for equal variances could be used. When comparing the variable relative advantage of male and female respondents, the results indicate that there is no statistically significant difference in the scores for males (M=4.00, SD=.46) and for females (M=3.98, SD=.33) with regard to their perceived advantage of mobile banking: t= 0.476, p=0.635. The null hypothesis is therefore rejected.

iii. Complexity

The t-test shown in the Table below was done to compare the mean value of the variable complexity between male and female respondents. The result of the Levene test for the equality of variances is not rejected and therefore, the t-test value for equal variances could be used. The results show that no statistically significant difference in the scores were shown for males (M=2.42, SD=.65) and for females (M=2.43, SD=.52) with regard to their perceived complexity of mobile banking; t=-.179, p= 0.858. The null hypothesis is therefore rejected.

iv. Usefulness

The t-test shown in the Table below was done to compare the mean value of the variable usefulness between male and female respondents. The result of the Levene test for the equality of variances is not rejected and therefore, the t-test value for equal variances could be used. The variable usefulness showed no statistically significant difference in the scores for males (M=3.96, SD=.52) and females (M=3.98, SD=.29) with regard to their perceived usefulness of mobile banking: t=-.380, p =0.704. The null hypothesis is therefore rejected.

v. Trust

The t-test shown in the Table below was done to compare the mean value of the variable trust between male and female respondents. The result of the Levene test for the equality of variances is not rejected and therefore, the t-test value for equal variances could be used. When comparing the results of the variable trust for male and female respondents, there was no statistically significant difference in the scores shown for males (M=3.90, SD=.53) and for females (M=3.92, SD=.50) with regard to their trust of mobile banking; t=-.193, p=0.847. The null hypothesis is therefore rejected.

vi. Cost

The t-test shown in the Table below was done to compare the mean value of the variable cost between male and female respondents. The result of the Levene test for the equality of variances is not rejected and therefore, the t-test value for equal variances could be used. The results of the variable cost were compared for male and female respondents and it was found that there was no statistically significant difference shown in the scores for males (M=3.81, SD=.507) and for females (M=3.76, SD=.507) with regard to the perceived cost of mobile banking; t=.849, p= 0.397. The null hypothesis is therefore rejected.

Table 14: T-test for significance of difference between males and females with respect to the factors that affect the adoption of mobile banking

		Levene's test for equality of variances		t-test for equality of means		
		F	Sig.	t	df	Sig. (2-tailed)
Awareness	Equal variances assumed	.001	.974	.016	209	.987
	Equal variances not assumed			.016	205.005	.987
Relative Advantage	Equal variances assumed	1.327	.251	.476	209	.635
	Equal variances not assumed			.475	189.888	.635
Complexity	Equal variances assumed	3.184	.076	-.179	209	.858
	Equal variances not assumed			-.179	199.012	.858
Usefulness	Equal variances assumed	14.375	.000	-.380	209	.704
	Equal variances not assumed			-.379	165.481	.705
Trust	Equal variances assumed	.503	.479	-.193	209	.847
	Equal variances not assumed			.016	209	.847
Cost	Equal variances assumed	1.826	.178	.849	209	.397
	Equal variances not assumed			.848	194.495	.397

Age groups

H_0: People in different age groups differ with regard to the adoption of mobile banking.

$H17_a$: People in different age groups do not differ with regard to the adoption of mobile banking.

An analysis of variance (ANOVA) was conducted to examine whether any differences exist between groups of respondents categorised by demographic characteristics of age, education level and employment status; and with respect to the six factors that affect the adoption of mobile banking among rural South Africans that are under study.

A one-way ANOVA was conducted for each of the select demographic categories. The procedure for the ANOVA is to derive two different estimates of population variance from the data, followed by calculating a statistic from the ratio of the two estimates, i.e. 'between groups' and 'within groups variance'. The F ratio is the ratio of 'between-groups' variance to 'within-groups' variance. If the F value is significant, it indicates that the means are probably not equal. The one-way ANOVA is considered a robust test against the normality assumption.

In order to test the hypothesis: 'People in different age groups differ with regard to the adoption of mobile banking', an ANOVA was conducted. The age groups considered were 18-25, 26-35, 36-45, 46-55 and 55+. For the analysis, the age group 46-55 and 55+ were grouped together due to a small number of respondents in the 55+ group, arriving at four testable groups.

The mean scores and standard deviations for the various age groups were deduced; and based on these scores the F value was computed. The results for the mean and standard deviations can be found in the Table below, which contains the descriptive table. This is then followed by the results for the one-way ANOVA and Tukey post hoc test, which are illustrated in the multiple comparison table (Table 17).

Table 15: Descriptive for age groups

	Age groups	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper bound
Awareness	18-25	26	3.9288	.57212	.11220	3.6977	4.1599
	26-35	99	3.9992	.25544	.02567	3.9482	4.0501
	36-45	59	4.0077	.39396	.05129	3.9050	4.1104
	46-55+	27	3.8190	.61021	.11743	3.5777	4.0604
	Total	211	3.9698	.40289	.02774	3.9152	4.0245
Relative Advantage	18-25	26	3.8461	.53458	.10484	3.6302	4.0620
	26-35	99	4.0485	.27867	.02801	3.9929	4.1040
	36-45	59	4.0471	.34708	.04519	3.9567	4.1376
	46-55+	27	3.8359	.65407	.12588	3.5772	4.0947
	Total	211	3.9960	.40572	.02793	3.9409	4.0510
Complexity	18-25	26	2.3903	.49632	.09734	2.1898	2.5908
	26-35	99	2.3379	.50568	.05082	2.2370	2.4387
	36-45	59	2.3763	.52795	.06873	2.2387	2.5139
	46-55+	27	2.9032	.83718	.16111	2.5720	3.2343
	Total	211	2.4274	.58839	.04051	2.3476	2.5073
Usefulness	18-25	26	3.9223	.32049	.06285	3.7929	4.0518
	26-35	99	3.9469	.36277	.03646	3.8745	4.0193
	36-45	59	4.0800	.36408	.04740	3.9851	4.1749
	46-55+	27	3.9150	.72467	.13946	3.6283	4.2017
	Total	211	3.9770	.42372	.02917	3.9195	4.0345
Trust	18-25	26	3.8395	.57776	.11331	3.6061	4.0729
	26-35	99	3.9125	.48548	.04879	3.8157	4.0093
	36-45	59	4.0055	.46910	.06107	3.8833	4.1278
	46-55+	27	3.7881	.64159	.12347	3.5343	4.0419
	Total	211	3.9136	.51628	.03554	3.8435	3.9837
Cost	18-25	26	3.7045	.48022	.09418	3.5106	3.8985
	26-35	99	3.8439	.41110	.04132	3.7619	3.9259
	36-45	59	3.8347	.44059	.05736	3.7199	3.9495
	46-55+	27	3.5630	.52115	.10030	3.3569	3.7692
	Total	211	3.7882	.45057	.03102	3.7271	3.8494

The Table below illustrates the output of the one-way ANOVA and whether there exists a statistically significant difference between the group means.

The results show:

- Awareness – the significance value is 0.165 (i.e. p=.165), which is above the 0.05 (5%) level. (Not statistically significant)
- Relative advantage – the significance value is 0.015 (i.e. p=.015), which is below the 0.05 (5%) level. (Statistically significant)
- Complexity – the significance value is 0.000 (i.e. p=.000), which is below the 0.05 (5%) level. (Statistically significant)
- Usefulness – the significance value is 0.172 (i.e. p=.172), which is above the 0.05 (5%) level. (Not statistically significant)
- Trust – the significance value is 0.262 (i.e. p=.262), which is above 0.05 (5%) level. (Not statistically significant)
- Cost – the significance level is 0.019 (i.e. p=.019), which is below the 0.05 (5%) level. (Statistically significant)

One-way ANOVA for age groups

Table 16: ANOVA for significant difference between age groups

		Sum of Squares	df	Mean Square	F	Sig *(p)*
Awareness	Between Groups	.828	3	.276	1.717	.165
	Within Groups	33.261	207	.161		
	Total	34.088	210			
Relative Advantage	Between Groups	1.703	3	.568	3.575	.015
	Within Groups	32.865	207	.159		
	Total	34.568	210			
Complexity	Between Groups	7.095	3	2.365	7.462	.000
	Within Groups	65.607	207	.317		
	Total	72.702	210			
Usefulness	Between Groups	.897	3	.299	1.681	.172
	Within Groups	36.807	207	.178		
	Total	37.704	210			
Trust	Between Groups	1.067	3	.356	1.341	.262
	Within Groups	54.908	207	.265		
	Total	55.975	210			
Cost	Between Groups	1.986	3	.662	3.371	.019
	Within Groups	40.648	207	.196		
	Total	42.633	210			

The null hypotheses were thus rejected in the case of three of the constructs, namely *awareness, usefulness* and *trust*. There are thus statistically significant differences between the age groups with regard to *relative advantage, complexity* and *cost*.

In order to determine which specific groups differ from each other in the findings above, the Tukey HSD multiple comparison test, which is generally used in conjunction with an ANOVA, was used.

Tukey post hoc test for age groups

The Table below (multiple comparison age groups) shows that there is a statistically significant difference in perception of complexity of mobile banking between the age group 46-55+ and the 26-35 year age group (p=0.000), as well as between the 46-55+ and the 36-45 year age group (p=0.000) and between the 18-25 year age group and the 46-55+ group (p=0.006).

Statistically significant difference in the perception of cost of mobile banking was also found between the age groups 46-55+ and 26-35 age group (*p* = 0.020), and 46-55+ age group and 36-45 age group (p= 0.044).

Table 17: Multiple comparisons for age groups

Dependent Variable	(I) age_4g	(J) age_4g	Mean Difference (I-J)	Std. Error	Sig. (*p*)	95% Confidence Interval	
						Lower Bound	Upper Bound
Awareness	18-25	26-35	-.07039	.08833	.856	-.2992	.1584
		36-45	-.07892	.09436	.837	-.3233	.1655
		46-55+	.10973	.11014	.752	-.1755	.3950
	26-35	18-25	.07039	.08833	.856	-.1584	.2992
		36-45	-.00853	.06593	.999	-.1793	.1622
		46-55+	.18012	.08703	.167	-.0453	.4055
	36-45	18-25	.07892	.09436	.837	-.1655	.3233
		26-35	.00853	.06593	.999	-.1622	.1793
		46-55+	.18865	.09314	.182	-.0526	.4299
	46-55+	18-25	-.10973	.11014	.752	-.3950	.1755
		26-35	-.18012	.08703	.167	-.4055	.0453
		36-45	-.18865	.09314	.182	-.4299	.0526

Relative advantage	18-25	26-35	-.20234	.08781	.100	-.4298	.0251
		36-45	-.20102	.09379	.143	-.4440	.0419
		46-55+	.01020	.10948	1.000	-.2734	.2938
	26-35	18-25	.20234	.08781	.100	-.0251	.4298
		36-45	.00132	.06553	1.000	-.1684	.1711
		46-55+	.21254	.08651	.070	-.0115	.4366
	36-45	18-25	.20102	.09379	.143	-.0419	.4440
		26-35	-.00132	.06553	1.000	-.1711	.1684
		46-55+	.21122	.09258	.106	-.0286	.4510
	46-55+	18-25	-.01020	.10948	1.000	-.2938	.2734
		26-35	-.21254	.08651	.070	-.4366	.0115
		36-45	-.21122	.09258	.106	-.4510	.0286
Complexity	18-25	26-35	.05243	.12406	.975	-.2689	.3738
		36-45	.01399	.13252	1.000	-.3292	.3572
		46-55+	-.51286*	.15469	.006	-.9135	-.1122
	26-35	18-25	-.05243	.12406	.975	-.3738	.2689
		36-45	-.03844	.09259	.976	-.2783	.2014
		46-55+	-.56530*	.12223	.000	-.8819	-.2487
	36-45	18-25	-.01399	.13252	1.000	-.3572	.3292
		26-35	.03844	.09259	.976	-.2014	.2783
		46-55+	-.52686*	.13081	.000	-.8657	-.1881
	46-55+	18-25	.51286*	.15469	.006	.1122	.9135
		26-35	.56530*	.12223	.000	.2487	.8819
		36-45	.52686*	.13081	.000	.1881	.8657
Usefulness	18-25	26-35	-.02456	.09292	.994	-.2652	.2161
		36-45	-.15764	.09926	.388	-.4147	.0994
		46-55+	.00735	.11586	1.000	-.2927	.3074
	26-35	18-25	.02456	.09292	.994	-.2161	.2652
		36-45	-.13308	.06935	.223	-.3127	.0465
		46-55+	.03191	.09155	.985	-.2052	.2690
	36-45	18-25	.15764	.09926	.388	-.0994	.4147
		26-35	.13308	.06935	.223	-.0465	.3127
		46-55+	.16499	.09798	.335	-.0888	.4188
	46-55+	18-25	-.00735	.11586	1.000	-.3074	.2927
		26-35	-.03191	.09155	.985	-.2690	.2052
		36-45	-.16499	.09798	.335	-.4188	.0888
Trust	18-25	26-35	-.07301	.11350	.918	-.3670	.2209
		36-45	-.16604	.12124	.520	-.4800	.1480
		46-55+	.05144	.14152	.984	-.3151	.4180
	26-35	18-25	.07301	.11350	.918	-.2209	.3670
		36-45	-.09303	.08471	.691	-.3124	.1264
		46-55+	.12445	.11182	.682	-.1652	.4141

	36-45	18-25	.16604	.12124	.520	-.1480	.4800
		26-35	.09303	.08471	.691	-.1264	.3124
		46-55+	.21747	.11967	.268	-.0925	.5274
	46-55+	18-25	-.05144	.14152	.984	-.4180	.3151
		26-35	-.12445	.11182	.682	-.4141	.1652
		36-45	-.21747	.11967	.268	-.5274	.0925
Cost	18-25	26-35	-.13938	.09765	.484	-.3923	.1135
		36-45	-.13016	.10431	.597	-.4003	.1400
		46-55+	.14150	.12176	.651	-.1739	.4569
	26-35	18-25	.13938	.09765	.484	-.1135	.3923
		36-45	.00922	.07288	.999	-.1795	.1980
		46-55+	.28088*	.09621	.020	.0317	.5301
	36-45	18-25	.13016	.10431	.597	-.1400	.4003
		26-35	-.00922	.07288	.999	-.1980	.1795
		46-55+	.27166*	.10296	.044	.0050	.5383
	46-55+	18-25	-.14150	.12176	.651	-.4569	.1739
		26-35	-.28088*	.09621	.020	-.5301	-.0317
		36-45	-.27166*	.10296	.044	-.5383	-.0050

*. The mean difference is significant at the 0.05 level.

Education groups

H_0: People with different education levels differ with regard to the adoption of mobile banking.

$H18_a$: People with different education levels do not differ with regard to their perception of mobile banking.

In order to test the hypothesis: 'People with different education levels differ with regard to their perception of mobile banking', the ANOVA was conducted. The education groups considered in this study were: no schooling, some primary schooling, some secondary schooling, grade 12/matric, post grade 12 certificate, post grade 12 diploma, degree and post-graduate degree. For the analysis, the education levels were placed into four categories, i.e., no schooling to some schooling (includes: no schooling, some primary schooling and some secondary schooling), matric/grade 12, post-grade 12 certificate and degree/post degree (includes: degree and post-graduate degree). The mean scores and standard deviations for the various education groups were deduced and based on these

scores, the F value was computed. The results for the mean and standard deviations can be found in the Table below which contains the descriptive table, followed by the results for the one-way ANOVA and Tukey post hoc test which is illustrated in the multiple comparison table (Table 20).

Table 18: Descriptive for education levels

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper bound
Awareness	No school/some	93	3.8578	.49888	.05173	3.7550	3.9605
	Matric/Gr 12	61	4.0267	.19983	.02559	3.9755	4.0779
	Certificate	26	4.0000	.28284	.05547	3.8858	4.1142
	Degree/post grad	31	4.1688	.37326	.06704	4.0319	4.3057
	Total	211	3.9698	.40289	.02774	3.9152	4.0245
Relative Advantage	No school/some	93	3.9177	.44552	.04620	3.8259	4.0094
	Matric/Gr 12	61	4.0952	.29118	.03728	4.0206	4.1697
	Certificate	26	3.9462	.43288	.08489	3.7713	4.1210
	Degree/post grad	31	4.0774	.41209	.07401	3.9262	4.2285
	Total	211	3.9960	.40572	.02793	3.9409	4.0510
Complexity	No school/some	93	2.5782	.58358	.06051	2.4580	2.6984
	Matric/Gr 12	61	2.3041	.60662	.07767	2.1487	2.4594
	Certificate	26	2.4462	.49738	.09754	2.2453	2.6470
	Degree/post grad	31	2.2020	.53166	.09549	2.0070	2.3971
	Total	211	2.4274	.58839	.04051	2.3476	2.5073
Usefulness	No school/some	93	3.8643	.40783	.04229	3.7803	3.9482
	Matric/Gr 12	61	4.0898	.42591	.05453	3.9808	4.1989
	Certificate	26	4.0197	.26382	.05174	3.9132	4.1263
	Degree/post grad	31	4.0574	.50238	.09023	3.8731	4.2416
	Total	211	3.9770	.42372	.02917	3.9195	4.0345
Trust	No school/some	93	3.9247	.45870	.04756	3.8302	4.0191
	Matric/Gr 12	61	3.9412	.45729	.05855	3.8241	4.0583
	Certificate	26	4.0000	.48990	.09608	3.8021	4.1979
	Degree/post grad	31	3.7537	.75337	.13531	3.4774	4.0300
	Total	211	3.9136	.51628	.03554	3.8435	3.9837
Cost	No school/some	93	3.6789	.46724	.04845	3.5827	3.7752
	Matric/Gr 12	61	3.8674	.31604	.04047	3.7865	3.9484
	Certificate	26	3.8725	.47048	.09227	3.6825	4.0625
	Degree/post grad	31	3.8895	.54848	.09851	3.6884	4.0907
	Total	211	3.7882	.45057	.03102	3.7271	3.8494

The Table below illustrates the output of the one way ANOVA and whether there exists a statistically significant difference between the group means.

The results show:

- Awareness – the significance value is 0.001 (i.e. p=.001), which is below the 0.05 (5%) level. (Statistically significant)
- Relative advantage – the significance level is 0.032 (i.e. p=.032), which is below the 0.05 (5%) level. (Statistically significant)
- Complexity – the significance level is 0.003 (i.e. p=.003), which is below the 0.05 (5%) level. (Statistically significant)
- Usefulness – the significance level is 0.006 (i.e. p=.006), which is below the 0.05 (5%) level. (Statistically significant)
- Cost – the significance level is 0.019 (p=.019), which is below the 0.05 (5%) level. (Statistically significant)
- Trust - the significance level is 0.271 (i.e. p=.271), which is above the 0.05 (5%) level. (Not statistically significant)

Table 19: One-way ANOVA for education groups

		Sum of Squares	df	Mean Square	F	Sig (*p*)
Awareness	Between Groups	2.615	3	.872	5.734	.001
	Within Groups	31.473	207	.152		
	Total	34.088	210			
Relative Advantage	Between Groups	1.440	3	.480	3.000	.032
	Within Groups	33.127	207	.160		
	Total	34.568	210			
Complexity	Between Groups	4.626	3	1.542	4.689	.003
	Within Groups	68.076	207	.329		
	Total	72.702	210			
Usefulness	Between Groups	2.207	3	.736	4.289	.006
	Within Groups	35.497	207	.171		
	Total	37.704	210			
Trust	Between Groups	1.045	3	.348	1.312	.271
	Within Groups	54.931	207	.265		
	Total	55.975	210			
Cost	Between Groups	1.996	3	.665	3.390	.019
	Within Groups	40.637	207	.196		
	Total	42.633	210			

The null hypothesis was thus rejected in the case of one of the constructs, namely *trust*. There are thus statistically significant differences between the education groups with regard to *awareness, relative advantage, complexity, usefulness* and *cost.*

In order to determine which specific groups differ from each other in the findings above, the Tukey HSD multiple comparison test, which is generally used in conjunction with an ANOVA, was used.

Tukey post hoc test for education groups

The Table below (multiple comparisons education groups) shows that there is a statistically significant difference in awareness of mobile banking between those with no schooling/some schooling and matric (p=0.045), and those with a degree/post graduate degree (p=0.001).

A statistically significant difference in the relative advantage of mobile banking also exists between those with matric and no schooling/some schooling (p=0.038).

There is also a statistically significant difference in the complexity of mobile banking between those with schooling/some schooling and matric (p=0.021), and those with a degree/post-graduate degree (p=0.010).

A statistically significant difference in the usefulness of banking exists between those with schooling/some schooling and matric (p=0.006).

Table 20: Multiple comparisons for education groups

Dependent Variable	(I) EduGroups	(J) EduGroups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Awareness	1. No school/some schooling	Matric	-.16891*	.06424	.045	-.3353	-.0025
		Certif	-.14221	.08650	.356	-.3663	.0818
		Degree/Post	-.31099*	.08087	.001	-.5204	-.1015
	2. Matric/ Grade 12	NoSch/Some	.16891*	.06424	.045	.0025	.3353
		Certif	.02669	.09133	.991	-.2098	.2632
		Dgree/Post	-.14208	.08601	.352	-.3648	.0807
	3. Certificate	NoSch/Some	.14221	.08650	.356	-.0818	.3663
		Matric	-.02669	.09133	.991	-.2632	.2098
		Degree/Post	-.16877	.10369	.365	-.4373	.0998
	4. Degree/post grad degree	NoSch/Some	.31099*	.08087	.001	.1015	.5204
		Matric	.14208	.08601	.352	-.0807	.3648
		Certificate	.16877	.10369	.365	-.0998	.4373
Relative Advantage	1. No school/some schooling	Matric	-.17749*	.06591	.038	-.3482	-.0068
		Certificate	-.02848	.08875	.989	-.2583	.2014
		Degree/Post	-.15968	.08297	.221	-.3746	.0552
	2. Matric/ Grade 12	NoSch/Some	.17749*	.06591	.038	.0068	.3482
		Certificate	.14901	.09370	.386	-.0937	.3917
		Degree/post	.01781	.08824	.997	-.2107	.2463
	3. Certificate	NoSch/Some	.02848	.08875	.989	-.2014	.2583
		Matric	-.14901	.09370	.386	-.3917	.0937
		Degree/post	-.13120	.10638	.606	-.4067	.1443
	4. Degree/post grad degree	NoSch/some	.15968	.08297	.221	-.0552	.3746
		Matric	-.01781	.08824	.997	-.2463	.2107
		Certificate	.13120	.10638	.606	-.1443	.4067
Complexity	1. No school/some schooling	Matric	.27413*	.09449	.021	.0294	.5188
		Certificate	.13204	.12722	.727	-.1975	.4615
		Degree	.37614*	.11893	.010	.0681	.6842
	2. Matric/ Grade 12	NoSch/some	-.27413*	.09449	.021	-.5188	-.0294
		Certificate	-.14209	.13431	.715	-.4900	.2058
		Degree/post	.10201	.12649	.851	-.2256	.4296
	3. Certificate	NoSch/some	-.13204	.12722	.727	-.4615	.1975
		Matric	.14209	.13431	.715	-.2058	.4900
		Degree/post	.24411	.15250	.380	-.1509	.6391
	4. Degree/post grad degree	NoSch/some	-.37614*	.11893	.010	-.6842	-.0681
		Matric	-.10201	.12649	.851	-.4296	.2256
		Certificate	-.24411	.15250	.380	-.6391	.1509
Usefulness	1. No	Matric	-.22558*	.06823	.006	-.4023	-.0489

	school/some schooling	Certificate	-.15548	.09187	.330	-.3934	.0825
		Degree/post	-.19312	.08588	.114	-.4156	.0293
	2. Matric/ Grade 12	NoSch/some	.22558*	.06823	.006	.0489	.4023
		Certificate	.07011	.09699	.888	-.1811	.3213
		Degree/post	.03246	.09134	.985	-.2041	.2690
	3. Certificate	NoSch/some	.15548	.09187	.330	-.0825	.3934
		Matric	-.07011	.09699	.888	-.3213	.1811
		Degree/post	-.03764	.11012	.986	-.3229	.2476
	4. Degree/post grad degree	NoSch/some	.19312	.08588	.114	-.0293	.4156
		Matric	-.03246	.09134	.985	-.2690	.2041
		Certificate	.03764	.11012	.986	-.2476	.3229
Trust	1. No school/some schooling	Matric	-.01654	.08487	.997	-.2364	.2033
		Certificate	-.07534	.11428	.912	-.3713	.2207
		Degree/post	.17098	.10683	.381	-.1057	.4477
	2. Matric/ Grade 12	NoSch/some	.01654	.08487	.997	-.2033	.2364
		certificate	-.05879	.12065	.962	-.3713	.2537
		Degree/post	.18752	.11362	.353	-.1068	.4818
	3. Certificate	NoSch/some	.07534	.11428	.912	-.2207	.3713
		Matric	.05879	.12065	.962	-.2537	.3713
		Degree	.24631	.13699	.277	-.1085	.6011
	4. Degree/post grad degree	NoSch/some	-.17098	.10683	.381	-.4477	.1057
		Matric	-.18752	.11362	.353	-.4818	.1068
		Certificate	-.24631	.13699	.277	-.6011	.1085
Cost	1. No school/some schooling	Matric	-.18851	.07300	.051	-.3776	.0006
		Certificate	-.19357	.09829	.203	-.4481	.0610
		Degree/post	-.21060	.09189	.103	-.4486	.0274
	2. Matric/ Grade 12	NoSch/Some	.18851	.07300	.051	-.0006	.3776
		Certificate	-.00506	.10377	1.000	-.2738	.2637
		Degree/post	-.02210	.09773	.996	-.2752	.2310
	3. Certificate	NoSch/some	.19357	.09829	.203	-.0610	.4481
		Matric	.00506	.10377	1.000	-.2637	.2738
		Degree/post	-.01704	.11783	.999	-.3222	.2881
	4. Degree/post grad degree	NoSch/some	.21060	.09189	.103	-.0274	.4486
		Matric	.02210	.09773	.996	-.2310	.2752
		Certificate	.01704	.11783	.999	-.2881	.3222

*. The mean difference is significant at the 0.05 level.

Employment groups

H0: People with different employment statuses differ with regard to the adoption of mobile banking.

$H19_a$: People with different employment statuses do not differ with regard to the adoption of mobile banking.

In order to test the hypothesis: 'People with different employment statuses differ with regard to the adoption of mobile banking' the ANOVA was done using the F test. The employment groups considered in this study were unemployed, part-time employed, full-time employed and self-employed. For the analysis, the employment groups were placed into three categories, and grouped as, unemployed, part-time employed and full-time or self-employed.

The mean scores and standard deviations for the employment groups were deduced and based on these scores, and the F value was computed. The results for the mean and standard deviations can be found in the Table below, which contains the descriptive table, followed by the results for the one-way ANOVA and Tukey post hoc test which is illustrated in the multiple comparison table (Table 24).

Table 21: Descriptive for employment groups

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper bound
Awareness	Unempl	61	3.9107	.47802	.06120	3.7883	4.0331
	Part-time	55	3.9040	.50598	.06823	3.7673	4.0408
	FT/Self	95	4.0459	.24302	.02493	3.9964	4.0954
	Total	211	3.9698	.40289	.02774	3.9152	4.0245
Relative Advantage	Unempl	61	3.9206	.40060	.05129	3.8180	4.0232
	Part-time	55	3.9853	.46798	.06310	3.8588	4.1118
	FT/Self	95	4.0505	.36434	.03738	3.9763	4.1247
	Total	211	3.9960	.40572	.02793	3.9409	4.0510
Complexity	Unempl	61	2.4979	.64166	.08216	2.3335	2.6622
	Part-time	55	2.4093	.48412	.06528	2.2784	2.5402
	FT/Self	95	2.3927	.60938	.06252	2.2685	2.5168
	Total	211	2.4274	.58839	.04051	2.3476	2.5073

Usefulness	Unempl	61	3.9536	.31384	.04018	3.8732	4.0340
	Part-time	55	3.8732	.50193	.06768	3.7375	4.0089
	FT/Self	95	4.0521	.42562	.04367	3.9654	4.1388
	Total	211	3.9770	.42372	.02917	3.9195	4.0345
Trust	Unempl	61	3.9034	.47101	.06031	3.7827	4.0240
	Part-time	55	3.9811	.48078	.06483	3.8512	4.1111
	FT/Self	95	3.8811	.56328	.05779	3.7663	3.9958
	Total	211	3.9136	.51628	.03554	3.8435	3.9837
Cost	Unempl	61	3.7406	.39920	.05111	3.6384	3.8429
	Part-time	55	3.7411	.52903	.07133	3.5981	3.8841
	FT/Self	95	3.8461	.42999	.04412	3.7585	3.9337
	Total	211	3.7882	.45057	.03102	3.7271	3.8494

The Table below illustrates the output of the one way ANOVA and whether there exists a statistically significant difference between the group means.

The results show:

- Awareness - the significance value is 0.045 (i.e. p=.045), which is below the 0.05 (5%) level. (Statistically significant)
- Relative advantage – the significance value is 0.145 (i.e. p=.145), which is above the 0.05 (5%) level. (Not statistically significant)
- Complexity – significance value is 0.535 (i.e. p=.535), which is above the 0.05 (5%) level. (Not statistically significant)
- Usefulness – significance value is 0.039 (i.e. p=.039), which is below the 0.05 (5%) level. (Statistically significant)
- Trust - the significance value is 0.513 (i.e. p=.513), which is above the 0.05 (5%) level. (Not statistically significant)
- Cost – significance value is 0.242 (i.e. p=.242), which is above the 0.05 (5%) level. (Not statistically significant)

Table 22: One-way ANOVA for employment groups

		Sum of Squares	df	Mean Square	F	Sig
Awareness	Between Groups	1.001	2	.501	3.147	.045
	Within Groups	33.087	208	.159		
	Total	34.088	210			
Relative advantage	Between Groups	.635	2	.318	1.946	.145
	Within Groups	33.933	208	.163		
	Total	34.568	210			
Complexity	Between Groups	.436	2	.218	.627	.535
	Within Groups	72.266	208	.347		
	Total	72.702	210			
Usefulness	Between Groups	1.161	2	.581	3.305	.039
	Within Groups	36.542	208	.176		
	Total	37.704	210			
Trust	Between Groups	.358	2	.179	.669	.513
	Within Groups	55.618	208	.267		
	Total	55.975	210			
Cost	Between Groups	.578	2	.289	1.430	.242
	Within Groups	42.055	208	.202		
	Total	42.633	210			

The null hypothesis was thus rejected in the case of four of the constructs, namely *relative advantage, complexity, trust* and *cost*. There are thus statistically significant differences between the employment groups with regard to *awareness* and *usefulness.*

In order to determine which specific groups differ from each other in the findings above, the Tukey HSD multiple comparison test, which is generally used in conjunction with an ANOVA, was used.

Tukey post hoc test for employment groups

The multiple comparison table below shows that there is a statistically significant difference in the usefulness of mobile banking between those who are fulltime/self-employed and those who are part-time employed (p= 0.033).

However, other variable (awareness, relative advantage, complexity, cost and trust) comparisons are not significantly different from one another.

Table 23: Multiple comparisons for employment groups

Dependent Variable	(I) Emp_3g	(J) Emp_3g	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Awareness	1.Unempl	Part-time	.00663	.07416	.996	-.1684	.1817
		FT/self	-.13522	.06544	.099	-.2897	.0193
	2.Part-time	Unempl	-.00663	.07416	.996	-.1817	.1684
		FT/self	-.14185	.06758	.092	-.3014	.0177
	3.FT/Self	Unempl	.13522	.06544	.099	-.0193	.2897
		Part-time	.14185	.06758	.092	-.0177	.3014
Rel_Advantage	1.Unempl	Part-time	-.06464	.07510	.666	-.2419	.1127
		FT/self	-.12987	.06627	.125	-.2863	.0266
	2.Part-time	Unempl	.06464	.07510	.666	-.1127	.2419
		FT/self	-.06523	.06844	.607	-.2268	.0963
	3.FT/Self	Unempl	.12987	.06627	.125	-.0266	.2863
		Part-time	.06523	.06844	.607	-.0963	.2268
Complexity	1.Unempl	Part-time	.08858	.10960	.698	-.1702	.3473
		FT/Self	.10521	.09671	.523	-.1231	.3335
	2.Part-time	Unempl	-.08858	.10960	.698	-.3473	.1702
		FT/self	.01663	.09987	.985	-.2191	.2524
	3. FT/self	Unempl	-.10521	.09671	.523	-.3335	.1231
		Part-time	-.01663	.09987	.985	-.2524	.2191
Usefulness	1.Unempl	Part-time	.08040	.07794	.558	-.1036	.2644
		FT/self	-.09847	.06877	.326	-.2608	.0639
	2.Part-time	Unempl	-.08040	.07794	.558	-.2644	.1036
		FT/Self	-.17887*	.07102	.033	-.3465	-.0112
	3.FT/Self	Unempl	.09847	.06877	.326	-.0639	.2608
		Part-time	.17887*	.07102	.033	.0112	.3465
Trust	1.Unempl	Part-time	-.07778	.09615	.698	-.3048	.1492

		FT/self	.02227	.08484	.963	-.1780	.2226
	2.Part-time	Unempl	.07778	.09615	.698	-.1492	.3048
		FT/self	.10005	.08761	.489	-.1068	.3069
	3.FT/Self	Unempl	-.02227	.08484	.963	-.2226	.1780
		Part-time	-.10005	.08761	.489	-.3069	.1068
Cost	1.Unempl	Part-time	-.00047	.08361	1.000	-.1978	.1969
		FT/self	-.10546	.07378	.328	-.2796	.0687
	2.Part-time	Unempl	.00047	.08361	1.000	-.1969	.1978
		FT/self	-.10499	.07619	.354	-.2848	.0749
	3.FT/Self	Unempl	.10546	.07378	.328	-.0687	.2796
		Part-time	.10499	.07619	.354	-.0749	.2848

6.6.2 Structural Equation Modelling (SEM)

Structural Equation Modelling (SEM) is a process that is used for multivariate correlational analysis. Schumacker and Lomax (2004:4-7) indicate that SEM could be used in the quantitative analysis and testing of theoretical models. It was conducted in this study to test the fit of the hypothesized model and to determine the structural path coefficients, thereby enabling us to test the postulated hypotheses as indicated below:

$H9_a$ There is a relationship between the perceived awareness of mobile banking and its perceived complexity.

$H12_a$ There is a relationship between the perceived awareness of mobile banking and its perceived cost.

$H11_a$ There is a relationship between the perceived awareness of mobile banking and its perceived trust.

$H6_a$ There is a relationship between the perceived complexity of mobile banking and its perceived usefulness.

$H15_a$ There is a relationship between the perceived cost of mobile banking and its perceived usefulness.

$H14_a$ There is a relationship between the perceived trust of mobile banking and its perceived usefulness.

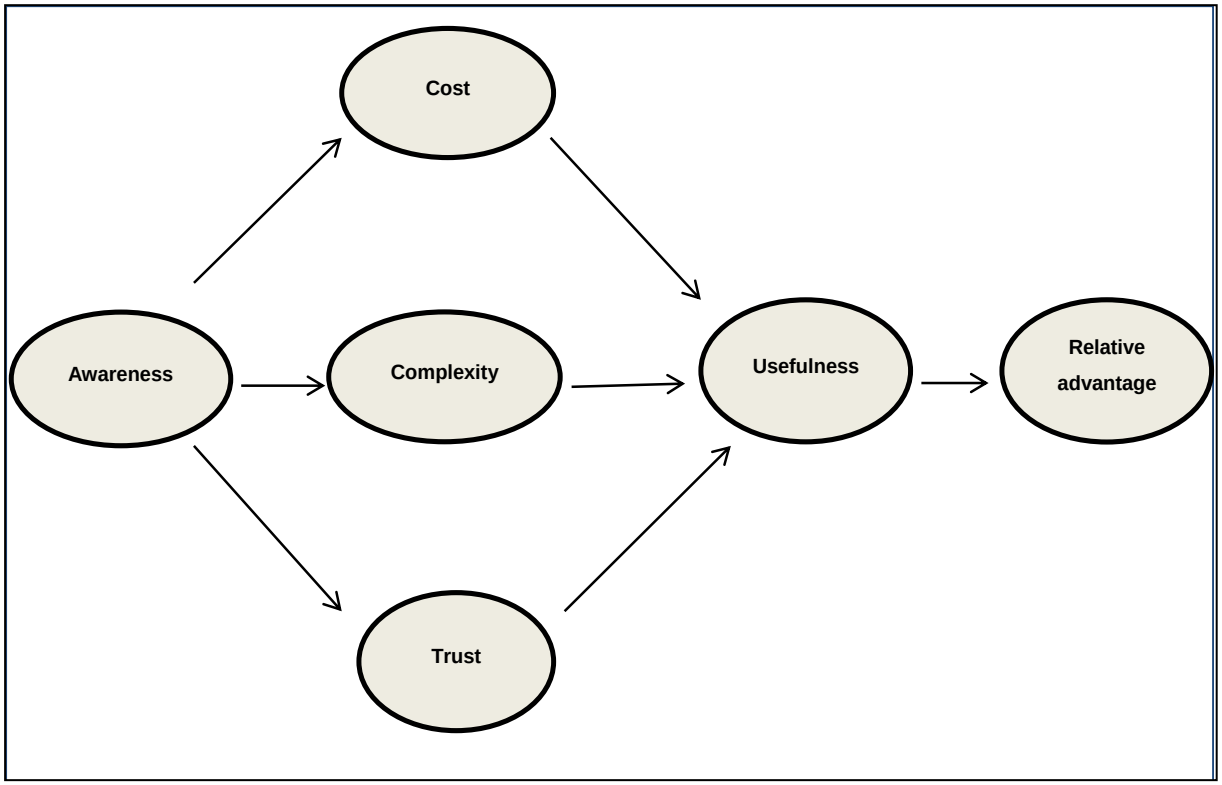
$H1_a$ There is a relationship between the perceived usefulness of mobile banking and its perceived relative advantage.

According to Brown (2006:2-3), SEM as a modelling technique is able to provide valuable information of convergent and discriminate validity of theoretical constructs used in a study. Convergent validity is shown by indicators of theoretically similar or overlapping constructs that are strongly related, while discriminate validity results show that indicators of theoretically distinct constructs are not correlated (Brown, 2006:2-3).

In SEM, a hypothetical model must be specified before proceeding with an analysis. This model is guided by theory and empirical results from the research (Hox & Bechger, 1998 in Rahman, Shah & Rasli, 2015:374).

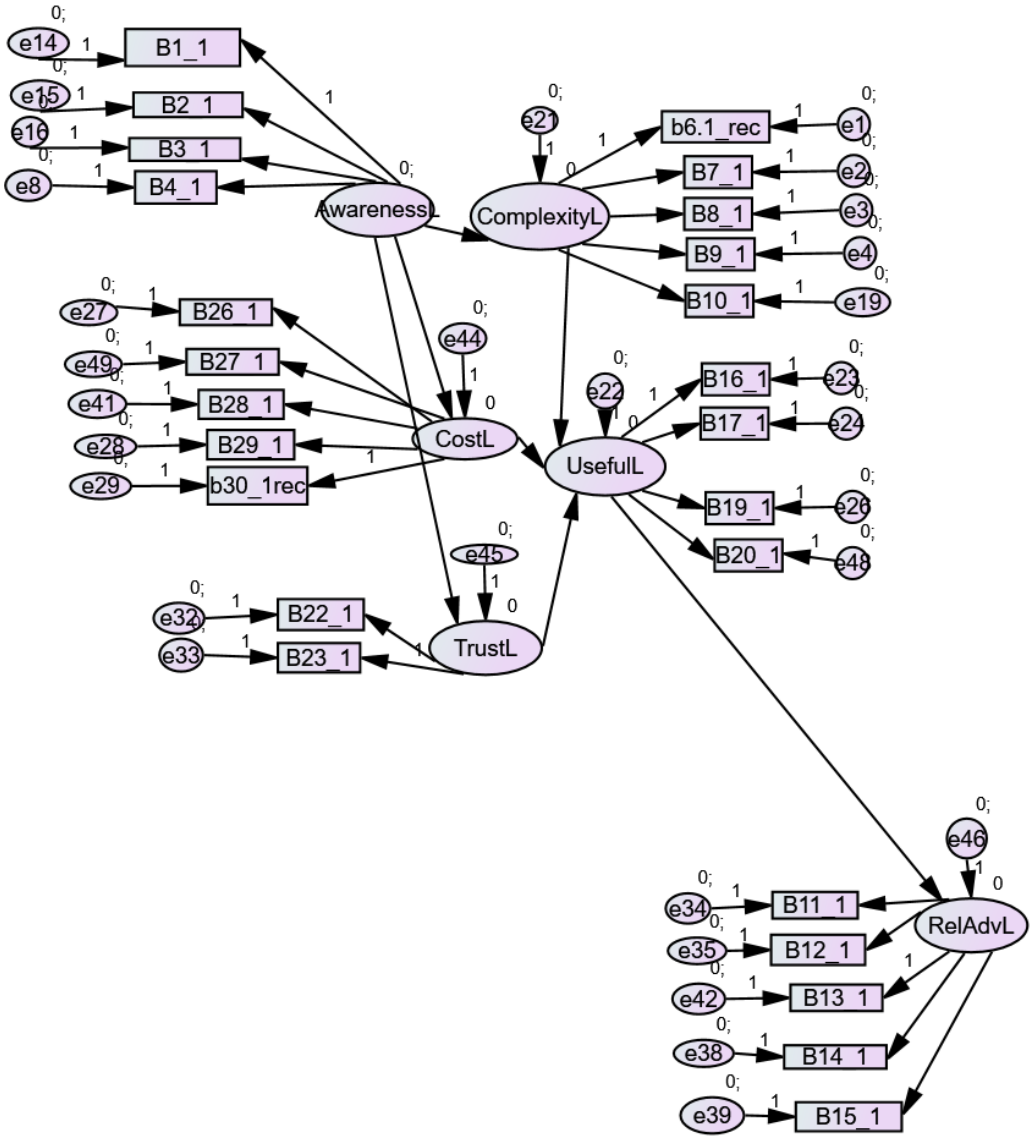
The hypothesized model is illustrated in Figure 18 below:

Figure 18: Hypothesized model



The conceptual model, including the items linked to each latent variable, and the associated error terms, are shown below in Figure 19.

Figure 19: Conceptual model



As indicated in Table 24 below, the CMIN/DF is lower than the acceptable threshold value of three, indicating fit. However, the IFI and CFI values were below the acknowledged threshold value of 0.90 and therefore do not indicate acceptable fit. The RMSEA value was lower than the acceptable threshold value of 0.08 and indicated fit. The indicators of model fit, as a combination, however, illustrate that the model is not an adequate fit and therefore further improvements must be investigated.

Table 24: Goodness-of-fit indices (Model 1)

Model	CMIN/DF	IFI		CFI	RMSEA
Goodness-of-fit indices (Model 1)	2.247	.830		.827	.077
Acceptable Threshold Levels	<3	>0.90		>0.90	<0.08

In order to improve the model, several steps can be taken. This can be achieved by:

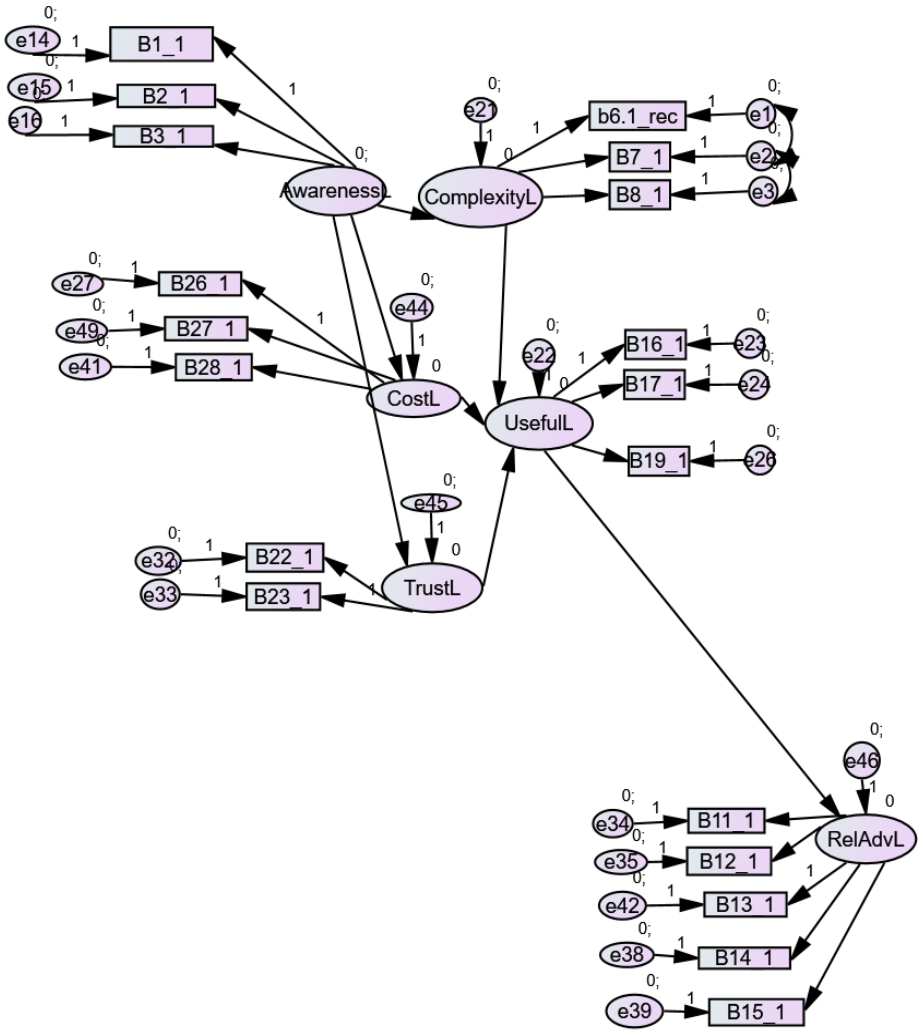
- Deleting some items (observed variables) with loadings that are less than 0.5.
- Deleting non-statistical significant paths.
- Examining the modification indices for potential additional co-variances considering that these need to be justified theoretically.

It must be borne in mind that these changes are not made to merely improve the model fit indices. It was done to ensure that the model that is used is still in line with the core theoretical model that is postulated.

Observed variables with factor loadings less than 0.5 were deleted and two co-variances, based on the modification indices, were added. In the optimised model illustrated in Figure 20, the items that covary are b6 and b7, and b7 and b8. These items pertain to the construct complexity and they are represented as items B6, B7 and B8 in the questionnaire. Considering that the items (B7 and B8) in the questionnaire refer to skill or expertise required for mobile banking, they can covary. Similarly, b6 and b7 in the model, which represent items B6 and B7 in the questionnaire, refer to effort that is required in mobile banking. This, therefore, explains why these items covary.

The optimised model is illustrated in Figure 20 below.

Figure 20: Optimised model



The goodness-of-fit indices in Table 25 below, illustrate that the value of Chi-square for this model is 2.142. The value of CFI and IFI are above .9 and the RMSEA value is .074 which is less than .08. Therefore the model fit can be considered adequate (Hair & Anderson, 1998).

Table 25: Goodness-of-fit indices (Model 2 – optimised model)

Model	CMIN/DF	IFI		CFI	RMSEA
Goodness-of-fit indices (Model 1)	2.142	.902		.900	.074
Acceptable Threshold Levels	<3	>0.90	>0.90	>0.90	<0.08

Table 26 below provides a report of the standardised path coefficients that are estimated by AMOS v24 for the theory-based SEM model. Upon assessing the structural coefficients of the final structural model, the following is found:

H_0: There is no relationship between the perceived complexity of mobile banking and its perceived awareness.
$H9_a$. There is a relationship between the perceived complexity of mobile banking and its perceived awareness.

A strong, statistically significant negative relationship exists between the perceived awareness of mobile banking and perceived complexity (-.786). The null hypothesis is rejected. Higher levels of perceived awareness of mobile banking are therefore related to lower levels of perceived complexity of mobile banking.

H_0: There is no relationship between the perceived awareness of mobile banking and its perceived cost.
$H12_a$. There is a relationship between the perceived awareness of mobile banking and its perceived cost.

A strong statistically significant positive relationship exists between the perceived awareness of mobile banking and its perceived cost (.604). The null hypothesis is rejected. Higher levels of perceived awareness of mobile banking are therefore related to higher levels of perceived cost of mobile banking.

H_0: There is no relationship between the perceived awareness of mobile banking and its perceived trust.

$H11_a$. There is a relationship between the perceived awareness of mobile banking and its perceived trust.

A weak positive relationship exists between the perceived awareness of mobile banking and its perceived trust (.164) which is statistically not significant. The null hypothesis is rejected. Lower levels of perceived awareness of mobile banking, are therefore related to lower levels of perceived trust in mobile banking.

$H_{0:}$ There is no relationship between the perceived complexity of mobile banking and its perceived usefulness.
$H6_a$. There is a relationship between the perceived complexity of mobile banking and its perceived usefulness.

A strong statistically significant negative relationship exists between the perceived complexity of mobile banking and its perceived usefulness (-.713). The null hypothesis is rejected. Higher levels of perceived complexity of mobile banking are therefore related to lower levels of perceived usefulness of mobile banking.

H_0: There is no relationship between the perceived cost of mobile banking and the perceived usefulness.
$H15_a$. There is a relationship between the perceived cost of mobile banking and the perceived usefulness.

A weak positive relationship exists between the perceived cost of mobile banking and its perceived usefulness (.240) which is statistically significant. The null hypothesis is rejected. Lower levels of perceived cost of mobile banking are therefore related to lower levels of perceived usefulness of mobile banking.

H_0: There is no relationship between the perceived trust of mobile banking and the perceived usefulness.
$H14_a$. There is a relationship between the perceived trust of mobile banking and the perceived usefulness.

A weak positive relationship exists between the perceived trust of mobile banking and its perceived usefulness (.118) which is statistically significant. The null hypothesis is rejected. Lower levels of perceived trust in mobile banking, are therefore related to lower levels of perceived usefulness in mobile banking.

H_0: There is no relationship between the perceived relative advantages of mobile banking and its perceived usefulness.
$H1_a$. There is a relationship between the perceived relative advantages of mobile banking and its perceived usefulness.

A strong statistically significant positive relationship exists between the perceived usefulness of mobile banking and its perceived relative advantage (.760). The null hypothesis is rejected. Higher levels of the perceived relative advantage of mobile banking are therefore related to higher levels of usefulness in mobile banking.

Table 26: Standardised regression weights and statistical significance: (Group number 1 - Default model)

			Estimate
Complexity	<---	Awareness	-.786***
Cost	<---	Awareness	.604***
Trust	<---	Awareness	.164
Usefulness	<---	Complexity	-.713 ***
Usefulness	<---	Cost	.240*
Usefulness	<---	Trust	.118*
Relative Advantage	<---	Usefulness	.760***

*** indicates significance at $p < 0.001$, ** at $p < 0.01$, * at $p < 0.05$

6.7 Conclusion

This Chapter presented the results of the study which examined the respondents' perceptions of the factors that affect the adoption of mobile banking amongst rural South Africans. In presenting the results of this Chapter, the demographic profile of the respondents were outlined first, which was followed by the descriptive analysis. This was followed by the factor analysis and the inferential analysis, the correlations, analysis of variance (ANOVA), multiple comparisons and t-tests. Finally, a SEM model was developed as the outcome of the factor analysis.

The majority of respondents that took part in the survey use cellphones for banking purposes, while only a small percentage do not use the service. The respondents who do not use cellphones for banking purposes indicated that they are either unaware of it or that they do not like it nor understand it.

Results of the frequency analysis for the demographic profile of respondents were produced first. The education profile of the respondents showed that the majority of respondents attended secondary school, while a small percentage had no schooling at all. Also, a small percentage of the sample attained a post-schooling diploma and degree. The employment profile showed that approximately half of the respondents surveyed were employed on a part-time and full-time basis. A small percentage of respondents were self-employed while a quarter of those surveyed were unemployed.

An exploratory factor analysis was conducted, using principal axis factoring as extraction method and promax as rotation method to determine the effects of the seven factors (awareness, complexity, relative advantage, usefulness, trust, cost, and trialibility) on the adoption of mobile banking among rural South Africans. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy and the Bartlett's Test of Sphericity which was significant both indicated that a factor analysis was appropriate.

The results showed that of the seven components included in the factor analysis, only six components contained eigenvalues greater than 1. The factor analysis found that trialability could not form a reliable factor and was not retained in further analysis

in the study. Only the item statements, B31 to B35, of the questionnaire (for trialability) were used separately in all the correlation and inferential analysis in the study. The factor analysis identified two factors, based on the eigenvalue criterion greater than one. One factor was labelled as ‘convenience’.

The statistical significance and strength of the relationships between the six variables were determined in order to test the hypotheses by applying the Spearman Rho correlation coefficient. Although trialability was proposed in the hypotheses, this variable was eventually excluded due to weak factor loadings.

The study indicated that the items in the questionnaire that had the greatest influence on the adoption of mobile banking due to the high mean scores according to the responses received, were; ‘mobile banking has improved my life’; followed by ‘mobile banking prevents the risk of carrying cash around’. This was followed by ‘the cost to do mobile banking is cheaper than going to a bank’ and ‘mobile banking allows me to bank anytime’. This was followed by ‘mobile banking allows me to save time’ and ‘mobile banking is easy to use’’.

The descriptive analysis illustrated the respondents’ level of disagreement and agreement on the seven factors that were perceived to have an impact on the adoption of mobile banking. These factors were classified into groups according to: awareness, complexity, relative advantage, usefulness, trust, cost and trialability. Each group further had five items of statements which the respondents were tested on using a six-point Likert scale.

An inferential analysis was done in order to obtain information about the population by formulating conclusions about the relationships between the variables. The correlation, t-test, and ANOVA were used for this purpose.

A SEM model was finally developed as the outcome of the factor analysis.

The next Chapter provides the discussion and conclusion of the study.

CHAPTER SEVEN
DISCUSSION AND CONCLUSION

7.1 Introduction

In this Chapter, the findings of the research are summarised and the conclusions based on the findings are presented. The links between the objectives of the study and the findings are discussed and the Chapter concludes by providing recommendations for future research areas as well as for management, practitioners and industry. The limitations of the study are also outlined with suggested recommendations.

Mobile phones have changed the way people communicate and do business and therefore mobile technologies and devices are likely to continue to be used by individuals and industries around the world. This research study examined a number of factors that relate to the use and adoption of mobile banking amongst people in the rural areas of South Africa. Considering the drivers that lead to an increase in the uptake of mobile banking and the use of mobile phones for banking purposes, it was important to understand the issues that relate to the subject of mobile banking and its adoption especially in a rural context.

The aim of this research was to understand the factors that were perceived to affect the adoption of mobile banking amongst rural South Africans. The literature review showed that although the uptake of mobile phones is high in South Africa, the adoption and use of mobile banking are generally low. The constructs that were determined in this study were primarily based on the Diffusion of Innovation (DOI) theory and the Technology Acceptance Model (TAM). This study shed light on the factors that were perceived to affect the adoption of mobile banking amongst rural South Africans. It contributes to knowledge in the area of communication, mobile communication and information communication technology. The study also brings to the fore the rural context of mobile banking and considers the factors perceived to

affect the adoption of mobile banking that are important for policy makers and industry.

Although many studies exist that attempt to understand the adoption of mobile banking, they are limited in the South African context especially for rural areas. Most studies mainly focus on urban areas. However, since no study was done in the rural context in South Africa, this research focused on this context, especially since it is known that access to financial services in these areas is low. Also, given that no known research exists on the factors that are perceived to affect the adoption of mobile banking in rural areas in South Africa, the results of this study could provide the platform for enhancing future research in the rural context. Furthermore, people in rural areas are known to have low incomes, thus making their situations worse, especially with the lack of accessibility to financial services. Considering that mobile technology and mobile banking have now created immediate access to banking from anywhere and at any time, it was important to establish whether rural people use mobile banking and what their perceptions are of the technology.

7.2 Findings of the study

The studies that were reviewed in the literature show the reasons for the low usage of mobile banking, although these address mainly urban usage. The literature that were reviewed for this study show that some of the factors that affect the low adoption of mobile banking globally are, complexity of using a mobile phone, that is, users do not understand how to use the device or the banking platform. Also, trust and risk were considered hindering factors to the adoption of mobile banking.

This study in particular, found that the adoption of mobile banking is high amongst rural South Africans and various factors were perceived to affect mobile banking adoption, such as; awareness, complexity, relative advantage, usefulness, trust, cost and trialability.

A total of 211 respondents participated in this study. The fieldwork was carried out in the Free State province in the areas of Dealesville, Edenburg, Soutpan and Boshof. In order to effectively conduct the research, the study adopted a quantitative approach whereby a survey was used to gather data by means of a structured questionnaire which were analysed numerically and represented using tables and graphs.

The questionnaire that was developed, tested the relationship between seven factors in order to determine the perception of these factors on the adoption of mobile banking, i.e. awareness, complexity, relative advantage, usefulness, trust, cost and trialability. The questionnaire also elicited information on the demographic profile of the respondents in terms of gender, age, employment status, education level and marital status.

A total of 23 hypotheses were formulated in order to analyse the relationships between the constructs that were determined from the theories that were reviewed. Most of the assumptions were proven empirically and were statistically significant. Therefore the research and data analysis make several theoretical and practical contributions. Although, some facets of the findings of the study and the subsequent conclusions drawn may not necessarily be unusual, the uniqueness and exclusivity of this study is found in the context, which is that of rural areas. The intention of the research was to shed light on the subject of mobile banking and examine the perceived factors that affect its adoption within a rural context, which is generally taken for granted.

The outcome of the study provides valuable implications for decision-makers in organisations, banks and financial institutions as well as policy makers and service providers offering or intending to offer mobile banking services. Most of the significant variables in the study were validated and the findings are supported by past research.

The objectives of this study are outlined below:

The primary research objective of this study was:

To examine the factors perceived to affect the adoption of mobile banking among rural South Africans.

The secondary research objectives of this study were:

Objective 1: To determine whether mobile banking offers advantages to rural South Africans.

Objective 2: To determine whether rural South Africans find mobile banking complicated to use.

Objective 3: To determine whether rural South Africans are aware of mobile banking services.

Objective 4: To determine whether rural South Africans are prepared to try out mobile banking.

Objective 5: To determine whether rural South Africans find mobile banking useful.

Objective 6: To determine whether rural South Africans trust mobile banking.

Objective 7: To determine whether rural South Africans find mobile banking affordable to use.

Objective 8: To determine whether demographic variables such as age, gender, employment status and educational levels, of rural South Africans, affect the adoption of mobile banking.

7.2.1 Awareness of mobile banking

Objective 1: To determine whether rural South Africans are aware of mobile banking.

The first secondary objective of the study was to determine whether rural South Africans are aware of mobile banking services*.* Observability of an innovation refers to the extent to which an innovation is visible to other members of a social system, and how easily the benefits can be observed and communicated (Rogers, 2003:16). According to Rogers (2003:18), individuals are able to make a decision about an innovation through a communication process which could entail mass media communication or interpersonal communication which entails sharing information in order to equip individuals to make decisions about an innovation.

The study therefore found that the more aware individuals are about mobile banking and the benefits that it offers; the more they tend to use the service.

This suggests that individuals who are exposed to any form of communication either through advertisement about mobile banking or through the experiences of peers, tended to adopt mobile banking. This creates an awareness of mobile banking and it translates into visibility. This is also in line with the DOI theory which suggests that awareness leads to adoption. Similarly, in this study some respondents did indicate that they use mobile banking because they have seen others use it.

The results suggest that if people are unaware of mobile banking, they tend not to use the service due to low levels of awareness of the service. A lack of awareness also increases cost for individuals which is mainly found in travel expenses to banks. Being located in rural towns with an average distance of 77km to a nearest bank branch could be an expensive exercise for individuals with low income levels. Therefore, a lack of understanding and knowledge about where to obtain information on the technology influences individuals' decisions to adopt mobile banking.

Furthermore, it is plausible that although people are aware of mobile banking, their decision not to use it could be due to their lack of willingness to use new innovation and technology in banking. This would therefore require a change in behaviour. For example, Chen's (2013:428) study in Taiwan argued that although individual awareness is important, behavioural characteristics of individuals also contribute to the adoption of mobile banking. A study by Brown *et al*. (2003:391) found that South Africans are more risk averse and therefore approach new technologies with caution. Therefore it supports this study in view of the fact that low levels of awareness in mobile banking results in low levels of trust in it.

Laukkanen and Kiviniemi (2010:384) conducted a study in Finland and found that by offering guidance to customers and communicating relevant information, the usage barriers of mobile banking is reduced. A study by Bhanot *et al*. (2012:480), which focused on the marginalised and disadvantaged people in remote rural areas of northeast India, also found that information that is communicated using various channels such as education on financial issues, and creating awareness in the rural areas, can result in increased adoption rates.

The results of this study showed that although people are aware of mobile banking, it does not necessarily translate into usefulness. It could also mean that because the population in the study is a rural one, with most respondents earning low incomes, not completing secondary schooling and mostly being unemployed and part-time employed, they tend to be unaware of mobile banking and its details and as such do not find it useful. It could mean that the benefits of mobile banking are not communicated thoroughly to communities in order for people to understand the benefits which could potentially translate into usage. This is supported by Moore and Benbasat (1991:203) who found that if a potential adopter of mobile banking can see the innovation, and if its advantages are visible then they are more likely to adopt it. Therefore observability or awareness is an important and effective factor that influences the adoption of mobile banking.

A study by Kim *et al.*(2010:309) defined trust as a feeling of security and willingness to depend on someone or something and they therefore found that once individuals

have some form of knowledge about a technology they would trust it. Knowledge would imply an awareness of the technology, which would make an individual comfortable enough to adopt the technology. The results of this study are aligned with Roger's DOI theory on the attribute of observability that influences an individual's decision to adopt mobile banking. Other studies have also indicated that awareness of an innovation will influence the adoption rate.

7.2.2 Complexity of mobile banking

Objective 2: To determine whether rural South Africans find mobile banking complicated to use.

Another secondary objective of the study was to determine whether rural South Africans find mobile banking complicated to use. For Rogers (2003:16), complexity, which is an attribute of technology in the DOI theory, refers to a situation where adopters want to have an idea of whether the technology is more difficult to understand and use than an existing one, which will in turn affect the adoption of the technology. Complexity is defined by Cheung *et al.* (2000:90) as the extent to which an innovation can be considered relatively difficult to understand and use.

In this study the results showed that the majority of respondents agreed that mobile banking is easy to use. While most respondents disagreed that mobile banking requires mental effort, there were a few who agreed that mobile banking requires mental effort. It is possible that those respondents who found mobile banking easy to use and less complex were in fact educated or had a good level of awareness and knowledge about the technology. The obverse exists for those individuals who found that the technology requires mental effort.

Some respondents indicated that they needed technical skills and training to use mobile banking. Their reasons for the need for technical skills or training could possibly mean that some respondents lacked awareness and knowledge of the technology. Education levels of the respondents could also potentially affect their

level of understanding of the technology. Research does show that when users find a technology difficult to understand or use, it results in poor adoption of that technology. This is supported by Shi (2011:55) who found that higher levels of task complexity would inhibit the success of implementation of a technology.

The results showed that the more the levels of complication faced by users of mobile banking, the more it would result in the lack of use or low levels of use. From this study it is evident that many respondents felt nervous when using mobile banking, which implies their lack of confidence in using the technology which they potentially found complicated to use. In situations like this, users could discontinue the service and revert to traditional methods of banking, while potential users could be dissuaded if they observe others struggling with usage. As a result individuals who opt for traditional methods of banking incur cost due to travel expenses, because the more complex they find mobile banking to be, the more costly it can become for them. Furthermore, mobile banking also becomes complex with a lack of information and awareness on how to use the service and where to obtain help on the service. Therefore, low levels of awareness of mobile banking results in high levels of complexity which impact the adoption of the technology or innovation.

The outcome of this aspect of the study supports the DOI theory and is also supported by studies done in the past. For example Elogie (2015:5) indicated that when a technology is considered complex to use, the adoption of the technology will be affected. Vrechoupoulos *et al*'*s.* (2003:338-339) study indicate that complexity in the use of technology and design are considered barriers to the adoption of mobile banking which result in users feeling frustrated. As a result, users find the technology time-consuming to use when they apply more mental effort to the use of technology.

7.2.3 Advantages of mobile banking

Objective 3: To determine whether mobile banking offers advantages to rural South Africans.

The third secondary objective of the study was to determine whether mobile banking offers advantages to rural South Africans. A descriptive analysis was done to ascertain the respondents' level of disagreement and agreement with statements on the relative advantage of mobile banking. According to Rogers (2003:16), relative advantage is the degree to which an innovation is perceived as being better than the innovation it supersedes. Rogers found that a new technology can increase efficiency amongst users, leading to economic benefits and also enhancing one's status (Rogers, 2003:28). Lin (2011) found that relative advantage refer to the benefits of using a product or service and in the case of mobile banking adoption, some of the benefits are immediacy, convenience and affordability.

This study showed outcomes that were similar to other studies, whereby the majority of respondents agreed with the perceived advantages of mobile banking as it relates to banking at any time, saving time, banking anywhere, avoiding queues and having control over finances. It would seem that the more advantages mobile banking offer, the higher the adoption rate.

The results show that, the lower the level of perceived advantage of mobile banking, the lower the levels of usefulness, which may lead to low adoption rates. This suggests that because users find benefits in mobile banking with regard to saving time; banking from anywhere; not standing in queues; and further having control over their finances, they tend to adopt the technology.

This result is in line with the DOI theory and is supported by other studies that show that consumers will use a product if it offers them value. For example, Zollmann, (2014) found that individuals' decisions to use a product is based on the benefit they derive from that product in relation to alternative products that they may be exposed to. Another study supporting this claim was done by Oluoch (2012) in Kenya where it was found that respondents were able to accomplish tasks more quickly through mobile banking which rendered it more advantageous. As a result, relative advantage was considered a key attribute that influences the adoption and usage of mobile banking.

The results of this study show that users perceive advantages in mobile banking if it allows them to save money. This saving could be in the form of less travel to a traditional bank branch when one uses mobile banking. Especially for rural areas, saving on time and travel is considered beneficial as people in these areas generally have low incomes and affordability levels are low. Also, when mobile banking is user-friendly, easy to use and not complicated, it is considered an advantage and leads to the adoption of the technology. In this instance, irrespective of the profile of the customer, if the technology is user-friendly, then it offers advantages to the user which results in adoption and use.

Furthermore, the more aware an individual is about mobile banking and its offering, the more this level of awareness and comfort about a product results in usage and perhaps increased adoption. This also translates into advantages presented by the technology.

Other similar studies have shown that perceived advantages of mobile banking result in increased adoption. For example, Laukkanen's (2007) research conducted in Finland found that convenience and efficiency were considered advantages that were important factors that influence the adoption of mobile banking. Laukkanen and Kiviniemi (2010:384) also found relative advantage to positively influence one's intention to adopt mobile banking. Rogers (2003:16-17) furthermore addressed relative advantage as increased efficiency, with economic benefits, and enhanced status.

This is further supported by a study conducted by McCloskey (2006) that found that a positive relationship exists between relative advantage and the adoption of mobile banking to the extent that if a user perceives the advantages or usefulness of a technology over an old one, they are inclined to adopt it.

7.2.4 Usefulness of mobile banking

Objective 4: To determine whether rural South Africans find mobile banking useful

The fourth secondary objective of the study was to determine whether rural South Africans find mobile banking useful. Perceived usefulness is understood to be the extent to which a person is of the view that using a technology would enhance or improve one's job/task performance (Davis, 1989:326). It has also been found to influence an individual's behaviour towards a technology, which in turn affects the use of the system. Consumers are likely to accept or adopt a technology if they believe that the technology is useful to them, and convenient to use for mobile banking.

In this study there is an indication that people will use technology if they find it useful. When testing the perceived usefulness of mobile banking, the majority of respondents were in strong agreement that they found mobile banking convenient, and that it improved their lives, prevents the risk of carrying cash around and prevents the need to travel to a traditional bank.

However, a few respondents agreed that mobile banking can be frustrating to use and therefore they prefer to travel to a bank branch to do banking. On the other hand, some respondents disagreed that mobile banking is frustrating to use and therefore they did not find it necessary to travel to a bank branch. Regarding the frustration that people experience with mobile banking, it would seem that people do not understand mobile banking which leads to their frustration, and therefore they do not find it useful. This outcome is in line with the theory on TAM and the study by Davis (1989:329) which indicates that if users perceive a technology as difficult to use and less useful, then they will discard the technology. Supported by other research, Davis (1989:337) suggests that a useful, less complex technological system will more likely be adopted by potential users.

For those who still find it necessary to travel to a traditional bank branch, trust could be an issue that prevents them from adopting the technology. These individuals probably also prefer the face-to-face contact with bank consultants in traditional banks, which implies their lack of trust towards the technology. Also, it could potentially indicate that perhaps some respondents are not fully comfortable with mobile banking from an understanding and awareness perspective, and therefore still feel the need to travel to a bank. Considering that the same number of respondents found mobile banking frustrating to use, this could imply that those respondents are the ones who prefer to travel to a traditional bank. There could be numerous reasons for the need to travel to a bank, for example: the frustration experienced with the technology, trust issues and not understanding the technology.

Low levels of awareness of mobile banking result in low levels of adoption due to a lack of understanding which in turn result in the lack of usefulness in the technology. On the other hand, a high level of awareness could suggest that individuals understand the technology; have sufficient information about it; and have sufficient knowledge to allow them to make decisions when using it. Therefore, when individuals reach this comfort point, it translates into their usage of the technology. This could apply to those individuals in this study who indicated that they found mobile banking convenient and that it prevents them from carrying cash around.

This finding substantiates the understanding in existing research and literature that perceived usefulness of mobile banking enhances its adoption. This is also supported in studies by Lu, Zhan and Wang (2009) which show that when technology is easy and user-friendly, potential users will be inherently motivated to adopt it. Therefore, perceived usefulness is an important determinant in accepting an innovation or technology. Similarly, Putzer and Park (2010:6) indicate that an individual's behavioural intention to use a smartphone was largely influenced by the device's usefulness and ones' attitude towards using a smartphone. A study by Parijat (2016:50) conducted in India corroborated that usefulness is an important determinant of mobile money adoption in India. Further to this, Luarn and Lin (2005:873-879) found that perceived usefulness significantly affects the development

of one's initial willingness to use mobile banking. Therefore, technology that is not useful to the performance of tasks is less likely to be adopted or used.

On the other hand, this study did find a few instances where, although people are aware of mobile banking, they do not find it useful and therefore do not adopt it. As indicated earlier, some respondents find the technology frustrating and some prefer travelling to a bank. A study by Sathye (1999:332) found that specific needs of consumers must be met in order for them to change from traditional banking methods to mobile banking.

7.2.5 Trust in mobile banking

Objective 5: To determine whether, rural South Africans trust mobile banking.

The fifth secondary objective of the study was to determine whether rural South Africans trust mobile banking. For Wang and Shan (2013), trust in mobile banking refers to the customers' confidence regarding the ability, integrity and benevolence of a bank that provides mobile banking services. Kim, Shin, and Lee (2009:298) found that when people have less trust in mobile banking services it affects the initial usage of mobile banking. Davis (1989:335) considers trust to be a behavioural intention centred upon the expectations of another person. Research has shown that customers' certainty about the privacy of their information, security, protection and integrity of their banking information and details, are factors that are likely to influence their decision to adopt mobile banking.

It seems that respondents either trust or do not trust mobile banking. For those who feel the need to go to a bank, it is possible that they are concerned about security and feel that banking at a traditional bank is safer. Individuals, who agreed that mobile banking is safe, also indicated that they prefer to go to a bank for security reasons. This therefore suggests people still feel secure with traditional banks, although they use mobile banking for its convenience. It is also possible that individuals go to a traditional bank due to having cash on hand.

The results suggest that the less trust that people have in mobile banking, the more costly it would be for them to bank, which will result in low adoption. Reason being that people would have to travel quite a distance to a traditional bank, whereas the mobile banking option offers them the convenience of immediate, anywhere and anytime banking. The study revealed that for those individuals who use mobile banking, the option to travel to a traditional bank still exists irrespective of the cost factor associated with travelling. This therefore implies that people often do not trust mobile banking although they adopt it. Furthermore, the less trust that people have in mobile banking, the less useful they would find mobile banking, which will impact its use.

The finding supports the TAM and is in line with other findings reviewed in the literature. For example, Kaasinen (2005:102) agrees that trust is an important factor that influences the acceptance of mobile services. A study by Gu *et al*. (2009) show that trust perceptions influence the perceived usefulness in the cellphone banking context. Gu *et al*. (2009) included trust as a predictor of perceived usefulness in their study and the results of their study confirmed that trust exerts a positive influence on the perceived usefulness of mobile banking. Laforet and Li (2005:373) conducted a study in China that investigated consumers' attitudes towards online and mobile banking and they found that security was the most important determinant for consumer adoption of mobile banking among Chinese. Their study found that people rejected online banking as they perceived risk in computers and mobile devices and therefore preferred cash.

7.2.6 Affordability of mobile banking

Objective 6: To determine whether rural South Africans find mobile banking affordable to use.

The sixth secondary objective was to determine whether rural South Africans find mobile banking affordable to use**.** Cost refers to the extent to which a person believes

that using mobile banking would cost money (Luarn & Lin 2005:873-879). Some of these costs entail the cost of the mobile device, network and bank transaction charges, as well as data costs.

The results of this study indicate that people adopt mobile banking due to the cost-effective nature of banking through using a cellphone. With regard to the perceived cost of mobile banking, most respondents agreed that mobile banking saves them money and that it is affordable to use. Respondents also agreed that mobile banking is cheaper than going to a bank and that they would still use mobile banking even if charges are introduced in the future. While many respondents found that data for mobile banking was not expensive, some respondents did not know about data charges, while a few found data to be costly.

The results indicate that the higher the perceived cost of mobile banking the lower the perceived advantages experienced by the user. This suggests that if individuals are able to see the benefits of saving money through the use of mobile banking and they find mobile banking affordable to use, they will experience the advantages associated with mobile banking, which in turn will increase the adoption rate.

As indicated in earlier discussions, if individuals find mobile banking too complicated to use, then it will influence cost as individuals will choose to remain with traditional methods of banking. On the other hand, if they understand how to use mobile banking, it will result in savings by users whereby they do not need to travel to traditional banks. The results show that the lower the perceived cost of mobile banking, the lower the levels of usefulness and levels of adoption.

It was evident that people found a benefit of cost in using mobile banking and some agreed that they would continue to use mobile banking even if charges were introduced in the future. This could suggest that because people are located in rural areas and far distances from traditional banks, the convenience of mobile banking far outweighs cost in some instances. They therefore do not mind paying the extra charges to enjoy the benefit of convenience that mobile banking has to offer. This aspect of the study also supports the cost construct found in the TAM, where it is

indicated that cost is a determinant of the adoption of technology and mobile banking.

Similar outcomes were found in studies by Wu and Wang (2005:726) which show that although perceived cost is a concern when a technology is first introduced, when there is an emergency or sudden need, the benefits of the technology far outweigh the cost issues. Wu and Wang (2005:726) also found that perceived cost had no significance when compared to variables such as perceived risk, compatibility and perceived usefulness. Hua (2009:2-3) found that mobile banking is a means to reduce cost in the form of travelling and inconvenience cost. It is also considered beneficial to minimise risk that is often associated with travelling and carrying cash around.

A lack of information awareness of mobile banking influences cost as people would choose traditional forms of banking as opposed to mobile banking, while an increase in awareness will result in savings and increased adoption rates. It seems that many respondents in this study were not fully aware of data charges related to mobile banking. For example, the number of those who responded ‘don’t know’ to the statement on data costs, is an indication that more awareness needs to be created on data charges and how this relates to using mobile banking services. A lack of understanding of this or a wrong perception of these charges could result in poor adoption rates.

Mallat (2007:9-10) and Cruz and Laukkanen (2010:363) found that cost has a negative effect on the adoption of mobile banking services. This is due to the subscription and service fees for accessing mobile banking which have a significant influence on user acceptance of mobile banking.

7.2.7 Trialability of mobile banking

Objective 7: To determine whether rural South Africans are prepared to try out mobile banking.

The seventh secondary objective of the study was to determine whether rural South Africans are prepared to try out mobile banking. According to Rogers (2003:16), the capacity to experiment with and use a technology before adopting it is referred to as trialability. Rogers (2003:16) found that when potential adopters of new innovations have the opportunity to try out and experience an innovation, it can have a positive effect on their desire to adopt the innovation.

Agarwal and Prasad (1998:214) and Rogers (2003:16) found that when individuals are allowed to experiment with an innovation or technology, they are more likely to adopt it as it will lead them to feeling comfortable with the innovation.

In this study, the trialability of mobile banking was considered in order to establish the respondents' appetite for adopting new technology and whether they have had the opportunity to test the technology in mobile banking. Although trialability as a construct was excluded from all analysis as it did not form a reliable factor, the items B31-B35 of the questionnaire linked to this variable were tested on their own.

While many respondents disagreed that they had the opportunity to try out mobile banking, there were also a substantial number of respondents who agreed that they tried out mobile banking before using it. This could mean that those respondents who have tried mobile banking first, have had their uncertainties about the technology reduced which therefore influenced their decision to adopt the technology. On the other hand, it is possible that those who have not had the opportunity to try the technology may have been the ones that found the technology frustrating to use.

This study shows similarities to other studies, that when individuals are able to or are given an opportunity try out a technology, they are more likely to adopt it. Studies have shown that trialability was a major factor for mobile banking adoption. For example, a study by Suoranta (2003:66) regarding mobile banking in Finland found that people adopted mobile banking if they had the opportunity to try it out. Rogers (2003:16) also found that when individuals have the opportunity to experiment with technology, the chances of adopting the technology are high.

Most respondents agreed that they prefer to try out mobile banking first for at least a month in order to make a decision to use it, while some disagreed that it was necessary try out mobile banking first. It would seem that these individuals need to first acquaint themselves with mobile banking before investing trust in it.

Research conducted by Brown (2005:27) found that potential adopters of technology who experiment with and test an innovation are more likely to adopt it. Dash *et al.* (2014:13) also did a study on customers' attitudes toward the acceptance of mobile banking in India and they found that trialability had a significant influence on individuals' behavioural intention to adopt mobile banking.

However, an almost equal number of respondents in this study indicated that they do not think that it is necessary to try out mobile banking first in order to use it. It is possible that the age and education profile of individuals influence their decision on whether or not to test the technology first before using it. Generally those who are younger and with some schooling and post-schooling education find it easy to use a new technology as opposed to individuals with no schooling and those of the older age group category. Most respondents indicated that they prefer to test new innovations in banking and technology.

Those in the age group 18-25, 26-35 and 36-45 seem to be most comfortable with not trying out mobile banking first in order to make a decision to use it. This age group could possibly be technologically adept and feel comfortable with new technology. The 46-55+ age group feel the need to try out mobile banking first. The reasons could be that this age group is not technology adept and perhaps not aware of mobile banking which results in their need to first acquaint themselves with it. Also, this group could possibly not trust technology as opposed to the younger age group and therefore feel this way.

The study revealed that those who are part-time and full-time employed are more interested in testing new innovation and technology as opposed to others. This result could be attributed to the fact that these individuals are income earners and therefore they can afford technology. It is also possible that they work with technology in their jobs and therefore are interested in new innovations.

Therefore trialability as a construct in itself was not significant in this study with the exception of some of the items that related to it. It would seem that because people are rural-based, having low incomes and inconsistent employment, their major concern is that of meeting their basic needs as opposed to having an interest in technology.

This is in line with studies by Cruz *et al.* (2010), Mathieson (1991) and Shaikh and Karjaluoto (2015) that there is no significance with trialability as a factor that influences the adoption of mobile banking. Although this study attempted to understand the rural consumer's penchant for technology, it does indicate that in this context, interest in technology is not of immediate importance. Therefore the outcome of trialability in this study does not support the DOI theory as rural individuals are not keen on testing technology and do not find the need to test mobile banking before using it.

7.2.8 The effect of demographic variables on mobile banking

Objective 8: To determine whether demographic variables such as age, gender, employment status and educational level of rural South Africans, affect the adoption of mobile banking.

There are several studies that have examined the relationship between demographics and its effect on adoption behaviour with regard to mobile banking. For example, Munnukka's (2007:729) study done in Finland claimed that age, income and education are good indicators of mobile banking adoption and usage.

The results of this study show that there is no difference in perception of mobile banking between males and females with regard to the factors. Other studies had similar findings; for example in Koksal's (2016:342) study, gender was considered to have no significant effect on the adoption of mobile banking in Lebanon.

The results of this study show that individuals in the age range of 25-45 find mobile banking less complicated to use than those in the age category 46-55+. Individuals in these age categories are therefore technologically astute, and they find mobile banking understandable which results in a positive impact on adoption.

The results show that individuals in the 26-45 age range are employed and therefore understand the advantages of mobile banking in terms of affordability, cost and their needs, and this therefore influences their perception that results in the adoption of mobile banking.

The outcome of this study is similar to that of other studies. For example, a study by Laforet and Li (2005:371) in China indicated that consumers in the age category 35-44 had positive attitudes and were more inclined to use mobile banking. They deduced that this could be due to the fact that these banking customers are mature, and understand their needs and requirements better.

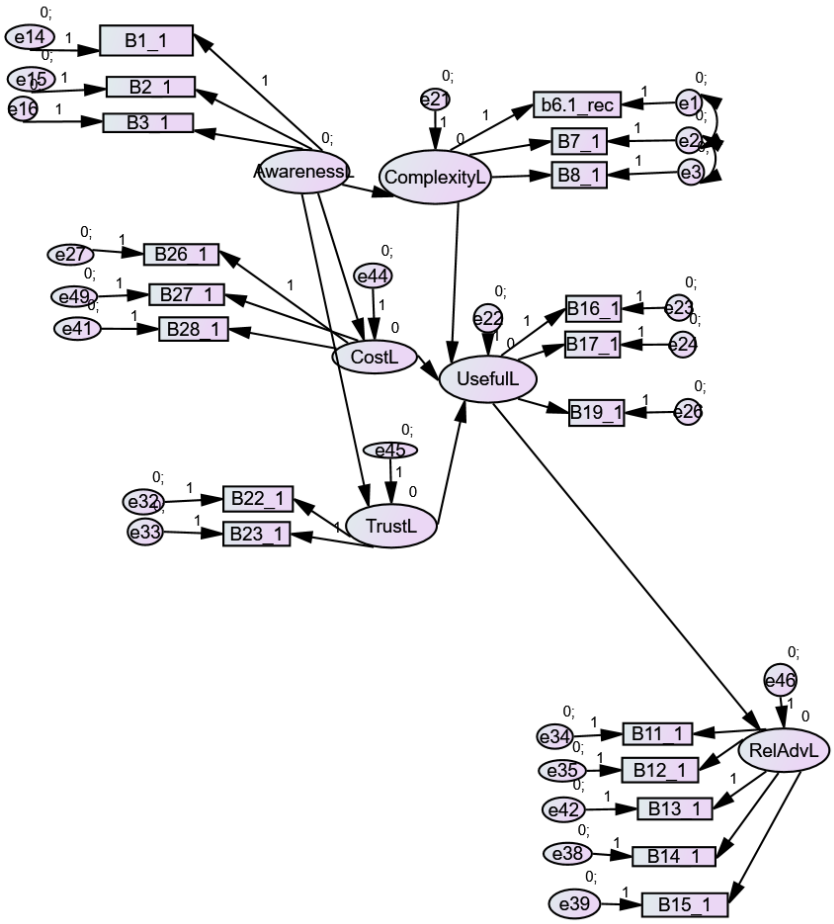
The results suggest that the adoption of mobile banking is higher among those with degrees and post graduate degrees as opposed to those with schooling and some schooling and matric due to their awareness of mobile banking. Also, it is possible that these individuals are employed and therefore find the technology useful for their needs.

The research also indicates that individuals with degrees find the technology less complicated compared to those with some schooling/no schooling and matric. This outcome is in line with studies by Detenber *et al.* (2006:605) and Van den Bulte (2007) which showed that the level of one's education is related to the level of resources that one has, and one's ability to experiment with and adopt new technology.

However, other variable (cost and trust) comparisons are not significantly different from one another. Also, variables such as awareness, relative advantage, usefulness and trust, when compared to some education groups show no significant differences from one another.

The study shows that there is a statistically significant difference in the usefulness of mobile banking between those who are fulltime/self-employed and those who are part-time employed. Full-time/self-employed individuals most likely have a consistent income, and therefore due to their need for mobile banking, they find it useful. Whereas those who are part-time employed do not see the need for mobile banking and perhaps do not find it useful as they do not have consistent income. Variable (awareness, relative advantage, complexity, cost and trust) comparisons are not significantly different from one another.

7.2.9 Structural equation model – the final model



The structural equation model was tested and the overall model fit was assessed using multiple fit indices (Hair & Anderson, 1998).The following fit indices were reported for the final model: Chi-square for the model is 2.142 with the value of CFI

and IFI above .9 and the RMSEA value at .074 which is less than .08. Therefore the model fit was considered adequate. The discussion of the final model is as follows:

i. Perceived awareness and perceived complexity of mobile banking

The results indicate that the higher the level of perceived awareness of mobile banking, the lower the levels of perceived complexity of understanding mobile banking. As such, more people tend to adopt mobile banking if they are aware of it and therefore would find it less complicated to use. This is in line with a study by Elogie (2015:11) where it was found that a relationship exists between observability, or awareness, and rate of adoption. The more aware people are of the technology, the less complex they will find it and they will tend to adopt the technology. Similar results were found by Sathye (1999), Moore & Benbasat (1991) & Mattila (2003).

ii. Perceived awareness and perceived cost of mobile banking

The results show that the higher the level of perceived awareness of mobile banking, the higher the levels of perceived cost. The more people are aware of mobile banking, the less money they will incur in costs related to travelling to traditional banks which are located a distance away. This is in line with the results of studies by Laukkanen (2007), Tiwari and Buse, (2007) who found that if people are aware of the cost benefits related to mobile banking they would adopt it. On the other hand, some researchers like Jeong and Yoon (2013:37) and Wu and Wang (2005:726) found that cost did not significantly influence the adoption of mobile banking in their study.

iii. Perceived awareness and perceived trust of mobile banking

The finding that a relationship exists between the perceived awareness of mobile banking and its perceived trust is similar to studies reviewed in the literature. For example studies by Ivatury and Pickens (2006:4) and Porteous (2006:40) have indicated that trust plays a significant role in the use of mobile banking in South Africa. Although their studies were mainly urban based, they found that users are

keen on some face-to-face contact and assistance by bank branches as opposed to only banking via mobile banking technology.

iv. Perceived complexity and perceived usefulness of mobile banking

The results of the SEM showed that the lower the levels of perceived complexity of mobile banking, the higher the levels of perceived usefulness which contributes to high adoption rates. This outcome is similar to studies done by Lin (2011:257) and Bhatt (2016) where it was found that users adopted mobile banking if they find that the technology is easy to use and navigate for the purpose of mobile banking.

v. Perceived cost and perceived usefulness of mobile banking

The results suggest that the lower the perceived cost of mobile banking, the higher the perceived usefulness that will be experienced by users. This outcome is similar to other studies. For example, Wentzel *et al.* (2013:670) found that usefulness was an important factor that determined the adoption of mobile banking among the poor in South Africa. Abdulkadir *et al.* (2013:156) also found that usefulness of mobile banking influenced the adoption rates in Malaysia. A study by Wessels and Drennan (2010:552) furthermore found that cost of mobile banking affected adoption rates.

vi. Perceived trust and perceived usefulness of mobile banking

The results of the SEM indicate that the lower the level of perceived trust that people have in mobile banking, the lower the levels of usefulness, translating in low adoption rates. This is supported by literature which shows that trust in mobile banking is based on whether a user accepts the technology that is used for mobile banking and also whether he/she considers the financial institution reliable and credible (Wang Lin & Luarn, 2006). Studies by Omwansa, Lule, and Waema (2015:14-15) also found that trust determined the use of mobile banking and moderates the risk of the adoption of mobile banking.

vii. Perceived usefulness and perceived relative advantage of mobile banking

The result of the SEM suggest that higher levels of usefulness perceived by individuals will result in higher rates of perceived advantage of mobile banking and therefore increased adoption rates. This finding is consistent with other research (Oluoch, 2012; Laukkanen & Kiviniemi, 2010; Khraim, *et al.*, 2011) where users who found advantages in technology like mobile banking tend to adopt it easily, especially if it meets their needs and they find it useful.

7.3 Theoretical contribution

Theoretically, the study findings contribute to knowledge in the field of communication, mobile communication and information communication technology adoption.

The study has shown that the use of the DOI and TAM is not necessarily applicable in every circumstance and context. Although many studies that have been reviewed in the literature have used the two theories to understand the adoption of mobile banking, they have yielded different outcomes. For example some studies have used an integrated approach whereby both DOI and TAM constructs were used, while others have used either only TAM or DOI. Also, not all constructs are relevant to all studies.

In this study for example, the construct of trialability from the DOI was not significant. It therefore illustrates that in the context of this study this is not applicable for many reasons cited earlier in the discussion. Therefore although the two theories are good platforms for understanding the attributes of technology that are perceived to affect the adoption of mobile banking, when tested the results offer interesting insights.

The results indicated that the DOI theory is still relevant in the mobile technology environment to help understand the diffusion attributes of technology that affect

adoption rates. Although not all the variables were compatible with the needs of respondents nor did some of them yield significant results, it does leave room for understanding adoption better contextually. For example the construct awareness was clearly highlighted as a determinant to the adoption of mobile banking. The study found that although the level of awareness is high, it does not necessarily translate into usage. Therefore this points to communication issues either from the banks to consumers or consumers themselves. Therefore, communication strategies employed by financial institutions that are targeted at stakeholders both internally and externally could be beneficial in addressing the awareness issues that are raised in the study. Convenience emanated as a factor during the factor analysis, and it seemed to have been compatible with consumer needs.

The TAM is considered relevant in this study as the constructs of usefulness, cost and trust yielded significant results. The outcomes of the perceptions of trust, cost and usefulness was integral in understanding individual attitude towards technology and the attributes of the technology to the decision-making process.

7.4 Management implications

The findings of this study can provide guidelines to banks and other financial institutions regarding the key factors that influence mobile banking adoption and usage intention. The findings also have practical significance. From a practical perspective, the research findings can provide banking institutions and mobile banking practitioners with information to formulate strategies that can enhance the adoption of mobile banking services.

In light of the findings of the study, financial institutions could embark on customised marketing and communication awareness campaigns to educate people in rural areas about the benefits of mobile banking so as to intensify the adoption rates among potential clients. There is also a need to educate potential customers and create awareness on how to use mobile banking services. This can be done by circulating marketing and communication collateral in the form of easy to understand

plain language pamphlets and sending messages (SMS) via mobile devices. Considering that the adoption of mobile phones is high, this is an indication that the technology is a popular communication tool. As such, organisations should leverage this opportunity to further enhance their marketing and communication campaigns for external audiences which should be customised and targeted to suit certain contexts.

This study could help banks to focus their strategies on building trust in the technology around mobile banking. Banks could embark on processes to enhance and implement security measures to engender trust in the technology.

In order to increase customers' confidence and attract new customers to these services, customer awareness must increase and technical support must be offered. Individuals need to understand the value proposition of mobile banking and this can only be achieved if organisations in the financial services industry actively use agents within areas to influence the change. While the use of traditional marketing material like that of pamphlets, newspapers, magazines could potentially be useful, there is still the need for face-to-face contact to win the trust of people. There is a need for education that focuses on the benefits of mobile banking as it is the lack of knowledge that acts as a barrier to adoption. This will be most beneficial to rural people who tend to distrust mobile banking. Through education they would understand the benefits of cost-saving that go with not travelling long distances to traditional bank branches.

Service providers need to offer training on mobile banking in order to make it simple to understand for all potential users irrespective of their education levels, so as not to lose a potential market. Although this may not necessarily translate into usage, it still does create the possibility for adoption and the client/user is ultimately left with the decision through the enabling environment that is created. Once individuals find the technology less complex to use and easy to understand, they will trust it and therefore would be encouraged to use it.

The study found varied responses to peoples' understanding of data expenses. It is in these instances that active awareness and education campaigns can make a difference from the side of financial institutions like banks.

Convenience emanated as a factor in the factor analysis of the study. From this perspective, organisationally banks should ensure that in their strategic objectives of rolling out financial services to the un-banked, they consider and leverage convenience as a potentially key driver in their strategies. In developing the strategies, consideration needs to be given to the attribute of the technology and mobile banking as an enabler to access finance. More needs to be done to ensure that mobile banking is easy to understand and use, and that it is free of potential risks and perhaps also offer individuals the opportunity to test the technology.

As communication tools, the technology around banking will not only increase the adoption rates, but also contribute to easy communication from institutions to the consumer in a cost-effective manner. The evidence from the study has shown that there are potential opportunities for banking institutions to enhance their communication technology platforms in relation to the needs of users whereby consideration should not only be given to the features of mobile banking, but also its enabling environment in order for the consumer to have a full understanding of mobile banking. This could be in the form of creating partnerships with locally designated agents who are non-bank institutions in order to access rural areas. Considering the scarce or limited presence of bank branches in rural areas, the formation of these corporate partnerships could benefit banks and consumers.

7.5 Limitations

Considering that the current study is not without limitations, the results of the study should therefore be interpreted while factoring the limitations within it.

This study was cross-sectional whereby data was gathered and measured at one specific point in time. Future studies should therefore employ a longitudinal

approach. There are limitations in cross-sectional studies where it is possible that the content under investigation may fluctuate over time or in response to external life circumstances (Rosenthal & Rosnow, 1991). Therefore considering that this survey was done in one month over a short period of time, it is possible that the profile of the rural population surveyed may change in terms of their financial status, their access to financial services and their access to technology over time. As such, and in the event of this occurring in the near future, the results of this study may not necessarily be relevant in case of shifts in profile and behaviours of individuals. Therefore, in this study this limitation is a reality and would have to be considered.

According to Rosenthal and Rosnow (1991), when a study is done in a specific period in time, its measurement could potentially provide limited or even distorted information. There might be some shifts in the behaviour of individuals over time with regard to mobile banking usage patterns which may change their perceptions and attitudes as individuals gain more experience and knowledge.

Against the above background, future research can embark on a longitudinal study in order to assess the factors affecting adoption of mobile banking over a period of time. Greater insight can be obtained from such a longitudinal study on the relationships between the variables (relative advantage, complexity, usefulness, trust, cost, awareness, trialability).

This study was conducted in four rural small-scale farming towns and communities in the Free State, namely: Dealesville, Soutpan, Edenburg and Reddersburg. The research surveyed 211 respondents selected from the four areas. Although these findings can be generalised to the broader national population, there would be a need for future research to expand the scope and vastness of the study and increase the sample size to include other provinces and to test this model extensively on a national level to allow for in depth and robust generalisability.

Future research should also consider expanding the areas to include a broader sample from a variety of areas from several provinces. In so doing, the environment, social and cultural factors and contexts would play a major role in understanding the

adoption of mobile banking. The context of the Free State province and the areas that were selected in this study are most likely different contextually to rural areas in other provinces in South Africa.

The demographic factors of gender, age, marital status, and employment status etc., were not included as constructs in the theoretical model nor were their influence measured in the structural model. Perhaps it would be useful for future research to include these factors in order to conduct a more robust analysis and provide a broader perspective of the profile of the user or potential adopter of mobile banking.

7.6 Recommendations

This study could serve as a basis for a longitudinal study in order to follow up on the adoption of mobile banking over a considerable period of time as opposed to a short period of time. Environments are dynamic and as such people's circumstances and perceptions change over time which could influence the study.

Other variables could be considered such as demographic factors like age, income levels, marital status etc. It merely sets the platform for further potential studies on the adoption of mobile banking in rural areas.

This study was based on the combination of constructs from the TAM and DOI theory and a theoretical model was further validated through the SEM. Therefore, this model provides a basis as a framework for organisations and researchers to evaluate the factors that lead to the adoption of mobile banking. Once these factors have been identified, they can be used to design interventions to further target users and potential users of mobile banking.

As a quantitative study, the study addresses the perceptions of rural South Africans on factors that affect mobile banking adoption. The findings can be used by banks towards their strategies and to identify the factors that affect mobile banking adoption rates.

7.7 Further research

Despite the limitations of the study, the findings provide valuable practical, academic, institutional and future research implications.

Any future research that is potentially considered may want to understand and investigate the adoption of mobile banking on a broader scale while still being relevant to the under-researched rural context. The current study can be either replicated or form the basis for future studies to expand on an understanding of mobile banking barriers and perhaps how it has changed, especially since this study has shown that there are limitations to the adoption of mobile banking that prevail. A qualitative study could also be done in future in order understand the perspectives and opinions of rural South Africans about mobile banking.

Research industries and mobile network providers can also embark on further research as an extension of the results of this study targeted at rural areas to better understand the rural users experience with mobile banking. Perhaps the research could be done on a larger scale with a bigger sample size to better understand the factors affecting the adoption of mobile banking in these areas. The researcher does acknowledge that further research could potentially unravel new models of understanding attributing factors of technology adoptions.

7.8 Importance of the study

The study shed light on the factors that are perceived to affect the adoption of mobile banking among rural South Africans. The study intended to understand whether rural South Africans are aware of mobile banking and whether rural South Africans are able to access financial services through the use of mobile banking. The ability to access financial services is regarded as financial inclusion which in itself has the ability to improve the livelihoods of people thus removing them from poverty. Financial inclusion is an important objective of the Financial Sector Charter,

particularly banking the un-banked and creating access for those who are in remote hard to reach places in society.

While many studies exist on mobile banking in South Africa, not much is done on understanding the context of rural South Africans in particular and their usage patterns as it relates to mobile banking. The on-the-surface perception is that users of mobile banking either do not understand it and/or they are not interested in the use of mobile technology for banking purposes. Therefore, this study attempted to understand the factors that affect the adoption of mobile banking among rural people, which brings to the fore a neglected area of study thus ensuring that the rural are part of the technology and development agenda.

It also makes logical sense to conduct such a study on the rural poor as they form part of the targeted group on the development agenda. Understanding their needs and issues as it relates to mobile banking, addresses the supply-side issues from the service provider perspective as well as a demand-side perspective from the requirements and needs of the rural people.

7.9 Major areas of contribution

This study intends to contribute to the body of literature in the area of communication and mobile banking especially related to rural areas. As a quantitative study, it attempted to address the perceptions of rural South Africans on mobile technology usage and mobile banking.

To academia, the research would serve as a source of academic reference for further studies and to policy makers and the regulatory environment, it can serve as a platform for considering the development of policies that favour the rural and bring the un-banked rural population into the realm of the financially included.

7.10 Conclusion

This Chapter provided an outline of the main findings of the study. Based on these findings, the relevant theories and literature were examined in order to establish whether they were relevant to this study and in line with the outcomes of this study.

Mobile banking services have the ability to be transformational and affect the lives of people in positive ways. More especially in rural areas, mobile banking is known to create access to financial services in effective ways which was not possible in the past. The findings of this study revealed that it is possible for mobile banking to transform the lives of those in remote rural areas and that mobile banking has in fact led to improving the lives of people in rural areas to a certain degree. However in order to fully maximise the potential of mobile banking and to successfully remove the barriers that still do exist that inhibit rural people from using mobile banking, there is the need to change the characteristic of technology somewhat and to influence the mind-set of people. In so doing, there is the possibility that the reliance on brick and mortar type of traditional banking could be avoided with a dependence on mobile banking. This could ultimately lead to maximum benefit to the individual user if mobile banking services are affordable and provide the potential conveniences that it promotes for the rural populations.

Demographic variables were presented in this study so as to have an understanding of any demographic influences on mobile banking which would potentially be useful for future studies in this area of work.

The findings revealed two additional variables, one of which was titled ‘convenience’ that have an effect on the adoption of mobile banking among the rural population. This was not included in the SEM, as a hypothetical model was specified first before proceeding with an analysis. The hypothetical model was guided by the theory and the empirical results of the study and therefore the variables; cost, complexity, trust, usefulness, awareness and relative advantage were only used.

The findings show that although people in the rural areas are poor, with the need to ensure that their basic necessities are met, they still understand the benefits and advantages of mobile banking and therefore tend to use it. What was apparent here was that although the study showed that trust was considered an issue among rural people in their decision to adopt mobile banking, the purpose of use, together with the advantages and benefits of the technology, far outweigh other factors. In view of this, we tend to take for granted the rural users' context and their intention to use a technology such as mobile banking and it seems that despite their major concerns related to trust, they have no choice in terms of their remoteness but to use the technology.

The study found that most people find that mobile banking offers advantages in terms of saving time and money. It prevents them from travelling long distances to the nearest bank branch especially since the cost to travel to a bank branch is at an average distance of 77km for all the areas under study. Also the advantage of anytime anywhere banking is most attractive particularly to the rural user where it makes a major difference to their lives and somewhat improves their lives. Therefore the advantages that people perceive in mobile banking do affect their adoption of the technology. These perceived advantages that the technology offers, in-turn makes the technology useful and therefore even easier to adopt.

With regard to the complexity of mobile banking, the study revealed that although most people found the technology easy to use and understand, there were respondents who found the technology complicated to use. These findings were prevalent among the older age group individuals, with low education levels. However, individuals who were educated and young were comfortable with the use of the technology. Therefore the less complex the technology is, the more useful it is to the user which in-turn leads to its adoption. The study did indicate that there was interest from some individuals for training and technical skills on how to use mobile banking. These were mostly from individuals who had low education levels and who were much older.

The study revealed that a high level of awareness of mobile banking exists among the people in the rural areas. People were not necessarily influenced by others to use mobile banking. However some individuals did indicate that they tended to make a decision based on observing others and obtaining information from friends or family. It is therefore encouraging to find that people in remote rural areas know what mobile banking is and that it is available to them. The critical and defining aspect to their decision to adopt the technology is based on how they feel about the technology and therefore it is these elements of the characteristics and attributes of the technology and the information around them that will eventually affect their decisions. In order for individuals to adopt the technology they would have to trust the technology, have confidence in its ability to have functions that meet their needs and most importantly be affordable to use.

The study found that trialability and the testing of mobile banking and new technology was not particularly significant for rural users. It would seem that people in rural areas are not particularly concerned about testing technology considering their economic status. People are probably mostly concerned about meeting their basic needs and perhaps trying to earn an income in order to survive. While mobile banking is integral to their lives in terms of the convenience associated with it, the attractiveness of new technology and testing it is not a significant factor.

However, individuals that are educated and young with full-time and part-time employment did indicate an interest in testing new technology and it would seem that this is due to their economic status in relation to others. The fact that they earn an income puts them in a position to potentially explore technology with the objective of perhaps adopting it at some point in their lives. Therefore, over and above other factors, the context of an environment and time in ones' life plays a role in whether one is prepared to adopt new technology or not. It would seem that rolling out technology in a rural environment would not be particularly easy and therefore in terms of mobile banking, it is important to ensure that the technology meets the needs of the people and their lifestyle. Although interest is shown in testing technology, it does not necessarily mean the people in this context would necessarily adopt the technology as their economic context does not allow them to do so.

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APPENDIX

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

INFORMED CONSENT

Faculty of Economic and Management Sciences

Letter of Introduction and Informed Consent

Division of Communication Management
Department of Business Management

Factors affecting the adoption of mobile banking among rural South Africans

Research conducted by:

Ms. N. Ramnath (15197001)
Cell: 082 921 4769 or 081 4055177

Dear Participant

You are invited to participate in an academic research study conducted by Ms Nitha Ramnath, doctoral student from the Division of Communication Management, Department of Business Management, at the University of Pretoria.

The purpose of the study is to understand what factors affect the adoption of mobile banking amongst rural South Africans. It attempts to understand whether rural South Africans believe that their lives have improved through the use of mobile technology and mobile banking and whether they are able to access financial services using their mobile phones. The study also intends to understand whether rural South Africans are aware of the benefits of mobile technology with regard to mobile banking and financial inclusion.
Please note the following:

This is an anonymous study survey as your name will not appear on the questionnaire. The answers you give will be treated as strictly confidential as you cannot be identified in person based on the answers you give.

- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than **15 to 20 minutes** of your time.

- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.
- Please contact my study leader, Dr Estelle de Beer, on 0124205082 or email estelle.debeer@up.ac.za if you have any questions or comments regarding the study.

Please sign the form to indicate that:

- You have read and understand the information provided above.
- You give your consent to participate in the study on a voluntary basis.

_____ _____

Participant's signature **Date**