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Faculty of Engineering, Built Environment and Information Technology

FACTORS INFLUENCING THE ADOPTION OF MOBILE BANKING TECHNOLOGY BY THE ELDERLY IN SOUTH AFRICA

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by

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ABSTRACT

Emerging technologies and innovations have provided smart solutions for conducting business and enhancing the livelihood of individuals, particularly those in developing countries. A high penetration of smartphones and technological advancements have afforded banking consumers an opportunity to transact on mobile electronic banking platforms using mobile devices such as smartphones. This method of banking has been perceived as convenient and cost-effective in the market, providing consumers with full access to their bank account profiles and the ability to manage it from anywhere, and at any time. Mobile banking services have been highly adopted by young people. The adoption rate among the elderly is reported to be low compared to other age groups. Scholars indicate that this research area has been overlooked, thus it is a challenge to understand what enables or hinders the elderly from adopting and using mobile banking. Therefore, this study aims to identify the factors that influence the adoption of mobile banking by the elderly in the South African context. The findings of this study may help banking institutions to provide mobile banking applications that are designed in alignment with the needs of the elderly and improve adoption by the ageing population that is reportedly growing.

The purpose of the study is to identify the enablers and barriers that influence the adoption of mobile banking among the elderly in developing countries; understand the perceptions of the elderly towards mobile banking and propose guiding principles to be considered by mobile banking providers. The study followed an interpretive approach. Qualitative data was collected using interviews (focus groups and individual interviews), and a systematic literature review was conducted. The Actor-Network Theory was adopted as a lens to interpret the data and understand the adoption of mobile banking by the elderly. The findings of this exploratory study were aligned with previous studies that reported low adoption of mobile banking technology by the elderly. The results indicate that a lack of information and understanding, security, trust, demographic factors, language, the complexity of mobile banking applications, and resistance to change are barriers that influence adoption. Convenience, unlimited access and cost-effectiveness were identified as important enablers that favour the adoption of mobile banking. The study sheds light on the elderly community's perceptions and willingness to use mobile banking.

The study contributes to the existing body of knowledge by identifying the factors that influence the adoption of mobile banking by the elderly, particularly in a developing country context. This study further highlights the application of the Actor-Network Theory as a theoretical framework for examining the interplay and complex relationship between the elderly and mobile banking. The study proposes a model for understanding the adoption of mobile banking by the elderly coupled with guiding principles for consideration by banking institutions and mobile banking providers. The study collected data from South African elderly citizens (aged 60 and above) residing in KwaZulu Natal province. Future studies may extend the research through collecting additional data from other provinces across urban and rural settings. This study was conducted in a cross-sectional nature and future studies can look at conducting a longitudinal research project. Additionally, this study only solicited the perceptions of the elderly, the research may be expanded by collecting data from other actors such as banking institutions and mobile banking providers.

Keywords: Mobile banking; Mobile payments; Elderly; Senior citizens; Technology Adoption, Developing countries, Actor-Network Theory.

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NOTATIONS

AI	Artificial Intelligence
ANT	Actor-Network Theory
ATMs	Automated Teller Machines
BB	Branchless Banking
BC	Before Computers
CSIR	Council for Scientific and Industrial Research
DRTC	Dispositional resistance to change
EFT	Electronic Funds Transfers
FNB	First National Bank
ICASA	Independent Communication Authority of South Africa
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Development
IoT	Internet of Things
IS	Information System
MB	Mobile Banking
MOU	Memorandum of Understanding
MRQ	Main research question
OPP	Obligatory passage point
OTP	One Time Password
PDA	Personal Digital Assistant
PIN	Personal Identification Number
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
RBI	Reserve Bank of India
SA	South Africa
SLR	Systematic Literature Review
SMS	Short message service
STAM	Senior Technology Acceptance Model
TAM	Technology Acceptance Model
TBSSB	Technology-based self-service banking
TPB	Theory of Planned Behaviour

TRA	Theory of Reasoned Action
USA	United States of America
US	United States
USSD	Unstructured Supplementary Service Data
UTAUT	Unified Theory of Acceptance and Use of Technology model
WHO	World Health Organisation
WAP	Wireless Access Point
WIG	Wireless Internet Gateway

GLOSSARY OF TERMS

Term	Description
Mobile Banking	Refers to a service provided by financial institutions, where consumers use mobile phone devices to perform banking transactions such as viewing statements, transferring funds, saving money, and paying bills (Nazaritehrani & Mashali, 2020).
Developing countries	World Health Organisation (WHO) Lower middle-income countries "Developing Countries" are those with a GNI per capita of more than $1045 but less than $4,125, as per World Bank Atlas.
Elderly	Also known as a senior citizen and commonly referred to as "pensioner", a term often used to describe someone who has aged.
Bank institution	Commonly referred to as "Banks", these are institutions that allow and assist individuals to keep and move their money using their facilities.
Mobile payments (m-payments)	Mobile payments can be described as "movement of value that is made from a mobile wallet, accrues to a mobile wallet, and/or is initiated using a mobile phone" (GSMA, 2010).
E-commerce	Refers to the use of technology to facilitate business transactions between parties (including businesses, government and consumers) using the internet quickly and efficiently (Khan, 2018).

PUBLICATIONS FROM THE THESIS

The following refereed paper was published during the completion of this master's study:

Type	Publication Name	Title	Author(s) and Year
Conference paper	Responsible Design, Implementation and Use of Information and Communications Technology - I3E2020	Enablers and Barriers for Mobile Commerce and Banking Services among The Elderly in Developing Countries: A Systematic Review	Msweli and Mawela, 2020

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CHAPTER 1

1 INTRODUCTION

1.1 BACKGROUND INFORMATION

The introduction of technology has simplified people's lives, offering a wide range of services and products at the touch of a button. This means quite a number of tasks can be done at great speed, thus leaving individuals with very little to worry about. Transformation within the Information and Communication Technology (ICT) sector has resulted in the implementation of mobile banking technology through partnerships between smartphone manufacturers, network providers and bank institutions. These collaborations have made it possible for banks to deliver their service much more efficiently, thus enabling the exchange of digital cash between the banked and the unbanked through the use of mobile banking platforms. The implementation of mobile banking has been successful in most parts of the world. However, its adoption is reportedly inconsistent. Recent estimates by Statistics South Africa (2019) indicate that many South African consumers have a network-connected mobile device, and this enables the penetration of mobile banking, online banking, online shopping and other mobile transactions. The Independent Communication Authority of South Africa (ICASA) has recently reported a smartphone penetration rate that exceeds 80% (ITWeb, 2019). This serves as an indication that the country is embracing digital evolution and latest technology trends.

Gu, Lee and Suh (2009) suggest that through the convergence and discovery of new mobile technologies and banking services, consumers are now able to conduct banking services without any time and location limitations. Mobile banking enables the exchange of digital cash with other bank account holders and non-holders and engagement with e-commerce platforms. With all the benefits that come with the use of smartphones and tablets for executing banking transactions (products and services) and/or viewing account information, the adoption rate has been lower than anticipated (Mcgaughey, Zeltmann, Mcmurtrey & Downey, 2012; Choudrie, Junior, McKenna & Richter, 2018).

While a sizeable percentage still uses traditional methods of banking in South Africa, reports show that mobile banking is a leading banking trend in other countries. In South Africa, the adoption of mobile banking remains modest, with projected cell phone banking usage among consumers estimated at 31% for the year 2015 (FinMark Trust, 2019). In 2014,

smartphone ownership rate among adults was estimated at 89%, with a mere 15% of the smartphone owners using their devices for banking purposes (Chigada & Hirschfelder, 2017). Based on the information provided by BASA (2018), 80% of the South African adult population has access to a bank account; however, just over 9% of bank account holders (i.e., 4% of the total population) use mobile and online banking services (Mujinga, Eloff & Kroeze, 2018). The elderly are defined as people aged 60 and above *(Older Persons Act*, 2006).Challenges such as memory functionality (Leung, McGrenere and Graf, 2011), learnability and usability have been reported as hindrances to the adoption of mobile phone banking by the elderly (Leung, McGrenere and Graf, 2011). Mobile banking is reported to have several benefits, namely: cost-effectiveness, convenience and availability. However, the adoption rate has been relatively low considering the high penetration rate of smartphones. This indicates that there is a need to gain a deeper and clearer understanding of factors influencing mobile banking adoption by the elderly.

1.2 PROBLEM STATEMENT

ICT innovation and mobile technologies such as mobile banking have made it possible to bank anywhere at any time, thus making banking services and financial information more accessible. The literature shows that younger consumers have adopted mobile banking more than the elderly (Vuori & Holmlund-rytko, 2005; Choudrie *et al.*, 2018; Owusu, Bekoe, Addo-yobo & Otieku, 2020). However, studies on how the elderly experience mobile technologies, especially mobile banking, are limited (Mcgaughey *et al.*, 2012; Laukkanen, 2016; Choudrie *et al.*, 2018). Considering the global growth in the elderly population as reported by Mcgaughey *et al.* (2012), Chen, Downey, Mcgaughey and Jin (2016) and WHO (2020), understanding age-related issues in digital inclusion and adoption is significant and timely (Niehaves & Plattfaut, 2014).

In the United States of America (USA), the Federal Reserve bank claimed a few years ago that 67% of millennials use mobile banking, compared to 18% of elderly consumers aged 60 and above (Federal Reserve Report, 2016), leading to this study adopting age-range “60 and above” to define the elderly both females and males. In South Africa, the low adoption rates of mobile banking among the elderly is compounded by other factors such as the small population of the elderly that are engaged in full-time employment. With only 29% of South African adults working full-time, affordability could be another factor driving the low banking

percentages among the elderly, which ultimately leads to low adoption rates of mobile banking. A FinMark report indicated that even with all the remarkable improvements made to financial inclusion since 2004, areas generating cause for concern are still in existence (FinMark Trust, 2019). According to Chigada and Hirschfelder (2017), mobile banking is an emerging trend hence a shortage of academic research papers on the acceptance and adoption of mobile banking.

1.3 AIM OF THE STUDY

In response to the problem stated above, this study is fashioned to explore the adoption dynamics of mobile banking for the elderly. Specifically, the study aims to understand the factors and reasons behind the low adoption of mobile banking by the elderly and suggest directions for future research.

1.4 OBJECTIVES OF THE STUDY

The objectives of this research study are to:

- identify enablers and benefits of mobile banking amongst the elderly in developing countries;
- identify challenges and barriers hindering the adoption of mobile banking by the elderly in developing countries;
- identify the possible solutions and suggestions for consideration by banking institutions;
- propose guiding principles for consideration by mobile banking technology providers; and
- propose the adoption model that can be applied by the researchers interested in studying the adoption of mobile banking by the elderly.

To fulfil the study objectives mentioned above, the researcher adopted the interpretivist approach and applied actor network theory as the main theoretical lens to answer the questions listed below.

1.5 RESEARCH QUESTIONS

The main research question was formulated to address the aim and objectives of the study.

Main Research Question (MRQ)

- What factors influence the adoption of mobile banking among the elderly in developing countries?

Research Sub-Questions (RSQs)

The following sub-questions were formulated to support the MRQ:

- RSQ1: What are the enablers of mobile commerce and banking among the elderly in developing countries?
- RSQ2: What are the barriers to mobile commerce and banking among the elderly in developing countries?
- RSQ3: What are the perceptions of the elderly towards mobile banking?

1.6 JUSTIFICATION OF THE STUDY

Niehaves and Plattfaut (2014) point out that the literature lacks a complete explanation and consideration of technology acceptance and adoption in general especially by the elderly. In addition, Al-jabri and Sohail (2012) state that many studies do not explore the factors that possibly can assist banking institutions to design appropriate mobile services that bank customers can adopt. While it remains unclear why the elderly resist mobile banking, other researchers believe there might be additional problems that need to be unpacked, assessing complications associated with mobile trends together with services offered (Shaikh & Karjaluoto, 2015). Gell, Rosenberg, Demiris, LaCroix, Patel and Patel (2015) admit that previous research studies on technology usage by the elderly displayed low numbers of ICT use compared to other age groups, confirming that the elderly are uncomfortable with using technology. Lastly, Kobayashi, Hiyama, Miura, Asakawa, Hirose and Ifukube (2011) highlight a need for application designers and developers to understand how mobile technologies can be improved and be accommodative of the elderly.

This study is, therefore, significant in understanding the adoption of mobile banking by the elderly in South Africa, on the basis that few studies explaining its effect on elderly consumer satisfaction were conducted. The additional gap in research is the design of mobile banking technology which plays a major role in informing the designers and developers on how the banking app should be, for the elderly consumers to adopt and use it independently.

This research study unpacks the factors influencing the adoption of mobile banking and contributes to the limited research.

1.7 RESEARCH CONTRIBUTION

Bearing in mind that literature on the subject of adoption of mobile banking by the elderly is scarce and disregarded, the study, at a theoretical level, contributes towards building the body of knowledge focusing on the adoption of mobile banking by the elderly. This study serves as a response to a request from scholars requesting further research on the adoption of mobile banking by the elderly rather than focusing on internet banking. The study seeks to understand the factors behind low adoption of mobile banking so that the ICT practitioners can use the knowledge generated to promote their innovations.

Practically, the findings of this study would be of interest to banking institutions and other financial services institutions in that it offers an understanding of elderly consumer behaviour with regards to the adoption of mobile banking. Results generated from this study will assist the banking sector to improve or provide services or solutions targeted towards the elderly and allow them to devise relevant, appropriate and targeted marketing strategies. ICT practitioners including, but not limited to, designers and developers of mobile banking solutions may also find this study beneficial in that they can be guided by factors identified in this study to introduce technology-driven products and services that are accessible to the elderly, thus creating additional opportunities to reach the growing market. Lastly, the study may be of interest to scholars or researchers of online and mobile commerce, in particular mobile banking.

Methodologically, the study contributes to research by adopting an interpretivist approach to conduct the study. The majority of studies similar to this study have been undertaken following the positivism paradigm (Touchaie & Hashim, 2018; Chaouali & Souiden, 2019; Jayachandran, 2019). The qualitative nature of this research study intends to achieve the objectives of the study by soliciting descriptive and rich data that would be interpreted towards addressing the research question. The resultant findings contribute additional insights stemming from the high quality of data collected through the elderly sharing their experiences and perceptions. The proposed model for mobile banking among the elderly arising from this research may inform future studies, and allow researchers to apply the

model when undertaking research relating to the adoption of mobile technologies among the elderly.

1.8 ASSUMPTIONS

The underlying assumptions in this study are that participants are aware of mobile banking and they can answer the questions with honesty and integrity.

1.9 DELIMITATIONS OF THE STUDY

The delimitations of this research study are as follows:

- The research study only focuses on mobile banking and the elderly residing in South Africa.
- The conducted systematic literature review focuses only on studies that investigated mobile commerce (including banking) and the elderly. The study only considers published articles including journal articles and conference papers as well as students' theses and unpublished articles due to limited articles available on this topic.
- Only studies conducted between 2009 and 2019 were deemed eligible for the systematic literature review.

1.10 OVERVIEW OF THE RESEARCH REPORT

The work reported in this Research Report is divided into eight chapters, which are summarised as follows:

Chapter 1: Introduction

This first Chapter of this research study introduces and provides background information on the phenomena of interest. Furthermore, it presents the problem statement and the guiding research questions for addressing the research problem. After highlighting the research objectives of this research study, the chapter presents the justification for conducting the study before providing an outline of the Research Report.

Chapter 2: Literature Overview

The second Chapter looks at the literature review relevant to the study. In this Chapter, the term “the elderly” is defined and the elderly behaviour towards mobile banking technology are explored. The Chapter also reviews the state of the South African banking sector. In addition, it discusses the mobile banking technology in Africa and globally, drawing from the views of the other scholars.

Chapter 3: Theoretical Framework

Chapter 3 provides details of the theoretical framework, the Actor-Network Theory (ANT), which is applied as a lens in this research study. Following an explanation of the theory and a presentation of a critique of the ANT by other scholars, the Chapter continues to highlight IS studies that have applied the theory to address the research questions. Examples of how the theory has been applied in mobile banking studies are also provided. Lastly, the Chapter explains the applicability of ANT in this research study.

Chapter 4: Research Methodology

The fourth Chapter delivers an overview of the methodology followed by the researcher to undertake this investigation. The philosophical assumptions towards understanding this phenomenon are explained. The Chapter provides comprehensive information on the research approach and research strategy including the methods used for data collection. The Chapter concludes with an elaboration of how data was analysed to draw the requisite findings.

Chapter 5: Research Findings: Enablers and Barriers for Mobile Banking – A Systematic Literature Review

In chapter 5, an analysis and findings from the eleven (11) articles that comprised the secondary data set (i.e., the articles that met the inclusion criteria) are articulated. Furthermore, data extracted from the articles is presented and the findings are summarised to address the research questions. It is noteworthy that the research articles reviewed in this Chapter are those that were published between 2009 and 2019. The Chapter also outlines the critical factors that are perceived as enablers and barriers for mobile banking among the elderly as extracted from the selected and reviewed literature articles.

Chapter 6: Research Findings: Factors Influencing the Adoption of Mobile Banking – an ANT Perspective

This Chapter documents the results of the qualitative primary data that was collected. Following its collection, the quantitative data was manually transcribed and coded using ATLAS.ti 8. From the qualitative data, all the phrases that were perceived as enablers and barriers towards the adoption of mobile banking were extracted and are presented in this Chapter. The Chapter extracts and reports suggestions for enhanced mobile banking solutions.

Chapter 7: Discussion

Chapter 7 discusses the findings stemming from Chapters 5 and 6. It also outlines the enablers and barriers influencing the adoption of mobile banking among the elderly. The purpose of this Chapter (discussion) is to compare and contrast the results of this study with those of similar studies undertaken by other researchers. It is envisaged that insights emanating from these discussions would raise awareness that will guide the design of future mobile banking applications for the elderly, ultimately leading to an increased rate of their adoption. The Chapter suggests guiding principles that need to be considered by banking institutions when designing and marketing products and services to the elderly. The Chapter also proposes a mobile banking model for the elderly that can be adopted when developing an inclusive mobile banking application.

Chapter 8: Conclusion, Recommendations and Future Research

Being the last Chapter of this Research Report, Chapter 8 stipulates the conclusion, recommendations and suggestions for future studies. The Chapter concludes by summarising the purpose of the study. Thereafter, the research objectives and research questions are revisited to remind the reader about the problem that is being addressed. After explaining how each research question was addressed, the most important findings are highlighted. Lastly, the recommendations are suggested and a call for future research is made based on the findings in the research study.

A visual overview of this Research Report is illustrated in Figure 1.1.

Figure 1.1 Outline of Research Report

CHAPTER 2

2 LITERATURE OVERVIEW

2.1 INTRODUCTION

Although numerous studies have focused on the association between the elderly and internet banking (Mattila, Pento & Karjaluoto, 2003; Diako, Lubbe & Klopper, 2012; Peral-Peral, Arenas-Gaitán & Ramón-Jeronimo, 2013; Ramón-Jerónimo, Peral-Peral, Jorge & Villarejo-Ramos, 2014; Arenas-Gaitán, Peral-Peral & Ramón-Jerónimo, 2015), other studies have investigated the association between the elderly and online banking (Xiong & Matthews, 2005; Gatsou, Politis & Zevgolis, 2017, 2018). It is noteworthy that literature on the elderly and ICT have revealed shortage of research on older adults and mobile banking (Choudrie *et al*., 2018). However, it can be argued that in South Africa and other developing countries mobile banking is not as widespread as in developed countries, but it is simply viewed as part of new technology innovations. The relationship between inclusive development and mobile banking remains unclear due to a scarcity of literature on this phenomenon (Asongu & Odhiambo, 2019). Furthermore, the number of research studies targeting the elderly is limited. Based on previous literature, Laukkanen (2015) acknowledges that user adoption behaviour, attitudes towards innovation and innovation resistance is influenced by age. Research studies have indicated that younger consumers are more proficient and comfortable to use mobile banking.

Since this research study revolves around the issue of mobile banking, it is important that the phrase “mobile banking” is defined so as to put it into perspective for purposes of this Research Report.

2.2 MOBILE BANKING DEFINED

Defining mobile banking has become a challenge that often makes scholars to disagree over the description of this concept. Muzurura and Chigora (2019) define mobile banking as an inventive method for accessing banking services and products *via* a network connection, hence allowing the consumers to interact with a banking institution using a mobile device at any time from any location. Fenu and Luigi (2015) describe mobile banking or payments as an exploitation of mobile tools such as cellphone, Personal Digital Assistant (PDA), pagers to access a bank’s network or other mobile devices to gain access to the bank’s network using wireless networks. In addition, Kim, Shin and Lee (2009) describe mobile banking as

the use of m-commerce by consumers, where smartphones or other mobile devices are used to conduct bank-related transactions such as viewing bank account profile, money transfer and trading in stock. While some authors limited their definitions to devices used to conduct mobile banking, Lin (2013) elaborates that it is a symbiosis of telecommunication network and extension of banking infrastructure offered by banks to reach under-banked consumers and provide convenient banking services to all customers.

Mobile banking can be perceived as the response of banking institutions to the needs of a number of customers as the habits of these customers change due to mobile technologies and use (Fenu & Luigi, 2015). Mobile banking is amongst the innovations in mobile technology trends (Shaikh & Karjaluoto, 2015). Referring to mobile banking, Kemal (2018) says a new “branchless” transacting mode has emerged, where banks are no longer significant but banking is reaching even the marginalised populations across the globe. Mulwa and Waema (2016) add that this is the first solution for responding to issues concerning the unbanked.

Mobile banking can be categorised as a division of internet banking (Chigada & Hirschfelder, 2017), and Thakur, (2018) argues and describes it as an extension of internet banking. Even though the differences between the terms are arguable in research, Hong (2019) alludes that mobile banking and internet banking are both considered online banking from a consumer perspective. Mcgovern and Verrecchia (2019) assert that mobile banking is an alternate of electronic banking that offers comparable services and benefits to consumers as internet banking. Nazaritehrani and Mashali (2020) define internet banking as the acquisition of mobile banking services using the internet. Gatsou, Politisand Zevgolis (2018) describe online banking as banking transactions where laptops or other mobile devices, such as smartphones and tablets are used to check account balance, transfer and receive money, pay bills, and other bank-related tasks. This definition seems to describe internet banking, whether it is internet or online banking, the internet connection is required for consumers to use both.

The noted difference between the internet and mobile banking is that internet banking can be accessed on any device that has internet connection including desktop computers while consumers with a connected mobile device can access mobile banking or with airtime

applying the cellphone banking model. In addition, mobile banking has deeper reach as opposed to internet banking (Behl, Singh & Venkatesh, 2016). Mlitwa and Tshetsha (2012) define cellphone banking as expedient banking carried out via cellphone, enabling individuals; for example, to check their bank balances, transfer funds between accounts, make payments to beneficiaries and check bank statements. Despite the similarities in the concepts mentioned, Hong (2019) suggests that they should be investigated separately.

2.3 MOBILE BANKING TECHNOLOGIES

In this section, the various types of technologies underpinning mobile banking and the relevant service offerings provided by these technologies are discussed. The discussion concludes with a brief description of the risks posed by these mobile banking technologies.

2.3.1 Technologies behind mobile banking

To reach a wide and diverse range of customers, mobile banking is deployed utilising three different technologies, namely: web-based applications, messaging-based applications and client-based applications (Kim, Shin & Lee, 2009). As far as Columinate (2015) is concerned, banking consumers can access their bank accounts using their devices (e.g., smartphones, tablets and laptops) or computers *via* mobile browsers or relevant downloaded bank applications. Proper protocols and technologies are needed to support the mode of delivery. South Africa uses two technologies for mobile banking, WAP (Wireless Access Point) and WIG (Wireless Internet Gateway) (Goyal, Pandey & Batra, 2012). WIG supports short message service (SMS) that a user can access *via* the Unstructured Supplementary Service Data (USSD) code. Banks use these USSD codes which are similar to the “quick codes” used by network providers. The quick codes connect the banking institutions with their consumers, allowing consumers to perform specific transactions using their smartphones or features of these smartphones.

2.3.2 Technological service offerings of mobile banking

A wide spectrum of mobile banking offerings has penetrated the market, and every day the young and elderly people are seen with mobile phones (Mupfiga & Padare, 2017). Mobile banking service offerings can be classified into three broad categories, namely: payment services, banking services and value-added services (Chawla & Joshi, 2018). These

services enable consumers to digitally move the money around, buy products online (e.g. electricity and airtime), and access financial information (e.g. bank statements). The leading benefits driving the penetration of mobile banking are affordability and availability. Moreover, the adoption of mobile banking is linked to bank account ownership (Pankomera & van Greunen, 2018).

Mobile banking applications offer both the user and provider the following benefits: portability, less labour for bank employees, cheap service, convenience, the broader reach of consumers, high level of security, and readily availability (Eckhardt, Laumer & Weitzel, 2009; Laukkanen, 2016). These benefits make the delivery of banking services using this mode plausible. A broader range of banking product and services, the capabilities of instant money transfer, safety and reduced cost (Mbiti & Weil, 2016) are leading in the finance sector and the digital economy, among other things. Consumers can even take out an insurance policy for themselves and their families using mobile banking.

2.3.3 Risks associated with mobile banking technologies

Technological developments have changed the way people bank. While convenience is the leading benefit, there is a high level of threats surrounding mobile banking technology. Federal Reserve Board (2016) found that 37% of individuals are concerned about the occurrence of security risks. Hackers and fraudsters track and trace people's banking patterns, this leaves the safety of individuals' information and money ultimately dependent on the level of defence their bank employs. Trust is often a concern for those using online payments due to severe risks, which often hinder people from using online and mobile payments. A study by Chen, Su, Meng, Xue, Liu, Xu, & Fan (2018) reveals that individuals might have varying understandings of the vulnerabilities leading to inconsistent severity rating criteria and the innovative systems are not effective toward sensing susceptibilities that banking institutions most fear. Shoulder-surfing attacks are one of the serious threat in banking transactions where criminals spy on users for profile credentials (Panjwani & Cutrell, 2010). Wazid, Zeadally and Das (2019) identified some malware that attack mobile banking systems such as rootkit, hijacker, virus and ransomware. The following mobile banking risks and statistics on frauds make both banking institutions and consumers concerned about any digital conversions, and with good reason:

- **Fraud**- credit and debit card fraud are common ways of attacking mobile business applications such as mobile banking system targeting those who appear unsuspecting and vulnerable. Fraud is described as a practice of deceit calculated to gain an unfair advantage and the mobile banking context with the aim to extort money (Coppolino, D'Antonio, Formicola, Massei & Romano, 2015). One Time Password (OTP), security patterns such as passwords are some of the security measures introduced to solve issues pertaining to fraud (Anu & Soju, 2020).
- **Phishing-**Marforio, Masti, Soriente, Kostiainen and Capkun (2016) describe phishing as a technique that is applied by replicating the whole user interface of the targeted application often spotted in the mobile business application such as mobile banking. Wazid *et al.* (2019) recommend awareness programs to educate users about mobile banking threats such as phishing.
- **Account take-overs** - is a fraud in mobile payment service where an impostor steals the cellphone of a legitimate consumer to conduct to make illegal money transfers and infrequent activities to those of the legitimate consumer (Coppolino *et al.*, 2015).
- **Overlay attack-** is also among the criminal activities that are occurring on mobile banking. The goal of this activity is to capture the credentials for accessing the targeted application using a malicious program like a trojan horse (Marforio *et al.*, 2016).

2.4 MOBILE BANKING DIFFUSION

The worldwide preponderance of mobile devices coupled with increasing demand for self-service and personalised banking products and services has led to a growth of the mobile banking market. This section serves to highlight the prevalence of mobile banking globally, in Sub-Saharan Africa and South Africa.

2.4.1 Mobile banking - a global perspective

With emerging mobile technologies and increasing diffusion of the smartphone, countries have shown interest in the number of mobile money technologies. Developed countries have shown a massive interest in mobile technologies. These together with Internet of Things (IoT) have taken the lead in 4th industrial revolution (also called industry 4.0). It has been reported that the elimination of confinement associated with mobile technologies can

contribute towards the improvement of financial inclusion (Behl *et al*., 2016). Mobile banking has been around since October 1999 (Lee & Oh, 2005). The use of mobile banking in the United Stated (US) applications by age, which serves as a pseudo indicator of the adoption of mobile banking, is depicted in Figure 2.1. As expected, it is evident from Figure 2.1 that the young adults are taking the lead in terms of banking application usage; 45% of 18-24-year-olds and 21% of the 25-34-year-olds use of banking applications on a weekly and monthly basis, respectively. These figures are in sharp contrast to the 58% and 67% reported for people aged 55-64 years and 64+ years, respectively, who never use mobile banking applications. These results suggest that a huge number of elderly people needs to be convinced to migrate to mobile banking.

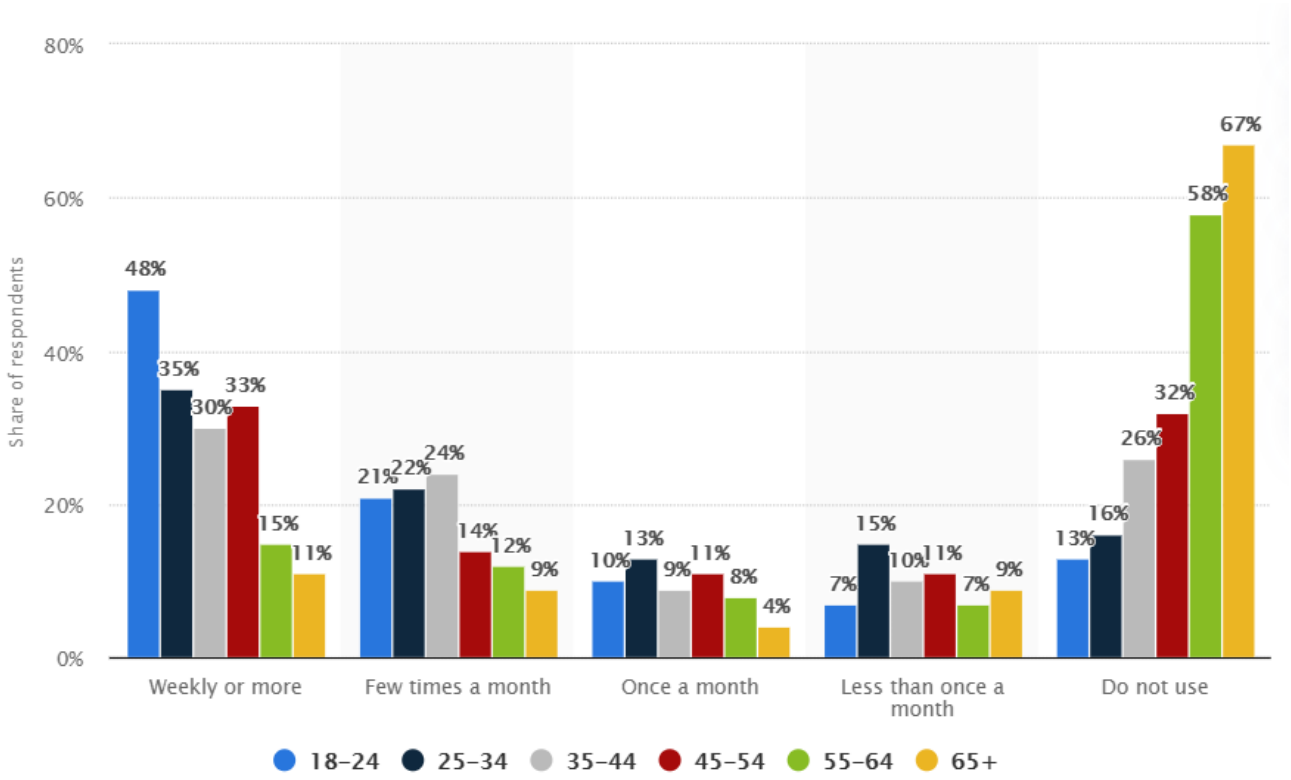

Figure 2.1. Use of mobile banking applications in the US by age

(Source: Statista, 2020)

Indian government ensured that there is a policy issued by Reserve Bank of India (RBI) to regulate mobile banking in the country (Behl, Singh & Venkatesh, 2016). This policy ensures that mobile banking such as EKO is operating within the proper standards while offering financial services and products. EKO profited Indian low-income communities by providing low-cost mobile banking, and in partnership with State Bank of India consumers were able to open zero balance accounts (Niyogi & Niyogi, 2012). Niyogi and Niyogi (2012) further

outlines the differences between M-Pesa and the mobile phone banking in India. They maintain that M-Pesa used in other countries is a non-banking model where an individual only needs a mobile phone and network connection, while the Indian model is a banking one and it needs to have a bank account as well as a mobile phone.

In Saudi Arabia, as part of their Vision 2030, the government accepted the significance of technology, including mobile banking, in improving the quality of life for the people in the country (Baabdullah & Alalwan, 2019). Through innovative technology, a number of banks in Iran are now conducting most of their transactions through SHETAB system (Information Exchange Network among Banks) which is similar to mobile banking with several functions such as cash exchange, e-commerce, money transfer and payments, bill handling, and account viewing which is available to consumers 24/7 (Mohammadi, 2015).

In Indonesia, Mangani, Syaukat, Arifin and Tambunan (2019) highlight that the branchless or mobile banking provided a new way to deliver financial services to low-income communities where banks became even more closer to individuals. The population in the Philippines is also benefiting from this low-cost banking. In the Philippines, Smart Money and G-Cash proved to have the advantage to reach the unbanked through mobile network operator model (Behl *et al*., 2016; Mangani *et al.*, 2019). While mobile banking has been highly adopted in developed nations globally, Muzurura and Chigora (2019) argue that the growth of mobile banking in first world countries such as USA and Europe is hindered by the existing alternatives such as internet banking, Electronic Funds Transfers (EFT), credit card payments and other converged methods.

2.4.2 Mobile banking - an African perspective

Although widely used in developed countries, a gap in the adoption of mobile banking in the African continent is evident. Be that as it may, the successful implementation of mobile banking in developing countries promises well for efforts directed towards banking exclusion, social exclusion and other financial challenges facing the continent of Africa (Ismail & Masinge, 2012). Latest developments on mobile banking are relevant and significant in the current era of digitalisation and ensuring financial inclusion in developing countries such as South Africa (Asongu& Odhiambo, 2019). Financial inclusion should encourage access to and the use of various low-priced financial products and services

affording convenience to individuals who are financially excluded, unbanked and under-banked (BASA, 2018).

The availability of advanced technology supported by connectivity means that banks can leverage on this and stretch their service offering by bridging access limitations and for other businesses to accept payments from such platforms. Mobile banking has the potential to offer unlimited access to financial services and products, and the elimination of the need to physically go to the bank makes it convenient and cost-effective for the customer. A comparative analysis of the number of registered mobile money accounts across different regions of the world (see Figure 2.2) revealed a general increase in the number new cases of mobile money across different parts of the world for the period 2017-2018. While a vast increase (19.8%) in the number of registered mobile money accounts was observed globally for 2017-2018, Sub-Saharan Africa was still lagging at 13.6% when compared with other regions.

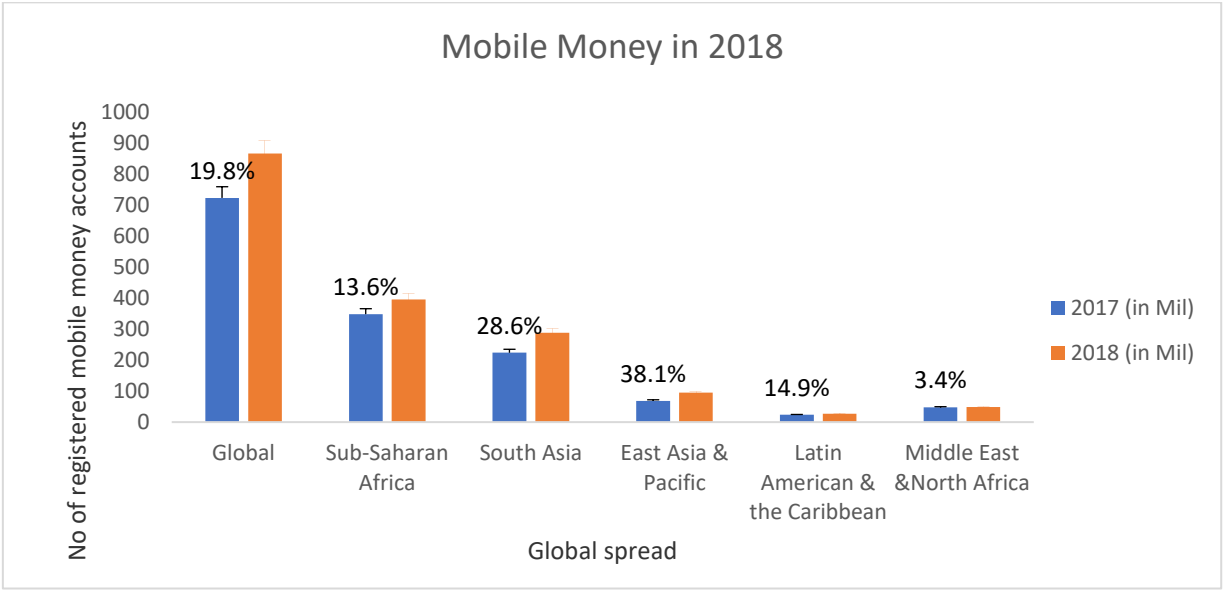

Figure 2.2 Mobile money in different regions of the world

Source: (GSMA, 2018)

Comninos, Esselaar, Ndiwalana and Stork (2008) highlight that Africa as one of the leading continents, still has only 15-20% of families with a formal bank account. However, mobile banking trends allow banks to reach those who remain unbanked with limited available services. Improvements in technology enabled the banking institutions to simplify the way

they conduct and deliver their business with a number of diversified products designed for different groups.

The following mobile banking models are used in African countries:

M-Pesa

Kenya and Tanzania have been using the mobile payment system called “M-Pesa”. M-Pesa refers to mobile money, commonly used in Sub-Saharan Africa. This system was propelled by Safaricom, the leading cellphone provider in Kenya (Niyogi & Niyogi, 2012; Mbiti & Weil, 2016; Mupfiga & Padare, 2017; Mangani *et al.*, 2019).

M-Pesa can be described as a “low-cost” money transfer system competing with long-serving mobile banking systems that have been adopted in western countries (Mbiti & Weil, 2016). The system has benefited about 20 million people living in Kenya, allowing the users to save money, develop other monetary considerations and additionally engaged in the creation of business opportunities (Mupfiga & Padare, 2017). In Kenya, M-Pesa permitted cash transfers (exchange of e-float) between users using mobile phones (Mbiti & Weil, 2016). It is similar to how m-finance permitted those previously unbanked to use their mobile phones to withdraw funds from Automated Teller Machines (ATMs), thus increasing financial inclusion (Anong & Kunovskaya, 2013). Lack of regulation and risk management, susceptibility to fraud and money laundering are some of the drawbacks that have been pointed out by the critics of M-Pesa (Hayes & Westrup, 2012).

Ghana MTN

This is a mobile banking facility that was introduced by one of the biggest network providers, MTN (Tobbin, 2012). Ghana MTN provided affordable means of banking to people in Ghana by introducing mobile banking. Even though the penetration of smartphone is relatively high, the usage is still confined to specific groups of individuals or certain geographic areas (Owusu *et al.*, 2020).

WIZZIT

This is a Branchless Banking (BB) model operated by a third party, namely a mobile payment provider inspiring interoperability between banks and telecom network providers and other

organisations serving previously disadvantaged communities (Mangani *et al.*, 2019). WIZZIT allows individuals and organisations to make EFT using the web and empowering the unbanked and under-banked by providing the money administration service to this group of individuals (Mupfiga & Padare, 2017).

Map in Uganda

MAP International is a New York-based fiscal services company established by Michael Landau in 2007 (Hisali, 2010). This facility aims to improve access to managing an account and financial administration to disadvantaged communities and enhance the livelihood (Mupfiga & Padare, 2017). MAP International has collaborated with the Ugandan government and other local partners to allow the interoperability of BB affording the under-served to have a bankable identification (Hisali, 2010).

2.4.3 Mobile banking - a South African perspective

Mobile banking is undoubtedly making inroads in various parts of the world, and South Africa is no exception. Before exploring the prevalence of mobile banking in South Africa, it is important to understand the context in which mobile banking exists in South Africa. In addition, background information on the South African mainstream and digital banking sector as well as the types of products and services offered in this sector is presented.

2.4.3.1 South African context of mainstream and digital banking sector

In a developing country like South Africa (SA), commercial banks form part of the resources that the country can use to increase and stabilise the economy. The majority of bank branches remain inaccessible to communities living in poverty and those in remote areas (Diako, Lubbe & Klopper, 2012) due to bank branches being positioned in central towns. Nevertheless, most South African banks currently provide free mobile and online banking service, packaged in bundles to encourage consumer's uptake of the products and services that can be accessed through these platforms (Mujinga *et al.*, 2018). In this digital age, technology capabilities together with internet connectivity have allowed the banks to reach

their customers using the internet or online banking, cell phone banking and mobile banking. Those that remain unbanked, have also benefited from these capabilities.

The South African banking sector has over trillions worth of asset and has only five (5) largest and leading banks. The banking sector has about 36 South African banking institutions registered with the Reserve Bank and 30 foreign banks with approved representative offices in SA (*South Africa Banking Industry Report*, 2019). Most of the registered banks in SA, which are listed and described in Table 2.1, are controlled locally. Commercial banks and non-commercial banks in SA work together towards contributing to the market where the banking system allows the non-commercial banks to fill the gaps left behind by commercial banks. It is worth mentioning that the banking sector has been growing in terms of new banks; and also the banking trends. SA has over 40 foreign banks which are approved to run local offices and ranked third position competing with other 148 countries in the World Economic Forum Global Competitiveness Survey (2013/14) (BASA, 2018). Discovery Bank together with TymeDigital and Bank Zero are three emerging banking institutions given new commercial banking licences and operating strictly on a digital mode, thus, increasing the number of banks operating in SA. These incumbents are causing digital disruption in the banking sector by driving their focus towards making their products more appealing to younger consumers. Mobile banking apps are also a part of digital banking and majority of commercial banks has their own mobile banking apps such as Yono which is the latest application introduced by the State Bank (Anu & Soju, 2020).

Table 2.1 South African Banking Sector

Bank name	Type of bank	Description
ABSA Group	Commercial	ABSA Group, commonly known as “ABSA bank” is one of the leading banks in SA. The bank aims to be the pride of the African continent by offering leading financial services.
African Bank Limited (ABL)	Commercial	The African Bank Limited is headquartered in Midrand, Johannesburg. Its primary market is to provide unsecured loans to the domestic market.
Al Baraka Bank	Commercial	Operating under the Al Baraka Banking Group, this is the largest Islamic bank worldwide. This is the only Islamic financial institution in SA.

Bank name	Type of bank	Description
Bidvest Bank Limited (BVBL)	Commercial	Bidvest Bank is considered the key player in foreign exchange products and services in SA, with over 80 branches operating in the country.
Capitec Bank Holdings Ltd	Commercial	Capitec bank is based in Stellenbosch (SA), with more than 800 branches across South Africa. It offers products and services to individuals and businesses; however, it does not service formal businesses.
RMB Private Bank	Commercial	With its headquarters in Johannesburg (SA), this bank is listed as a top private bank in South Africa. The bank was founded in 1977 and it has managed to keep up with the trends with the sector.
Nedbank Limited	Commercial	Nedbank Group was founded in Amsterdam in 1888. It focuses mainly on mercantile banking services, insurance, and asset and wealth management.
FirstRand Group	Commercial	This bank operates as subsidiaries across the African continent with over 800 retail branches nationwide.
First National Bank (FNB)	Commercial	FNB was recorded as the first commercial bank to be established in SA. The bank was established in 1838 and still serves as one of the largest banks in SA.
Investec Bank	Commercial	The Investec Bank is the leading private bank in SA.
Grindrod Bank	Commercial	Traded as “Marriott Merchant Bank Limited” until 2006. The bank is widely recommended for property finance.
HBZ Bank	Commercial	This Bank operates as a subsidiary of Habib Bank AG Zurich and has an exclusive division dedicated to Islamic banking.
Mercantile Bank Holdings	Commercial	Through its many holdings, this bank offers insurance, foreign exchange, asset management and credit card services. A share of this bank is owned by Old Mutual Company.
Standard Bank Group Limited	Commercial	Standard Bank Group Limited (also trading as Stanbic Bank SA) is one of the largest banks in SA and Africa. The bank operates over 560 branches across 20 countries in Sub-Saharan Africa. The major operations are in SA focusing on home mortgage and issuing bank cards.
Ubank Limited	Commercial	This is one of the SA’s Microfinance banks. Ubank operates over 100 branches but mainly in the rural and mining communities. It also acts as a TEBA Agency in neighbouring

Bank name	Type of bank	Description
		countries such as Botswana, Lesotho, Mozambique, and Swaziland.
Wesbank	Commercial	WesBank is a division of FirstRand and is considered the first instalment financial institution. This bank has a reputation when it comes to car loans and insurance in SA.
GBS Mutual Bank	Non-Commercial	Established in 1877, GBS Mutual is one of the oldest and one of the few non-commercial banks in SA. Although the bank originates from Grahamstown, it also operates in other cities such as Port Alfred, Cape Town, and Port Elizabeth.
Development Bank of Southern Africa	Non-Commercial	This bank was instituted in 1983 with the purpose to assist SA with economic development. It has achieved its objectives especially in rural economies by partnering with multiple stakeholders.
Ditsobotla Primary Savings and Credit Co-operative Bank	Non-Commercial	This bank is fairly run as a credit and savings society. It was formed in 2001 as a result of a merger between multiple units of SACCO (Ziphakamise Savings and Credit Co-operative) including Aganang, Ikageng and Itireleng.
Finbond Mutual Bank	Non-Commercial	The bank was established under the auspices of Mutual Saving and Friendly Society and is owned by a number of banks in SA. The primary focus of this bank is to develop the communities through deposits and motivating them to save more.
TymeBank	Digital Bank	TymeBank is one of the new banks that has joined the banking industry in SA. This is one of the banks that operate under the branchless model with all banking transactions taking place online or via a mobile device. This has afforded consumers even lesser costs for transactions conducted and on bank service fees. In less than 5 years, the bank has progressed aggressively and has, at the time of compilation of this Research Report (April 2020), already attracted over 1 million bank account profiles.
Bank Zero	Digital Bank	Bank Zero is another new digital banking entrant and it aims to compete with other traditional banks in SA. This bank plans to provide modern and tech-savvy banking by combining it with a mutual banking concept. The main focus is to provide a savings facility while offering a decent interest rate.

Bank name	Type of bank	Description
Discovery Bank	Digital Bank	With a history in insurance services, this bank is considered a first behavioural bank in the world. Discovery Bank was formally introduced to promote financial literacy. The consumers affiliated with this bank use “Vitality Money” to track and manage their financial status. Discovery Bank’s objective is to restructure the countries fiscal market and it is already threatening the traditional big players.

2.4.3.2 Products and services offered by the top four mainstream South African banks

Any South African citizen or foreign national can open an account with a local bank by simply providing an identity document (or a passport in the case of foreign nationals), proof of income, and proof of address. An additional and important requirement for foreign nationals is a valid visa due to the risk of fraudulent documents (Crush & Williams, 2018). The need for a bank account plays a substantial role in mobile banking, mostly in the low-income earners (Tobbin, 2012). The various options available for customers to independently access their accounts are *via* a laptop, tablet, mobile phone, smartphone, or computer. The five prevalent South African banks that provide mobile applications are ABSA, Capitec, FNB, Nedbank and Standard Bank (Columinate, 2015). However, it needs to be pointed out that depending on the product or service offerings desired, beneficiaries are not always required to have an affiliation with a banking institution. The service offerings and products, including mobile banking products, offered by these banks are indicated in Table 2.2.

Table 2.2 Summary of products and services offered by the four major SA banks on their mobile banking applications

Banks	FNB	ABSA	Standard bank	Nedbank
Products and Services	- FNB Pay Fingerprint ID - Secure Chat - Send money (e.g. e-wallet) - Apply for various loans (e.g. home Loans) - Renew Car License - Pay bills - Dispute unauthorised debit - Mobile payments	-Access to digital banking - Customise app menu - Use an app to share account info - Payment of bills - Manage your card limits	- Deposit cheques using a photo (Mobile Deposit) -Instant Money Transfer -Pay bills & Standard Bank loan -View account activity -View locations of other branches	-View previous transactions and payments - Management of account activities via eNotes - M-Pesa -Add scheduled payments and transfers -Set up recurring payments and transfers -Make payments to beneficiaries -UIF & tax payments -Request tax certificate -Get payment updates via e-mail, SMS or fax.

Source: FNB, ABSA, Standard Bank and Nedbank (Bank websites)

2.4.3.3 South African context of mobile banking

Developing countries such as SA have a different experience with mobile banking applications. It can be accentuated that access to mobile banking service will advance the qualities of lives of individuals particularly the elderly; however, access to mobile banking services in developing countries is at a lower rate (Dandena, Timbula & Mengesha, 2020). South African banks generally offer mobile banking as part of their suite of products and services. Other mobile banking channels that are available or have been initiated in South African are as follows:

- **M-Pesa** –is the SMS-based mobile money, originated from Kenya (Chigada & Hirschfelder, 2017). Mbiti and Weil (2016) define M-Pesa as a money transfer system that allows cash exchange for “e- float” between users using mobile phones. This system proved to work for other countries such as Kenya and Tanzania (Mangani *et*

al., 2019). However, in South Africa, M-Pesa failed due to poor distribution and administration (Chigada & Hirschfelder, 2017). Moreover, the regulatory inflexibility also contributed to the slow acceptance and adoption of M-Pesa (Rouse & Verhoef, 2017). Consequently, the leading mobile network provider in SA "Vodacom" partnered with Nedbank to redefine M-Pesa adaptable based money exchange administration to resemble the one for Kenya (Mupfiga & Padare, 2017).

- **Other initiatives** - WIZZIT in SA previously proved that even those that are unbanked can receive digital money. Mupfiga and Padare (2017) suggest that it is useful in the administration of money for those unbanked and bank accounts that are under-managed. MTN Banking Mobile Money Account is also said to give customers complete access to saving money adaptability, thus, enabling access to customer account from any location, and with no time limitations.

- **Money transfers without affiliation to a bank** - Although a bank account is important for accessing a mobile banking account, the formal banking system provides a banking problem for a high number of citizens that are low-income earners and foreign nationals without an affiliation to a bank. While the locals need to do various transactions within the country, the foreign nationals may need to send money to their respective home countries to support their families. Given this situation, financial practitioners have directed their efforts towards initiatives that assume the functions of a bank such as money transfers (Rosslee, 2017) and money transfers *via* mobile communication companies (Adaba & Ayoung, 2017; Sharma, Govindaluri, Al-Muharrami & Tarhini, 2017).

Table 2.3 below depict some of the money transfer solutions from SA banking institutions which permit bank consumers to send money to anyone with a South African valid cellphone number:

Table 2.3 Money transfer solutions from SA leading banks

Name of Bank	Money Transfer Service
FNB	e-Wallet
Standard Bank	Instant money Wallet
Nedbank	Nedbank Send-iMali

Name of Bank	Money Transfer Service
ABSA	ABSA CashSend

Technology in hypermarkets has also become a gateway in improving bankability and financial inclusion by enabling consumers to use hypermarkets to transfer and withdraw money (Dube & Gumbo, 2017). Using Personal Identification Number (PIN), users can send cash to other users or withdraw cash at a till point, ATM or even pay for goods (Rouse & Verhoef, 2017). Businesses are also benefiting on this initiative since instore ATM presence can increase the store turnover by 8% to 10% (Rosslee, 2017). The SA largest supermarket, Shoprite, implemented a solution that allowed consumers to deposit money at a service fee of R9.99 at any Shoprite branch in the country and the recipient can withdraw the money at any Shoprite branch or use it to pay for groceries (Rouse & Verhoef, 2017).

2.5 SOUTH AFRICAN MOBILE BANKING AND THE ELDERLY

SA experiences various challenges with regards to the elderly and the adoption of mobile banking. Some of these challenges are highlighted in the sub-sections that follow.

2.5.1 The elderly in SA

An “elderly” can be defined as an individual that has aged. Other authors refer to this notion as “senior citizen” or “senior”. Gatsou, Politis and Zevgolis (2017, 2018) refer to the elderly as “seniors” and “older adults”. Similarly, Gelderblom, Dyk and Biljon (2010) use the terms “senior”, “elderly” and “older adult” to describe individuals aged over 60. In the medical industry, the term elderly describes a person who is past young adulthood and close to old age. Nielsen (2013) defines the elderly as consumers aged 65 and above. In SA, *The Older Persons Act no. 13 of 2006* defines older individuals or the elderly as a person aged 60 years old or older for females and 65 years or older for males. Most countries agree with the notion of the elderly being individuals that are 65 years and more, but it is repeatedly disputed because of the positive change in life expectancy and improved lifestyle within the ageing segment (Alina, 2017).

When assessing the progress in human lifestyle, D’Albis and Collard (2013) claim that present “60-year-olds” are habitually different from their parents at equivalent age and behave differently compared to grandparents at an equivalent age. This group now lives

longer than the current predicted human life expectancy of 79 years. In the year 2017, SA's elderly population was 4.4 million (StatsSA, 2017), and the number is expected to double by the year 2050. According to Alina (2017) the number of pensioners will approximately reach one billion. Consequently, financial service providers are presented with an opportunity to cater for mature consumers with their significant spending patterns and necessity to manage valuable assets during their prolonged lifespan (Arenas-Gaitán, Peral-Peral & Ramón-Jerónimo, 2015). Nowadays, the elderly make early decisions and preparations about quality of life as they age and after retirement, while developers and providers of mobile commercial applications face several challenges including capability to empower elderly group with applications they can use (Gurtner, Reinhardt & Soyez, 2014). Banking institutions have been introducing new trends without user personalisation (Anu & Soju, 2020) or profiling consumers to maintain consumer relationships. Taking into consideration the definitions provide by other scholars and how the *Older Person Act* describe the elderly, in this study the elderly are defined as an individual aged 60 and above for both females and males.

2.5.2 The elderly and technology

Nearly a third of the elderly population in SA is dependent on welfare (FinMark Trust, 2010) that is friends, family and government grants. Access to this welfare often requires some technology to transfer and receive the funds. It is suggested that before society can influence the elderly to use technology to improve their quality of life, it is necessary to acknowledge and understand the patterns of technology use, the level of confidence and willingness to learn and use technology and mostly acknowledge their wishes and demands regarding the technology (Blažun*, Vošner, Kokol, Saranto & Rissanen*, 2014). Moreover, the findings of Malaquias and Hwang (2016) suggest that banks need to formulate strategies to convey trustworthiness to the elderly and women regarding mobile banking.

Scholarly and other research work on overall banking trends has revealed several technology risks (Hanafizadeh, Keating & Reza, 2014), and challenges impacting the adoption of technology by the elderly. Neves and Amaro (2012) acknowledges that elderly groups go through various impediments when it comes to adopting technology, citing distrust and doubt of technology benefits, physical and intellectual challenges and complications using technology. Only 20% of the elderly have reported age as a challenge (Blažun *et al.*,

2014), suggesting they are no longer young enough to learn new trends. Ageing is associated with non-chronic and chronic diseases leading to visual impairment, arthritis, cognitive decline, strokes, and immobility. While these diseases are encumbering the use of mobile technology by the elderly, Balakrishnan, Salwah, Salim, and Hong, (2012) maintain that the ageing population is slow and unaccustomed to the latest trends. According to Nielsen (2013), elderly consumers are 43% slower at using digital technologies and innovation. Ganor and Te'eni (2016) found that the user performance response time for older adults decreased by 19% compared to 14% for younger adults. Accuracy gradually decreased by 43% for older adults as opposed to 6% for young adults because of cognitive decline. Approximately 32% of the elderly have reported lack of ICT knowledge as a reason for not using the internet (Blažun *et al.*, 2014). Additionally, they did not find web-based banking user-friendly (Gatsou *et al.,* 2018). As a result, technology design should undoubtedly be modified further to accommodate the needs of elderly users (Gatsou *et al.*, 2018). The potential elderly users willing to adopt mobile devices and banking will need some level of understanding when using new technology (Choudrie *et al.*, 2018). Technology may seem daunting to older people; therefore, it is widely assumed that older people are more reluctant or rigid in adopting new technologies (Neves & Amaro, 2012)

2.6 CONCLUSION

The purpose of this Chapter was to highlight the key findings from the previous research studies conducted by other scholars on similar research. In this Chapter, the South African banking sector and mobile banking and how they relate to the elderly were reviewed. In summary, it was found that the banking system in SA is well established and positioned in the way that benefits the users, providers and the country's economy. With over 30 banks operating in the country, the study noted that from traditional and online banking, the banking sector has adopted very innovative ways to reach more consumers. The Chapter also looked at how other scholars and regions described the elderly. For the elderly, it was noted that mobile banking presented opportunities, but this was outweighed by much unprecedented barriers. Requests for further investigation were noted from the previously published studies. In the next Chapter (Chapter 3), the theory that has been applied in this study to address the research questions is discussed.

CHAPTER 3

3 THEORETICAL FRAMEWORK

This Chapter presents the theoretical framework underpinning this study.

3.1 INTRODUCTION

The purpose of a theory is to guide the researcher and assist in arranging thoughts or concepts. According to Gregor (2006), a theory is necessary to create inter-connections between social sciences, natural sciences and the artificial world of human structures, leading to accumulation in the body of knowledge. Walsham (1995) prescribes that there are no right or wrong theories but they should be judged with the attention it draws to the researcher and the area being addressed. Theories are developed to achieve certain goals in research, such as analysis and prediction, explanation, or prediction and prescription, which result in five theories of IS termed after these goals as described by Gregor (2002, 2006):

- Theory for analysing and describing descriptive,
- Theory for understanding,
- Theory for predicting,
- Theory for explaining and predicting, and
- Theory for design and action.

This study is aimed at finding a deeper understanding and offering an explanation on elderly opinions and perspectives towards mobile banking. To this end, a theory that may assist in unpacking the above-mentioned explanation and is thus deemed to be applicable for this research study is the theory of understanding. The theoretical views on mobile banking in the literature are drawn from multiple perspectives and disciplines such as IS, development studies and economics discipline. The perspectives provide a unique lens to study mobile banking.

The “how” and “why” phenomenon is a primary concern in this research study (Gregor, 2006). Gregor (2006) continues to proclaim that theory needs to bring new insights to the subjects that have been poorly understood or less investigated. Niehaves and Plattfaut (2014) pointed out that the literature lacks a complete explanation and consideration of technology acceptance in general, especially with regards to the elderly. This study seeks to understand and explain the various factors influencing the relationship the elderly have

with mobile banking technology. A theory of understanding will direct the research study in offering new interesting insights to the individuals involved. According to Gregor (2006), when applying a theory of understanding in an interpretivist paradigm research, there should be enlightenment or a sense of surprise when new knowledge or assumptions are brought forward. This study intends to understanding the interplay between the elderly and mobile banking. The ANT perspective has been adopted as a theoretical lens to guide the study, address the research question and understand the use of technology (Adaba & Ayoung, 2017). The theory is primarily focused on the interactions between technology and individuals. Moreover, it is continuously recognised as a lens to understand how people use technology (Arif, Sidek & Abu Bakar, 2017).

3.2 ACTOR-NETWORK THEORY

ANT is a theory that explores how a network of actors are formed, remain connected together or break. This theory was founded early in the 1980s by Bruno Latour, Michael Callon and John Law (Callon, 1986; Latour, 1987; Law, 1987), and it offers an interdisciplinary approach for investigating issues of society and technology. ANT was initiated to contribute to studies exploring information systems (Walsham, 1997).

According to ANT, all actors such as human, objects or organisations (non-human) are equally important and should be treated the same in the social world. The theory draws from the work of Callon (1986) who raised three principles, namely: “agnosticism”, “generalised symmetry” and ”free association”. Callon emphasised the application of impartiality towards actors in consideration and erasing pre-assumed differences of socio-technical structures (Callon, 1986). Referring to the use of different technologies and their purpose, Tatnall and Gilding (1999)maintain that ANT deals with the social-technical divide by denying that purely technical or purely social relations are possible. There are no differences in social interactions and technical interactions. ANT has been influential in technology adoption studies (Tatnall, 2005; Awa, Ukoha & Eke, 2016).

3.2.1 The key elements of the ANT

Walsham (1997) highlights the key elements of the ANT, which have proven to be stable over the last decade. The key concepts of ANT as described by Walsham (1997) are listed in Table 3.1.

Table 3.1 Key concepts of ANT

Concepts	Description
1. Actor (or Actant)	Both human and non-human actors (e.g. technology artefacts)
2. Actor-network	Heterogeneous network of aligned interests, including people, organisations and standards.
3. Enrolment and translation	Creating a body of allies, human and non-human, through a process of translating their interests to be aligned with the actor-network.
4. Delegates and inscription	Delegates are actors who "stand in and speak for" particular viewpoints which have been inscribed in them.
5. Irreversibility	The degree to which it is subsequently impossible to go back to a point where alternative possibilities exist.
6. Black box	A frozen network element , often with properties of irreversibility.
7. Immutable mobile	Network element with strong properties of irreversibility, and effects which transcend time and place.

Source: Walsham (1997)

The study attempts to trace all the aforementioned key elements. Both human and non-human actors contributes equally to the relationship; however, the differences are acknowledged and accepted. Furthermore, the theory considers the motivation and actions of the actors that form a network. The network can include humans (and non-humans), ideas or concepts and events that are all referred to as "actors" in the network (Cresswell, Worth & Sheikh, 2010). According to Adaba and Ayoung (2017), actants may refer to many entities such as an institution, a person, rule or regulation, or a smartphone. The actors join a network in an act of translation, where actors are identified and the possible interactions and margins of manoeuvre are negotiated and delimited (Callon, 1999).

3.2.2 Advantages of the ANT

The advantages of using ANT as a theory in social research are as follows:

- The injunction to follow the actors produces careful attention to the multiple interacting factors that produce any given event.

- It is inspired by Latour's relentless hostility of dualism. Researchers are encouraged to acknowledge both human and non-human actors, social, or cultural factors as a contributory cause of social events (Latour, 1999). In agreement, Garrety (2014) argues that ANT's greatest novelties and contributions are the inclusion of non-humans in sociological analysis, especially in this digital era.
- Researchers are encouraged to look deeper into influences that are ascribed to greater sociological powers (Latour, 1999).

3.2.3 Disadvantages of the ANT

ANT has received some criticisms from various scholars (e.g. Walsham, 1997). The disadvantages of ANT are as follows:

- It still undecided whether ANT should be considered a theory or a method (Cresswell, Worth & Sheikh, 2010). Even though it carries theory in the name, it is better appreciated as one of the methods of conducting research intended to describe the link between human actors and non-human actors, focusing mainly on how these acquaintances are formed and what keeps them together (Desai, Zoccatelli, Adams, Allen, Brearley, Rafferty, Robert & Donetto, 2017). Walsham (1997) cautions researchers against using ANT as both theory and methodology.
- This theory addresses local structures and puts less focus on global social structures.
- Another criticism involves its stance on moral and radical issues.
- ANT displays a generalised symmetry, whereby humans and non-humans are treated equally. Other scholars argue that only spokespersons can advocate for both humans and objects but only humans can act.

Although the criticisms of ANT are acknowledged, it is believed that this theory can support the researcher to understand the complex issues in the adoption of mobile banking by the elderly. Table 3.2 shows the contribution of ANT in this study.

Table 3.2 Contributions of the ANT approach in this study exploring the factors influencing adoption of mobile banking

Key notion	Valuable contributions of this notion	Implications to this study
Translations	This refers to the process where actors join the network. During this process, the actors are identified, and the possibility of interaction and the margins of manoeuvre are negotiated and delimited (Callon, 1984).	Perception of how mobile banking technology is integrated into the lives of the elderly. Moreover, to understand their perspectives regarding the technology in question.
Active role of objects	The focus here is on determining how established practices can be influenced by the relationships between human actors (Cresswell, Worth & Sheikh, 2010).	The mobile banking technology has reshaped the method of banking. It can also be viewed as an innovation that brings convenience in the world of banking.
Analytical method and theory development	Used as a theoretical tool to shape the research study, form research questions, collect and analyse data.	It is focused on the case of mobile banking technology, sampling the appropriate population and guided the researcher to ask the applicable questions.
Generalised Symmetry (agnosticism)	Harry, Sewchurran and Brown (2014) refer to generalised symmetry as the use of a single repertoire to describe human and non-human actors by the researcher(s), eliminating favouritism.	All actors (both human and non-human) were treated the same, without prioritising one over the other. All networks that were aligned to the key actors were traced to the point of interest defined in the study.
Enrolment	Here the roles are assigned to actors, based on their interests in the network (Adaba & Ayoung, 2017).	This follows the process of how actors were enrolled into a network (Cresswell, Worth & Sheikh, 2010). Also, how the roles evolved with time. For example, elderly users attempting to access a bank statement using a mobile device.

The translation process is critical in this study as it contributes to understanding how actors connect and interact in different networks. In a case where new artefacts are introduced in a context, it can inform or guide the sampling deliberations (Cresswell, Worth & Sheikh, 2010). When new technology is introduced such as mobile banking, those receiving it are said to go through moments of translation. There is no guarantee that the newly formed network will be successful, innovation may generate resistance, which is a common

consumer behaviour (Mohammadi, 2015). For a network to be stable, the translation needs to occur. Callon (2014) proposes 4 phases involved in the translation process (namely: Problematisation; Interressment; Enrolment; and Mobilisation), which are discussed briefly below.

- Problematisation is the process of identifying all key actors and the problem. The solution is thereafter proposed. In this study, the problem could be defined as low adoption of mobile banking by the elderly and then suggesting a user-friendly design of mobile banking technology or incorporating assistive technologies.
- Interessment involves influencing other actors that the defined problem in the problematisation together with the solution is in their interest (Adaba & Ayoung, 2017); this phase is about convincing other actors to join the network. Interessment is a second phase whereby the focal actor convinces other actors to agree on and accept the definition of the focal actor (Callon, 1986). ANT recommends the process of aligning the interests of the actors in the network to include the translation of those interests into a shared interest in adopting and using the technology (Mcbride, 2003). In this case, the interests of mobile banking, therefore, need to reflect and be linked to the network associated with the interests of the elderly clients. Translation can be achieved by shared meanings and inscription attached to mobile banking technology.
- Enrolment focuses on strategies that allow actors to enrol in new networks or factors that enable successful translation (Callon, 2014), and how relationships change over time. This process results from successful interessment where actors have accepted their roles.
- Mobilisation is when the actors have accepted the proposed solutions and are now convinced to follow the rules to stabilise the network.

3.3 ACTOR-NETWORK THEORY IN THIS RESEARCH

The ANT has been extensively applied in information systems research (Mcbride, 2003; Mwenya & Brown, 2017). Consequently, this approach is plausible for breaking boundaries by addressing the problems internally and defining both Information Technology and end-users as relational networks (Cordella & Shaikh, 2003). When applying ANT in IS research, Walsham (1997) argues that the social and technical elements should be treated as inseparable and suggested that both human and non-human actors should be analysed using the same conceptual or theoretical apparatus. In the field of IS research, studies such

as Mcbride (2003), Tatnall and Burgess (2004) and Arif, Sidek and Abu Bakar (2017a) have drawn on the ANT concept to investigate the developments, adoption and acceptance of IT technologies within different settings. Lepa and Tatnall (2006) used ANT to understand Virtual Community Networks of older people with the primary aim of understanding how the elderly adopt e-commerce. While Cresswell, Worth and Sheikh (2010) have applied ANT to understand the implementation of information technology trends in the healthcare sector, Paledi and Alexander (2018) applied the theory to understand the readiness for mobile learning in South African universities. These researchers focused only on one concept of ANT, namely the inscription to support the strategies that need to be inscribed in mobile learning policies for successful implementation of this technology. Adaba and Ayoung (2017) highlight the value ANT contributes to an investigation of the dispersion of emerging technologies in ICT for development (ICT4D) research.

In mobile commerce and banking, ANT has been widely used as a lens to understand acceptance, adoption and use of digital money, mobile banking and mobile payments (Anong & Kunovskaya, 2013; Harry, Sewchurran & Brown, 2014; Seifert, 2015; Kemal, 2016; Mulwa & Waema, 2016; Adaba & Ayoung, 2017). A study by Harry, Sewchurran and Brown (2014) used ANT to investigate "how is a mobile payment system introduced to a mobile subscriber market in an emerging economy". Mulwa and Waema (2016) used it to identify and follow the key actors involved in the execution of mobile banking services. ANT has also been applied by Adaba and Ayoung (2017) to understand the dynamics of the development and diffusion of mobile money service. Table 3.3 summarises how ANT has been applied in previous mobile banking studies.

Table 3.3 Applications of ANT in Mobile Commerce and Banking studies

Author(s)	Study title	How ANT has been applied in Mobile banking studies
Mulwa and Waema, 2016	Understanding Mobile Banking from a Theoretical Lens: Case Studies of Selected Kenyan m-banking Products	ANT was used as a lens to address the distribution of mobile banking products. Furthermore, ANT was used to identify and follow actors in this network and aligning the interest of all the actors.
Lee and Oh, 2005	How Technology Shapes the Actor-Network of Convergence Services: A Case of Mobile Banking	ANT was applied to show how technology shapes the consumption of mobile banking and to elaborate on relations and competition

Author(s)	Study title	How ANT has been applied in Mobile banking studies
		between the actors involved in the distribution of mobile banking.
Lee, *Harindranath, Oh and Kim,* 2015	Provision of mobile banking services from an actor-network perspective: Implications for convergence and standardisation	ANT was used as an interpretive lens to analyse the process of merging and integrating multiple players into a new network or system, which is realised through interactions among the involved actants. ANT was also used to analyse how actors form alliances and enrol other actors to secure their interests.
Harry, Sewchurran and Brown, 2014	Introducing a mobile payment system to an emerging economy's mobile phone subscriber market. An actor-network perspective	ANT was used as the theoretical lens, leading to an understanding of the networks formed amongst the actors affected by the introduction of the mobile payment system.
Adaba and Ayoung, 2017	The development of a mobile money service: an exploratory actor-network study	The ANT perspective was applied in an attempt to understand the socio-technical processes and dynamics that shape the continued use of mobile money.

3.4 WHY DOES ANT APPLY TO THIS STUDY

Researchers often ask themselves about the role of theory in their study, regardless of the philosophical stance (Walsham, 1995). Walsham (1995) identifies three different uses of theory in research: as an initial guide to design and data collection; as part of an iterative process of data collection and analysis; and as a final product of the research. The motivation for this study is to contribute to the discourse on the adoption of mobile banking using ANT. This theory is asserted to be influential in IS studies (Kemal, 2016), and it is anticipated that it may be significant and beneficial in this exploratory study and its objectives. In the case under investigation, the main actors are the elderly and mobile banking, and the researcher aims to understand the relationship between these and other actors using ANT as a lens. Mobile banking is reliant on the exchange of digital financial information through several networks (Mulwa & Waema, 2016). Subsequently, the relation remains unreliable and unstable and since the shift happens due to entrance of new entities or actors such as new technology trends or products, the network is bound to change or

shift responding to different influences. In addition, the enrolment of other actors is needed to mobilise the actor-network particularly the role played by designers or developers as actors in this network. These roleplayers engineer the ICT technical artefact and embody into the artefact the way it is used, their intention, their vision of the society, and the world in which the artefact best fits (Lee *et al.*, 2015), hence the application of this theory. They inscribe the interest of the focal actors hoping they will align with those of other actors. The depth of the inscriptions should be able to form a irreversible networks (Mpazanje, Sewchurran and Brown, 2013).

ANT is known for its in-depth research focusing on connections formed and re-formed between human and non-human entities under investigation. The new relationships and dynamic partnership can be better understood using this theory. The discourse related to the complex nature of mobile banking (Kemal, 2016) and its association in society is dominant to form the theoretical framework for this research study. Thus, the ANT lens was adopted to guide an interpretive view to examine mobile banking adoption among the elderly in SA. ANT has previously been adopted to investigate the use of online technologies (Arif *et al*., 2017), and is adopted in the present study to investigate the use of mobile technology. Arif *et al*. (2017) suggest three advantages of using ANT in such studies, namely: the ability to explain complex mechanism; ability to identify failure factors; and ability to present a holistic picture with a variety of interrelated factors. From the ANT perspective, the researcher was supported in naturally collecting textual or verbal data from human actors by using qualitative interviews (Cresswell, Worth & Sheikh, 2010). This study applies ANT to enable the researcher to explore the inter-connections between elderly consumers, banks and the mobile banking technology they use and how this association impacts their lives and those around them. Furthermore, ANT was applied to explore and theorise about how relationships come to exist, re-debated or cease to exist (Doolin & Lowe, 2002).

Lee and Oh (2005) suggest the existence of a link between ANT and the emergence of new, converged services. From the ANT perspective, the adoption and use of mobile banking is a process of establishing a human and non-human network through the process of translation. During this process, the outcome is not clear as it cannot be pre-defined how the actors will collaborate and negotiate their place in the network. Hence, actants are not confined into any system or account to any pre-existing structures; instead, they act as a

coordinated network (Shim & Shin, 2016). ANT is adopted to identify dynamic interactions between technology and other actors (Anong & Kunovskaya, 2013) such as the elderly involved in mobile banking. Furthermore, ANT is used to study actors involved in negotiating mobile banking, to understand how the actor-network is built, and to understand how social issues influence the adoption of mobile banking particularly by the elderly. Lee and Oh (2005) suggest the existence of a link between ANT and the emergence of new, converged services. From the ANT perspective, the adoption and use of mobile banking is a process of establishing a human and non-human network through the process of translation. During this process, the outcome is not clear as it cannot be pre-defined how the actors will collaborate and negotiate their place in the network. Hence, actants are not confined into any system or account to any pre-existing structures; instead, they act as a coordinated network (Shim & Shin, 2016). Lee and Oh (2005) suggest the existence of a link between ANT and the emergence of new, converged services. From the ANT perspective, the adoption and use of mobile banking is a process of establishing a human and non-human network through the process of translation, hence this ANT conce. During this process, the outcome is not clear as it cannot be pre-defined how the actors will collaborate and negotiate their place in the network. Hence, actants are not confined into any system or account to any pre-existing structures; instead, they act as a coordinated network (Shim & Shin, 2016).

3.5 CONCLUSION

This Chapter discussed in detail the ANT as a theoretical framework guiding this study. The Chapter also looked at how the theory has been applied in the IS field of research and how the theory has been used to study mobile commerce and, mobile banking. The contribution of ANT towards studying IT artefacts and humans was noted, and the researcher highlighted the appropriateness of the theory for this area of research which remains pertinent and yet overlooked. The next Chapter provides details on the research methodology adopted for this study.

CHAPTER 4

4 RESEARCH METHODOLOGY

This Chapter presents the research design and approach that were adopted for conducting the study.

4.1 INTRODUCTION

The research methodology provides a map of the overall research study process. It gives a layout of how the research is designed, the research approach suitable for the study, how the sample was selected, and how data was collected and analysed. A research strategy or methodology is shaped by the nature of the research questions and phenomena of interest (Denzin & Lincoln, 2005). Moreover, research is guided by fundamental philosophical assumptions with regards to what constitutes the valid truth or reality in the given study. This Chapter details the research paradigm and strategies underpinning the study. Additionally, it discusses the identified approaches that were used for data collection and analysis.

4.2 RESEARCH DESIGN

Burns and Grove (2003:125) assert that "*Research design can be described as a strategy guiding the study with increased control on factors that might tamper with the credibility of the findings*". It is a plan that illustrates how data will be collected and from whom it will be collected; it is inclusive of methodologies and procedures of data collection and data analysis. The research philosophy or paradigm are systems or assumptions that guide the development of knowledge. Four elements are said to form a research paradigm: epistemology, ontology, methodology and axiology. Paradigm can be translated into "patterns" used for the formulation of a conceptual framework used by scientists to solve problems. In research, a paradigm refers to the researcher's world view. Worldviews are the perspectives, school of thought, or set of shared beliefs, that informs the meaning or interpretation of research data (Kivunja & Kuyini, 2017). The research paradigm can emerge from a positivist approach, which is mostly used in a quantitative study or an interpretivist approach that is normally adopted in a qualitative study. A summary of the different philosophical assumptions is shown in Table 4.1:

Table 4.1 Summary of the philosophical assumption

Research Paradigm	Philosophical assumptions				
	Paradigm	**Ontology**	**Epistemology**	**Axiology**	**Methodology**
	Positivism	Dominated by rules	Focus on reliable and valid tools to undercover rules	Positivism, Post-positivism	Experimental research, Survey research
	Interpretivism	Reality created by individuals in groups	Discover the causal meaning of events and activities	Interpretivism-reality should be interpreted	Ethnography, Grounded Theory
	Critical	Society is rife with inequalities and injustice	Assist to uncover injustice and empowering individuals	Feminism	Critical discourse analysis, Critical ethnography
	Pragmatism	Truth is what is useful	The right method is the one that answers the question	Research through design	Design-based, Mixed method

Source: Creswell (2007)

Two possible worldviews exist, namely: objective view which supports the positivism, and subjective view supporting interpretivism. In other cases, both views can be adopted in a single study as complementary. In the view of the current situation, the researcher adopted a subjective stance towards the reality being investigated; therefore, the interpretive philosophical approach is deemed appropriate for this research study.

4.3 INTERPRETIVE PHILOSOPHY

In this study, the researcher aims to study mobile banking adoption using the inductive approach and argues that the interpretivist perspective is fit for such a study. Interpretivist researchers are certain that reality can solely be retrieved through social constructions using shared meanings (Tatnall and Gilding, 1999). The use of the interpretive perspective enabled the researcher to understand social and critical issues related to the adoption of mobile banking technology. The main characteristic of interpretive research is understanding that the nature of reality is not singular (Goldkuhl, 2004), but is rather shaped by human experiences and the society. Assuming a subjective epistemology, the investigator creates the meaning of data through their intellectual understanding of the informed data during conversations with participants (Kivunja & Kuyini, 2017).

The study aims to understand the factors and reasons behind the low adoption of mobile banking by the elderly. The interpretivism philosophy, therefore, assisted in explaining the experiences of social actors in the phenomena of interest since there is no existing set of hypotheses to be tested. This study was not aimed at testing any hypothesis or theory but at understanding the experiences of the actors involved and creating meaning behind a situation, and the interpretivist philosophy supported the researcher and the objectives of the research study. The researcher seeks to understand the user interaction between the elderly and mobile banking, to gain knowledge on how technology can be improved to meet the needs of the elderly consumers. The adopted assumption is significant in answering the research question and to understand the problem being investigated. Klein and Myers (1999) propose seven (7) principles of conducting an interpretive research study, which are based on the fundamental principle of the hermeneutic circle. The hermeneutic circle suggests an understanding of the complex whole from preconceptions about the meanings of its parts and their interrelationships. A summary of principles as proposed by Klein and Myers (1999) are documented in Table 4.2.

Table 4.2 Summary of Principles for conducting interpretive research

#	Principles of interpretive field research
1.	**The fundamental principle of Hermeneutic circle** This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of part and the whole that they form.
2.	**The principle of contextualisation** Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.
3.	**The principle of interaction between the researchers and the subjects** Requires critical reflection on how the research materials or data were socially constructed through the interaction between the researchers and participants.
4.	**The principle of abstraction and generalisation** Requires relating the idiographic details revealed by the data interpretation through the application of principles **1** and **2** to theoretical, general concepts that describe the nature of human understanding and social action.
5.	**The principle of dialogical reasoning.** Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings with subsequent cycles of revision.
6.	**The principle of multiple interpretations.** Requires sensitivity to possible differences in interpretations among the participants that are typically expressed in multiple narratives or stories of the same sequence of events under study.
7.	**The principle of suspicion.** Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.

Source: Klein and Myers (1999)

Researchers are advised to use their judgement when applying the listed principles (Klein & Myers, 1999).

4.4 QUALITATIVE STUDY

The qualitative method is normally used to discover the “why” or “how” a phenomenon occurs, to develop a theory, to make sense of individuals shared experiences, while quantitative approach addresses questions about causality, generalizability, or magnitude of effect (Fetters, Curry and Creswell, 2013). This method is significant when the researcher is attempting to understand an individual's beliefs, attitude, experiences and behaviour. The qualitative method follows a naturalistic approach in understanding the everyday lives of the individuals in a natural setting, henceforth it is fit in this research study. Guba (1981:76) proposes that "*it is proper to select that paradigm whose assumptions are best met by phenomenon being investigated*”.

The current situation focuses on elderly consumers and their experiences with mobile banking. The qualitative approach is appropriate in understanding perceptions in the setting through personal interactions. The focus is on participants’ manifold perceptions, meanings behind events and the researcher’s understanding of things. The qualitative approach can also better overcome the complexity that may exist within the group during the setting. However, this approach lacks some level of neutrality since the researcher can influence the pattern of interaction. Furthermore, the constructed reality is not stable but may exist for a specific context. Changes in technology permit new knowledge development and new relationships are formed and the truth is re-debated. The behaviour of an individual cannot be predicted, or numerically measured. The use of quantitative approach could limit the understanding of participant’s experiences and insights, which the researcher desired to understand in order to address issues around mobile banking. Themes within qualitative data are then presented followed by thematic analysis (Maguire & Delahunt, 2017).

4.5 TIME FRAME

The researcher has the option of conducting the study over a short or extended period. The study was done cross-sectionally with the intention of understanding and describing what is currently happening with mobile banking and the elderly. The data was collected within a period of four months (November 2019 to February 2020). All respondents were interviewed once due to a fairly large number of respondents that participated in the data collection process. Engaging with the elderly at homes and churches allowed the researcher to finish

data collection within the timeline required for the Master's degree and to have a diverse group of respondents for focus groups.

4.6 TARGET POPULATION

The respondents that participated in the study were the targeted population, which is the elderly in SA. The purpose was to gather their experiences and opinions regarding mobile banking.

4.7 SAMPLING

A sample refers to the share of the population, which is often selected from human beings with the purpose of studying it. According to Sharma (2017), sampling is a procedure or technique used in research to scientifically select a portion of representative individuals from a pre-defined population to serve as data sources for experimentation or observation in line with objectives of the study. In addition, Sharma (2017) suggests that the following aspects need to be considered when sampling data sources:

a) Objectives and nature of the research study;
b) Precision of desired results;
c) Size of the population;
d) Financial feasibility of the study; and
e) Heterogeneity and non-uniformity of the universe.

Banerjee and Chaudhury (2010) suggest that when selecting a sample population for a research study, the purpose or research questions of the study should allow a definition of the suitable population to be studied in terms of restrictions in age group and location, gender or occupation. Therefore, the population plays an important role in the research study to ensure that the collected data is appropriate to answer the research question in order to achieve the research objectives.

4.7.1 Sampling Method

Sample selection in a qualitative study has an impact on the quality of data collected. The researcher should be able to select participants that will be able to contribute to the topic being investigated. Marshall (1996:523) alludes to the fact that "*there are three broad approaches to selecting a sample for a qualitative study*": convenience sample; judgement

sample; and theoretical sample, which is often interchanged with judgement sampling. According to Morse (1991), four approaches can be used for sampling in a qualitative study: purposeful sampling, nominated sampling, volunteer sampling and total population sampling. Both Marshall (1996) and Morse (1991) see purposeful and theoretical sampling as synonymous where participants are sampled for their knowledge and experiences. In selecting the participants, the researcher must consider the needs of the research study and choose the right approach to sample the population. Convenience and purposive sampling were applied in this research study.

4.7.1.1 Convenience sampling

This sampling method allows the researcher to select the most accessible participants. The benefits of this method are it is less time-consuming and cost-effective. Even though this method may be criticised and it sometimes generates poor data, the significant and pronounced benefit of having the capacity to collect data where access is less permitted and data sources are scarce cannot be ignored.

4.7.1.2 Judgement sampling (also known as purposive sampling)

The use of purposive sampling for the qualitative study is a common practice (Roberts, 1997). The researcher selects the subjects that are accustomed to the topic of interest to answer the research questions. The researcher uses his/her judgement when selecting units to be studied.

The significant advantage of using purposive sampling is that generalisation becomes easier since participants have the characteristics that are being studied. In reference to selected participants, Sharma (2017:51) asserts that "*they can provide researchers with the justification to make generalisations from the sample that is being studied, whether such generalisations are theoretical, analytical and logical in nature*". The following disadvantages of this method are noted:

- The researcher can be biased when selecting data sources as it highly depends on the judgement of the researcher.
- The researcher might find it difficult to convince the audience on the appropriateness of selected units, thus discrediting the study on achieving the analytical/theoretical/logical generalisation (Sharma, 2017).

4.7.2 Study Setting

Judgement or purposive sampling was used in this research study. The researcher purposefully identified the elderly bank consumers within the region of KwaZulu Natal in SA using the following strategies:

- The participants had to be 60 years old or above.
- The participants must at least have had a smartphone and a bank account.

Through collaborations with municipality management, the researcher obtained access to different organisations that deal with the elderly such as church leaders and Old Aged homes, which allowed the researcher to spend enough time to understand the elderly and their perceptions of mobile banking. The researcher was able to access three churches and two Old Aged homes located in Durban. A Memorandum of Understanding (MOU) sample that was signed with one of the aged homes is presented as Appendix A. The interviews were conducted at the Old Aged home premises as respondents were staying there, as well as at church premises being the convenient and safe place for most respondents to meet.

A map of the KwaZulu Natal Province showing the research sites for this study is depicted in Figure 4.1. Most primary data was collected in the Durban area, located in eThekwini Municipality. The choice of using Durban as a research site was influenced by the familiarity the researcher has about the area and fluency in dominating spoken languages.

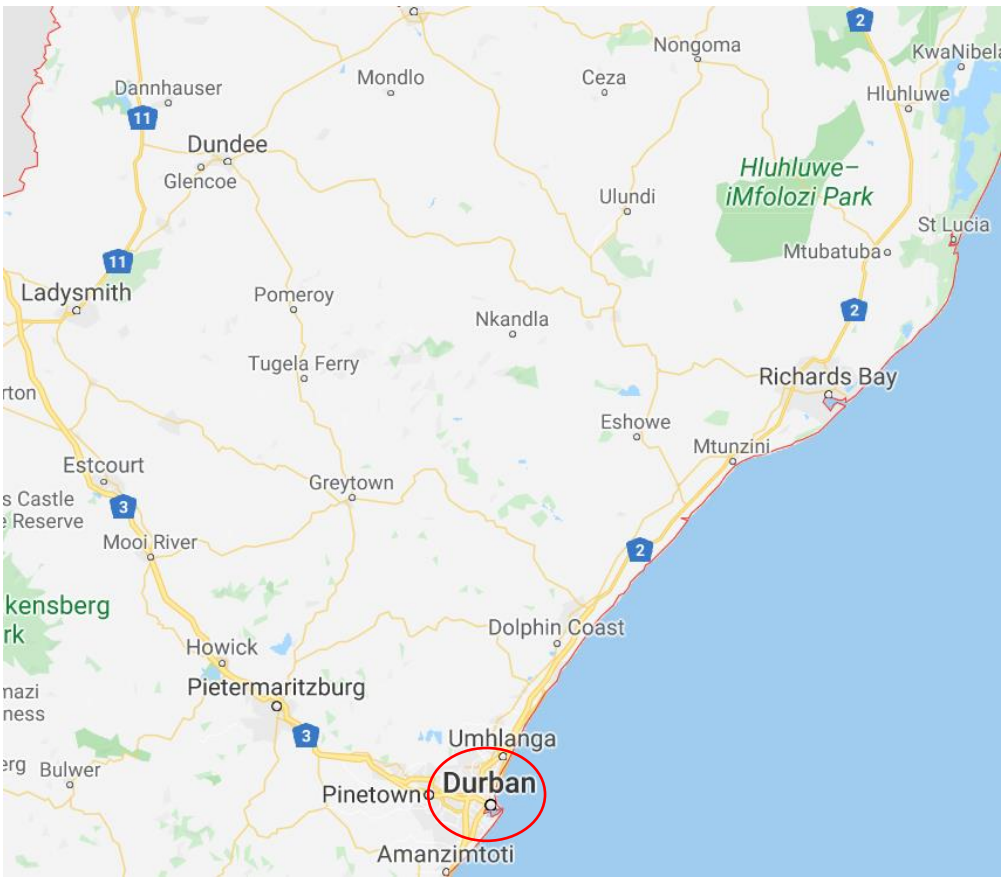

Figure 4.1 Map of KwaZulu Natal showing the research sites

4.7.3 Sample size

There is generally no prescribed subject size for a research study. As far as Marshall (1996:523) is concerned, "*An appropriate sample size for a qualitative study is one that adequately answers the research question*". Four (4) focus groups were held for this study, and each focus group session had a minimum of five (5) elderly respondents to discuss their experiences and perceptions with regards to mobile banking. Group members are likely to challenge each other; for this reason, it was envisaged that smaller manageable focus group discussions consisting a minimum of five (5) and maximum of ten (10) participants would provide more insight without necessarily wasting time on debates. Over and above the focus group discussions, a total of eight (8) individual interviews were conducted. With regards to demographics, the study had more female respondents as compared to male respondents. Other demographics such as race and education were not recorded for the purposes of this study.

4.8 DATA COLLECTION

The goal of all qualitative inquiry is to understand a phenomenon, rather than to generalise from the study sample (Forman & Damschroder, 2007). Guided by the formed theory, the study assumed focus groups and individual interviews as a method for the collection of primary data. The secondary data was also collected from the existing body of knowledge using a Systematic Literature Review (SLR). The purpose of the SLR was to answer the two sub-questions (RSQ1 and RSQ2). Using the Actor-Network Theory as the conceptual theory for this work provided broader and better insight as well as in-depth knowledge on this less investigated research area. Given the fact that a qualitative inquiry is intended to understand a phenomenon and not to generalise using the study sample (Forman & Damschroder, 2007), receiving the data directly from the subjects has proven to be a very fulfilling and rewarding experience, especially for this study. Suffice to say that this approach is in line with the aim of this study, that is, aimed to understand the factors and reasons behind the low adoption of mobile banking by the elderly. Interpretivist researchers collect textual data using different approaches that fit the study. In most cases, focus groups and interviews are used to gather data from participants. As already stated, in this research study, data was collected during a discussion with the respondents using focus groups and in-depth (one-on-one) interviews. The researcher had conversations with the respondents to understand their feelings and attitude about the study topic.

4.8.1 Data collection and ANT

A theory can be used as a practical guide for data collection or as part of an iterative process for the collection and analysis of data (Walsham, 1997). Applying ANT as a lens, Cordella and Shaikh (2003) maintain that this theory has been applied more as a method for data collection and analysis in interpretative research while its capacity as an ontology to inform IS research has been overlooked. Macleod, Cameron, Ajjawi, Kits and Tummons (2019) note issues concerning the epistemology with regards to a researcher undertaking an interpretive study informed by ANT. The interpretive approach recognises that most researchers are influenced by their preconceptions when conducting data collection and analysis (Klein & Myers, 1999). Even though the researcher can influence the nature of the conversation taking place (Paradis & Sutkin, 2017), the key ontological principle is that a reality exists that is independent of the researcher (Macleod *et al.*, 2019).

It has been acknowledged that there are differences in ontological assumptions of ANT and interpretivist. The fundamental assumptions made by ANT is that realities are all effects generated by connections or associations of diverse entities, followed by dualism (equality of human and non-human) (Callon, 1986). Interpretivists believe that the reality is multiple and socially constructed (Walsham, 1995). The multiple realities depend on other systems for meanings which are often challenging to interpret. The researcher enters the field with preconceptions of the context under investigation but assumes that it inadequate to develop a research strategy due to multiple natures that are complex, unstable and unpredictable but interpreted as reality. Interpretivists remain mindful of new realities and knowledge throughout the inquiry study and allow development to occur with the help of study respondents.

The work of an ANT informed interpretive study is to discover an assemblage continuous, evolving and emerging everyday reality. Therefore, the interpretivist researcher becomes part of the study.

Similarly, in this study ANT supported the use of key actor interviews as part of research methodology to follow the actors. The ANT informed interviews, allowing the researcher to reassess, and differently explore the nature of the situation under investigation. Since this research is about identifying the enablers and barriers to the adoption of mobile banking by the elderly, ANT has been applied as a methodological tool to assist the researcher to identify the actants “or actors” involved in negotiations within the mobile banking network. Furthermore, ANT assisted with the conceptualisation of how different realities are experienced and enacted by different actors (Cresswell, Worth & Sheikh, 2010).

Latour (1999) alludes to the fact that from its establishment, ANT has been positioned as a tool to acquire knowledge from the actants themselves without imposing any prior definition of their network-building abilities. Considering the nature of the ANT framework, actants are involved in their own ‘world-building activities’, and the researchers should, therefore, avoid using methods that are deemed to impose any unilateral form of interaction with the actors (Law, 1987). Associations within networks cannot be identified before the research network, hence the study posed this question during the interviews “in your understanding, what is mobile banking?”. Such questions are an indication that the researcher has not assumed a

unilateral interaction. ANT is well suited to understand the emerging areas which are deemed to be complex and overlooked. This allows the researcher to ask questions while avoiding making assumptions. Considering key concepts of ANT, inscription focus on how actants associate or form values towards mobile banking technology or how technology providers inscribe the functionalities (Mcbride, 2003). To establish how the mobile banking network of actors can come to existence, the researcher questions how the interest of key actors can be aligned with those of other actors by incorporating ANT concepts especially moments of translation. The concepts argue the need to address factors influencing the adoption of mobile banking, therefore, the research questions had to be aligned with this need. The interview guiding questions (interview protocol) had to address the inscriptions and how they would translate to actor's interests and those of network. The mobile banking actor-network focuses on reaching an agreement of how the mobile banking should be designed and introduced for the elderly to adopt it.

4.8.2 SLR

An SLR can be described as a pre-defined plan to assess any subject following a specific order (Jones & Evans, 2000). It is aimed at finding all the research articles aimed at answering a specific research question and to minimise bias on the selection of literature (Nightingale, 2009). Siddaway, Wood and Hedges (2019) identified four characteristics of the SLR namely, methodical, comprehensive, transparent and replicable. Put differently, SLR involves a process of identifying published and unpublished research articles to address a research question. A SLR does not seek to produce new knowledge but rather to synthesise and summarise existing knowledge (Aromataris & Pearson, 2014). In the views of Booth (1996), a SLR can assist to define the evidence with the capacity to state what is known, and not known, about the phenomena of interest. Jahan and Naveed (2016) also emphasise that a SLR is known for its ability to contribute to the knowledge of the scientific community particularly when there are gaps in the existing knowledge. Furthermore, it can be applied to minimise subjectivity and biases (Siddaway, Wood & Hedges, 2019). Conducting an SLR can be challenging, especially for inexperienced researchers; therefore, understanding the steps involved in an SLR is crucial (Tawfik, Agus, Dila, Yousif and Mohamed, 2019). The five steps to be followed when conducting an SLR as suggested by Khan, Kunz, Kleijnen and Antes (2003) are listed in Table 4.3.

Table 4.3 Five steps to conducting a systematic review

Step	Description
Step 1: Framing questions for a review	The problem or research question to be addressed should be pre-defined. After setting the research questions, adjustments to the guiding protocol can be allowed only if it is necessary.
Step 2: Identifying relevant work	The search for research studies should be conducted extensively. Multiple databases and other resources (both computerised and printed) should be searched, without language restrictions where possible. Inclusion and exclusion criteria should be stated and linked to research objectives.
Step 3: Assessing the quality of studies	Quality assessment of all research studies is relevant and important for every step of the SLR. Research question (Step 1) and selection criteria (Step 2) should describe the minimum requirements of study acceptance. Selected studies should be subjected to a more refined quality assessment by use of general critical appraisal guides and design-based quality checklists (Step 3). These detailed quality assessments will be used for exploring heterogeneity and informing decisions regarding the suitability of meta-analysis (Step 4). In addition, the quality assessments assist in assessing the strength of inferences and making recommendations for future research (Step 5).
Step 4: Summarising the evidence	Data synthesis consists of tabulation of study characteristics, quality and effects as well as the use of statistical methods for exploring differences between studies and combining their effects (meta-analysis). Exploration of heterogeneity and its sources should be pre-planned (Step 3).
Step 5: Interpreting the findings	The issues highlighted in each of the four steps above should be met. The biases associated with publication should be explored. Exploration for heterogeneity should help determine whether the overall summary can be trusted, and, if not, the effects observed in high quality studies should be used for generating inferences. Any recommendations should be graded by reference to the strengths and weaknesses of the evidence.

The PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) flow chart can be used to show how the systematic review was conducted, detailing the number of articles that were processed in each phase. The different phases for conducting a flow chart are illustrated in Figure 4.2.

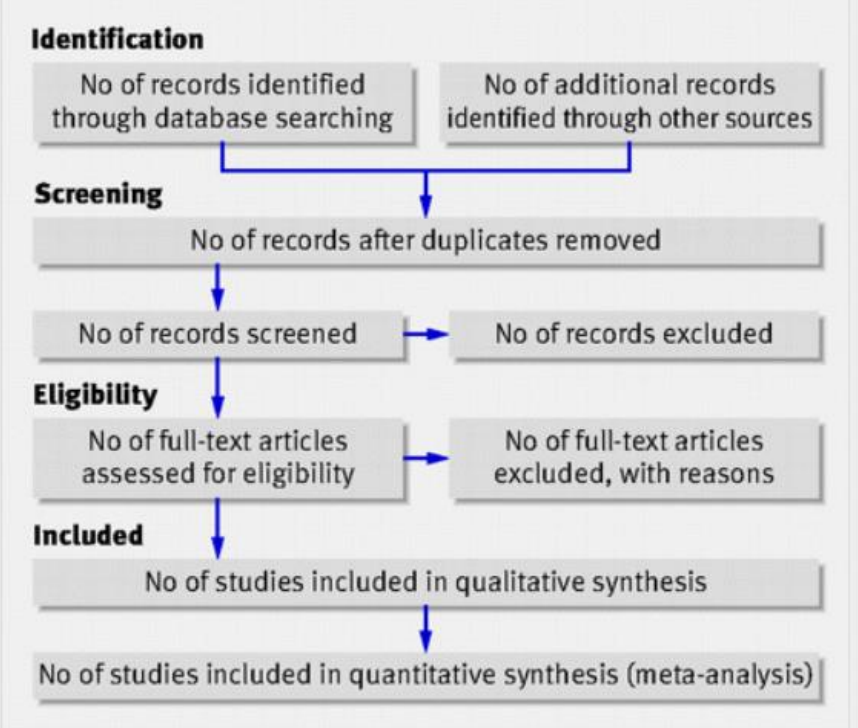

Figure 4.2 Phases of conducting a SLR

In this study, the SLR was conducted to find out how mobile commerce and the elderly have been investigated and what were the findings to inform and complement the present study.

4.8.3 Interviews

Generally, the interviews allow the researchers to collect perceptions to better understand how ordinary individuals live, work and learn and try to make sense out of it. Macleod *et al.* (2019) concur by suggesting that interviews are socially designed to prompt and understand the performative entanglement of human actors and non-human actors, in a sense that verbal data is conceptualised. Therefore, ANT informed researchers are cautious when conducting interviews where participants are labelled as vulnerable.

In this study, interviews were conducted in the form of focus groups and individual interviews.

4.8.4 Focus groups

A focus group is a qualitative research method whereby a group of demographically diverse people are brought together to study their opinions, reactions and attitude to a new product

or service. In this type of research, respondents are carefully chosen based on the criteria that they can relate with the topic discussed, they meet the age-range criteria, have similar social characteristics and would be comfortable to discuss the matter with the interviewer and other respondents (Richardson & Rabiee, 2001). The underlying strength of using focus group interviews is provided by group dynamics and conversations taking place, allowing the researcher to elaborate on individual's perspectives for the topic under discussion (Smithson, 2000). It is important to select the group members carefully for interactions within the group to succeed and diverse group to work (Doody, Slevin & Taggart, 2013).

During the focus group meeting, the participants and the researcher can have a conversation about the phenomena. It is an open-minded process where participants can elaborate on their feelings or emotions and opinions about mobile banking. Stewart and Shamdasani (2014) suggest that the validity and effectiveness of data collected from focus groups depend on participants' comfort to willingly talk about their views, opinions and experience. Participants can share their challenges and needs and those with similar challenges can share their views on the matter. Importantly, participants can also suggest technology improvement strategies to overcome the digital divide. Doody, Slevin and Taggart (2013) are of the view that group conversations may identify participants' differences and similarities, thus giving invaluable information on their experiences and perspectives. During this process, the researcher is able to draw data from the conversations and a range of views can be generated to answer the research questions.

A focus group has numerous benefits as a qualitative data collection method. According to Smithson (2000), the researcher can ask questions and probe for further explanation to generate a specific type of data. With assumed qualitative nature, the focus group gives the investigator insights that are bigger than numbers and facts obtained in quantitative research; new facts can be obtained and confirmed through common patterns (Mansell*, Brint, Gould, O'Neill & Hertzog*, 2004). However, like any other data collection tool, a focus group also has its disadvantages. The following disadvantages of a focus group are noted:

- The researcher might have a problem handling a group of participants compared to dealing with one person at a time.
- Modest participants may be intimidated by those who speak openly and those who like to dominate the conversation.

- This method is time-consuming and the researcher might take a while to complete data collection and analysis.

4.8.5 One-on-one interviews (also referred to as in-depth interviews)

The one-to-one interview is asocial interaction, and the relationship between the interviewer and interviewee is of paramount importance in ensuring the process is successful (Ryan, Coughlan & Cronin, 2009). An interview is one of the approaches used in this study to generate data from the participants. Interviews are done face-to-face, exposing the interviewee's body language and allowing the interviewer to observe reactions towards questions and information being shared. One of the advantages of this method is that it can be conducted telephonically, thus overcoming several issues. Since this research study is focused on the elderly, the environmental setting can be uncomfortable for other participants to disclose their challenges or in-capabilities when using mobile banking technology. To counter such challenges, interviewers and researchers can build positive associations with participants guaranteeing comfort and trust, which in exchange smoothens the conversation when discussing sensitive issues (Ryan, Coughlan and Cronin, 2009). The interviewee can express themselves without the influence of other group members or peers; as a result, experiences can be collected without any prejudice from other participants. The data that is analysed in Chapters 5 and 6 was sourced from the sources listed in Table 4.4.

Table 4.4 Data Sources

Event	Description
Period of data collection	(October 2019 – February 2020)
Primary Data sources	Interviews
Secondary Data Sources	Research articles (2009-2019)
Number of group interviews	4 x Groups of elderly (each with a minimum of 5)
Number of Individual interviews	8 Individual Interviews
Actors	Human Actors • Elderly consumers Non-Human Actors • Mobile bank app • Bank • Mobile device (e.g. Smartphone, iPad)

4.9 DATA ANALYSIS

Morse (2015) recommends that strategies employed for data analysis must fit the method used in the study. This study evaluated two sources of data, namely primary data from group conversations and in-depth interviews. Additionally, secondary data was sourced from the existing literature through a SLR. Analysing data includes assessing and interpreting collected data using different instruments to reach the goal of a research study. On one hand, analysing quantitative data involves manipulating raw data giving it meaning through calculation of frequencies of variables. On the other hand, qualitative data analysis is targeted towards the evaluation of diverse data patterns such as focus group notes, interview recordings, photographs, meeting minutes, answers from open-ended questions, observational field notes or other documents. Smithson (2000) suggests that focus group data should not be taken as naturally occurring conversation, but as conversations in a controlled setting. Qualitative data provides more insight and understanding than what quantitative data can offer. Malina, Nrreklit and Selto (2011) stipulate that qualitative data analysis should bring meaning and understanding to the research questions. The study embraced the ANT towards data analysis, more specifically the “moments of translation” (Callon, 1999) were adopted. ANT supported the researcher to analyse explanations provided by the theory to the research questions, identifying common patterns within the responses of the participants through the use of thematic analysis. Interpretive data was analysed in alignment with ANT concepts. Unlike quantitative methods that display statistical analysis of data, qualitative methods display a narrative description. Use of thematic analysis was influenced by the following reasons:

- Directed by the interest to address research questions;
- Was theoretically informed to explore the adoption of mobile banking; and
- Intention to generate and interpret themes from textual data.

4.9.1 Thematic analysis

The study applies the thematic analysis method to analyse data by searching across a dataset that included individual interviews and focus groups to find repeated patterns of meaning. Thematic analysis is a progression of identifying and drawing patterns and themes within qualitative data (Maguire and Delahunt, 2017) and it been widely used in interpretive studies and highly recommended by Braun and Clarke (2006). It is suggested that thematic analysis is a realistic method to report on experiences and reality of participants (Braun &

Clarke, 2006). Thematic analysis has been praised for being flexible (Braun and Clarke, 2014), denoting that it is not tied to a specific theoretical perspective or epistemology (Maguire & Delahunt, 2017). In addition, it can be implemented in various ways (Braun & Clarke, 2006). Braun and Clarke (2014:57) pronounce that "*Thematic analysis allows the researcher to see and make sense of collective or shared meanings and experiences*". Thus, it is believed that the thematic analysis supported the analysis and assisted the researcher to understand conversations and shared experiences during focus group sessions. Additionally, thematic analysis can produce rich insights and trustworthy findings (Braun and Clarke, 2006). Braun and Clarke (2006) propose a six-phase framework for conducting thematic analysis, which can be implemented back and forth in an iterative manner. The steps involved in the framework suggested by Maguire and Delahunt (2017) are listed in Table 4.6

Table 4.5 Framework for conducting Thematic Analysis

Step	Description
1: Becoming familiar with data	The qualitative analysis involves thorough reading of transcripts so that the researcher can get used to the data corpus the researcher is working with.
2: Generate initial codes	This step produces codes from data by allowing the researcher to simplify and extract specific features of data (Nowell*, Norris, White & Moules*, 2017)
3: Search for themes	In this step, codes shift from codes to themes, capturing important data that is related to research questions. Themes are generated rather than discovered.
4: Review themes	This step is about quality scrutiny (Braun & Clarke, 2014)**.** Here, the themes are checked against collated extracts of data to establish whether they form relations with the research data.
5: Define and name themes	The researcher in this step has to study the themes and be able to state what is unique about them. Braun and Clarke (2014) suggest that proper thematic analysis should meet the following characteristics: have singular focus; related

Step	Description
	and not repetitive; and directly address the research question.
6: Write up the report	Lastly, the researcher must transform analysis into an interpretable paper using extracts that are related to themes and research questions.

The above steps were followed in this research study for analysing the data. Analysing the data allowed the researcher to relate the story and answer the research questions. Braun and Clarke (2006) outline common errors that researchers may commit, affecting the plausibility of the research results. The common errors are providing data extract that:

- lacks analysis,
- uses data collection questions as themes,
- mismatch between data and analysis,
- unconvincing or weak data analysis and,
- lastly, mismatch between theory and analytical claims.

The aforementioned errors were minimised through familiarisation with the data and reading through the documents to extract the themes from qualitative data. When thematic analysis method is conducted properly, interpreted data should be consistent with the theoretical framework.

Using this method has advantages and disadvantages, and they are noted and summarised below.

Advantages of thematic analysis

- For the researcher, it is easy to learn and grasp since there are few procedures to be followed (Braun & Clarke, 2006).
- Thematic analysis is a useful method when exploring perspectives of different group participants, generating anticipated but interesting insights (King, 2004).
- Thematic analysis as a method is applicable to research questions that cover even beyond the experiences of the individuals.

Disadvantages of thematic analysis

It is reported that the disadvantages of most thematic analysis are linked to analyses that are poorly conducted and inappropriate research questions (Braun & Clarke, 2006). These disadvantages are as follows:

- There are few research papers written on thematic analysis as compared to ethnography and grounded theory, thus giving novice researchers less literature to work with (Nowell *et al.*, 2017).
- Thematic analysis limits the researcher on language usage (Braun & Clarke, 2006).
- Thematic analysis limits the strength of interpretivism if analysis excludes theoretical framework (Braun & Clarke, 2006).

4.10 RELIABILITY AND VALIDITY

Notions such as reliability and validity are often associated with quantitative research and have a lesser reference in qualitative research (Bashir, Afzal & Azeem, 2008; Noble & Smith, 2015). In qualitative research, these concepts are conceptualised as trustworthiness or credibility, rigour and quality (Golafshani, 2003; Cypress, 2017). Although reliability is a concept used to test and evaluate quantitative research, the idea applies to most research studies (Golafshani, 2003). With regards to validity, the researchers normally rely on experience and literature to address this issue of generalisation and validity (Cypress, 2017). Joppe (2000:1) defines reliability as:

> "*the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable"*.

With regards to validity, Bashir, Afzal and Azeem (2008) maintain that the interpretivists are of the view that the concept of "validity" is not applicable in their world; however, they have realised the need to qualify their research. Noble and Smith (2015) define validity as precision in which the findings reflect data accurately. Furthermore, Noble and Smith (2015) claim that due to the existence of multiple realities, accuracy can be achieved by reporting the participants' perspectives accurately and clearly.

Bashir, Afzal and Azeem (2008) reason that to ensure reliability and validity in a study following an interpretive paradigm, assessment of trustworthiness is significant. In a qualitative study, maintaining the credibility depends on the ability and effort of the researcher conducting the research. Therefore, it is worthwhile for the researcher to take a neutral stance when investigating. Consequently, the respondents will not perceive the researcher as having any other interest leading to reliable data (Walsham, 2006). In addition to this, McMillan and Schumacher (2006) put forward a combination of ten strategies that can be applied by qualitative researchers to improve reliability and validity of their studies, which are explained in Table 4.5.

Table 4.6 Strategies to improve reliability and validity in qualitative research

Strategy	Description
Persistent and prolonged fieldwork	Allows interim data analysis and corroboration to ensure a match between findings and participants reality
Multi-method strategies	Allows the researcher to perform triangulation in data collection and analysis
Participant language verbatim accounts	Obtain literal statements of participation and quotations from documents
Low-inference descriptors	Record precise, almost literal, and detailed descriptions of people and situations.
Multiple researchers	Agreement on the descriptive data collected by the research team.
Mechanically recorded data	Such as the use of audiotapes and photographs
Participant researcher	Use of participants recorded perceptions in diaries or anecdotal records for corroboration
Member checking	Check informally with participants for accuracy during data collection
Participant review	Ask participants to review the researcher's synthesis of interviews with a person for the accuracy of representation frequently done in interview studies
Negative or discrepant data	Actively search for record, analyse, and report negative or discrepant data that are exception to patterns or that modify patterns found in data

Source: McMillan and Schumacher (2006)

4.10.1 Reliability and validity of this study

This study adopted an exploratory approach, which means that validity and reliability cannot be defined upfront, but rather can rely on the qualitative measures of credibility, dependability, confirmability, transferability and authenticity (Guba & Lincoln, 1994; Connelly, 2016; Cypress, 2017). Before data collection, the objectives and purpose of this research study were communicated to the respondents clearly and assurances were given to the respondents that data and results would be reported honestly. The individual qualitative measures of credibility, dependability, confirmability, transferability and authenticity are discussed individually below.

- **Credibility** - The important measure of "credibility" refers to the degree with which the study conforms to accepted ways of obtaining data; "credibility" reflects the confidence in the findings as well. Credibility was applied to ensure that the results of the research are believable by focusing on the richness of the information gathered rather than the amount of data gathered. In this study, the researcher was guided by the pre-defined interview protocol. Cypress (2017) advances that only the respondents and readers can reasonably judge the credibility of the results.

- **Dependability** - This refers to the degree with which the data remains stable over time and place in the sense that if the same questions were asked later, the data would remain the same. In summary, it ensures that the research findings are consistent, and the study can be replicated. This is measured by the standard by which the research is conducted, analysed and presented. In this study, all processes were reported to enable other researchers to repeat the inquiry and achieve similar results in a different setting.

- **Confirmability** - Confirmability aims to ensure objectivity and reduce bias in the findings from the data. One of the methods of ensuring confirmability includes maintaining a detailed record of how the data was analysed, and how the findings emerge from the data and literature review. The details of data collection and data analysis are explained in this Chapter. The collected data was transcribed and coded using ATLAS.ti 8. The data was further analysed using thematic analysis.

- **Transferability** - Transferability is measured by offering rich and detailed accounts of respondents' perspectives. This refers to the degree to which the findings from the study apply to other contexts; transferability is defined by readers of the research. The readers of this study can note the specific details of the research situation and methods and compare them to a similar situation they have encountered before. If the specifics are comparable, the original research would be deemed more credible.

- **Authenticity** - Authenticity relates to the ability to show divergence in respondents' realities. This is established by ensuring that the right people are selected as respondents for the study, as well as providing the context of each respondent. All the respondents selected to participate in this research study were suitable candidates based on their profiles. This study provides a detailed account of the context of each respondent without revealing personal information and respecting their anonymity. The perceptions for each respondent was considered as part of this research data.

In addition to the above principles, the researcher applied the following strategies to improve the quality of the study:

- Multi-method strategies were applied in data collections that included interviews (focus groups and individual interviews) and SLR;
- Verbatim was also applied, where quotes extracted from secondary data were not changed.

4.11 RESEARCH ETHICS

Ethics, which is also referred to as morals, look at the separation of what is right from wrong. The purpose of ethical consideration in a research study is to try and minimise any fabrications by ensuring that the researcher does not provide data that is falsified or misleading (Resnik, 2011). Additionally, the researcher needs to acknowledge the participants' rights to withdraw from the study anytime they wish to withdraw. Ethics are accompanied by different principles such as honesty, integrity, confidentiality, diligence and respect of privacy. During an investigation, the researcher must apply these principles and acceptable practices throughout the process. To increase the credibility of the study and

ensure the anonymity and protection of the participants, all the aforementioned principles were applied in this research study.

To comply with ethical considerations, permission in the form of ethical clearance was obtained from the University of Pretoria to collect data from humans (Appendix B). In addition, to grant access to the requisite premises and permission to interview the elderly participating in this research, a MOU was entered into with the homes where the participants resided. All attempts were also made to ensure a fair selection of the participants. Throughout the data collection process, self-deception bias was avoided at all costs (Resnik, 2011). The views and opinions of the participants were taken as they were, and thereafter analysed for purposes of this study. All attempts were also made by the researcher to refrain from being biased during the interview; the researcher remained subjective towards shared thoughts. As discussed in the following sub-sections, consideration was given to the various ethical aspects.

4.11.1 Informed consent

Informed consent purportedly minimises maltreatment or harm for research participants in all qualitative research methodologies, including focus groups and individual interviews (Tolich, 2009). To ensure full protection of the respondents participating in research and to avoid deception, Patton (2011) proposes the use of guiding ethical principles of informed consent and confidentiality. In this study, following the signing of the MOU with the homes of the elderly and engagements with church leaders, the objectives of the study were explained to potential respondents and they were given a chance to ask any questions including clarification questions. All respondents were asked to sign the Informed Consent Form (Appendix C) as proof of consent to participate in the focus groups and one-on-one interview sessions. Consents were requested before asking the participants questions forming part of the data collection process for the research study.

4.11.2 Anonymity and confidentiality

The participants were notified that the focus group will be audio-recorded and that their personal information will not be included in any form of report or publication. The information of the participants was handled in a confidential manner and steps were always taken to protect this information. No identifying data were requested from the respondents.

4.11.3 Risk minimisation

The respondents in this study are the elderly people. As a precautionary measure to minimise risk, the focus group and one-on-one sessions were kept as short as possible to avoid any potential tension may arise from these sessions. The caregivers at the elderly homes were available on standby to offer assistance should any specific need arise. All interviews were conducted in a comfortable environment.

4.11.4 Right to withdraw

Before the sessions, the respondents were informed of their right to withdraw their participating from the study any time even after signing the consent form.

4.12 CRITICAL REFLECTION ON MY ROLE AS A RESEARCHER

According to Walsham (1995), interpretive researchers are undertaking a difficult task of unravelling other people's interpretations, screening them through their conceptual apparatus to make sense out of them. The version of events is then communicated to other or targeted audience. During this process, an interpretivist needs to have a view of their role. Two roles, which are said to exist in this instance are “outside observer” and “involved researcher”. Walsham (1995) contend that the two cannot be separated or be viewed as an objective reporter. In this regard, data collection and analysis assumed the subjectivity of the researcher.

This interpretative research study was focused on the ‘life world’, which included humanly created meanings about mobile banking that were shared during individual interviews and focus group meetings. The researcher acted as an observer while assuming a subjective role of a reporter. The researcher played an independent role to ensure data was collected without influencing the views of the respondents. While reflecting on this journey as a researcher, the path was not easy but fulfilling. Through responsible ward councillors, the researcher was able to secure appointments with elderly home leaders to gain access and collect data at the facility housing the elderly. Further conversations were thereafter established with multiple elderly in the City of Durban. Most of the conversations were conducted in English; however, communication with respondents whose mother tongue is Isizulu did not result in any problems. Given the fluency of the researcher in IsiZulu, any communication in IsiZulu was translated for the benefit of other members of the focus groups

or when one-on-one interviews were conducted. Access to the elderly in churches was facilitated by church leaders. Although keeping the opinions and views of the respondents to the researcher proved to be a challenging task, all attempts were made by the researcher to report on the exact opinions and views expressed by the respondents. The researcher was also captivated by the sharing of experiences by the respondents as well how in some cases the respondents attempted to sway each other's views based on their social truth.

4.13 CONCLUSION

In conclusion, this Chapter presented the underlying philosophical assumption leading to research methodology. The research design of the study was also discussed. Based on the nature of the study, an interpretive approach was deemed appropriate for the research study and ANT was used as a lens. Primary data was collected using semi-structured questions. This allowed the researcher to get social and contextual reality about the elderly lived experiences. All the focus groups and individual interviews were pre-arranged. Secondary sources of data (research articles) also formed part of the data collected for this study. The goal was to understand how the area of interest had previously been investigated and what the findings were regarding the adoption of mobile commerce and banking by the elderly. The data collection and analysis process closely followed ANT terms and principles. Primary data was collected in Durban, KwaZulu Natal Province over five months. Regarding the secondary data, SLR was conducted following previously stated PRISMA guidelines; the focus was on studies conducted between 2009 and 2019. Table 4.7 provides a summary of the Chapter and the decisions reserved for conducting the study.

Table 4.7 Research design summary

Decision	Reserved Choice
Research Context	Adoption of Mobile banking by the elderly
Philosophical Paradigm	Interpretive
Research Approach	Qualitative approach
Research data collection (Data gathering techniques)	Secondary sources (Articles) / Literature Review Focus group In-depth interviews
Units of analysis	Elderly bank consumers (aged 60 and above)

Decision	Reserved Choice
Subject	Adoption of mobile banking
Research underlying theory	ANT
Data Analysis	Qualitative (Thematic Analysis), Actor-Network, Theory
Time Frame	Cross-sectional

The upcoming Chapter details the findings on the SLR, which was conducted as part of the study to explore the enablers and barriers for mobile banking among the elderly.

CHAPTER 5

5 RESEARCH FINDINGS: ENABLERS AND BARRIERS FOR MOBILE COMMERCE AND BANKING – A SYSTEMATIC LITERATURE REVIEW

5.1 INTRODUCTION

This Chapter presents the findings of the SLR that was conducted to collect secondary data from the extant literature. The aim was to understand the behaviour of the elderly towards mobile commerce and banking and how this phenomenon has previously been investigated.

5.2 MOTIVATION FOR SLR

Technology developments have favoured the implementation of mobile commerce including mobile banking services. Transforming a simple smartphone to a mobile store and bank has created broader opportunities for new products and services. This platform has introduced new ways of generating revenue while establishing a competitive advantage and allowing new traders into the market. While the providers of these products and services have incorporated motivators for users, low adoption of these services has been reported among elderly consumers (Kolaki, 2017; Zhang & Soto, 2018). Therefore, a need exists for an investigation of the enablers (Manuel & Veríssimo, 2016) and barriers of mobile commerce and banking technology amongst the elderly (Laukkanen, Sinkkonen, Kivija¨rvi, and Laukkanen, 2007; Zhang & Soto, 2018). Considering the scarcity of research focusing on mobile commerce and the elderly, this research study was inspired to identify and gain an understanding on reasons that would lead to the adoption of mobile banking among the elderly population (Choudrie *et al.*, 2018).

As a response to the existing need for the above-mentioned enablers and barriers, a SLR study was initiated. Boell and Cecez-Kecmanovic (2014:51) acknowledge that a literature review can play an important role in IS research since it offers "*overview, synthesis and a critical assessment of previous research, challenge or problematise existing knowledge and identify or construct novel research problems and promising research questions*". Within this area of interest, there have been inconsistencies regarding the adoption of mobile banking by the elderly. This prompted the researcher to conduct a systematic review to track the developments and behaviour of the elderly in relation to mobile commerce and banking. The aim was to collect secondary data to complement and inform the study. The use of a systematic review has been recommended and accepted by the number of scholars in

various fields of study including IS. Aromataris and Pearson (2014) offer several guidelines for the undertaking of a SLR. These guidelines are as follows:

- Research questions and objectives should be clearly defined.
- Inclusion and exclusion criteria should be stipulated prior to the undertaking of the SLR to determine the suitability of studies.
- A comprehensive search to identify all relevant studies, both published and unpublished.
- Appraisal of the quality of included studies, assessment of the validity of their results, and reporting of any exclusions based on quality.
- Data resulting from the included articles should be analysed.
- Presentation and synthesis of the findings extracted.
- Methodology and approach followed to conduct the review should be reported clearly.

These guidelines are in line with those previously suggested by Khan *et al.* (2003). The reasons for conducting an SLR depend on the researcher and the study being investigated. Aromatis and Pearson (2014) suggest the following reasons for conducting the SLR:

- To present knowledge about a topic.
- To show how the topics have been investigated previously and what developments have been noted.
- To identify the gaps and relationships between the evidence (contradictory or conclusive).
- To establish whether there are any arguments around the topic.
- To justify why a problem is worthy of further study.

The literature review process assists the researcher to find different studies available in the area of mobile commerce and banking to address the research questions. Hussain, Mirza, Rasool, Hussain and Kaleem (2019) suggest three distinct phases involved in the process of SLR, and these are summarised in Figure 5.1.

Figure 5.1 Systematic Review Process

Source: Hussain *et al.* (2019)

5.3 METHODOLOGY

A SLR was conducted to collect secondary data. The intention was to understand the current state of the relationship between elderly and mobile commerce including mobile banking, how it has been investigated, what findings were reported and lastly to provide direction for this study. Research questions are very important in a study adopting a systematic review approach and are discussed in the following sub-section.

5.3.1 Research questions

Kitchenham (2004) asserts that formulating a research question is the most imperative activity when conducting a SLR. Having pre-defined questions is essential in determining and guiding the content and structure of the review (Attard, Orlandi, Scerri and Auer, 2015). This study aims to analyse the existing barriers and enablers towards the adoption of mobile banking and commerce by the elderly in developing countries such as SA. Therefore, the following research question was pre-defined:

> *What factors influence the adoption of mobile banking among the elderly in developing countries?*

The SLR answered two research sub-questions (RSQ1 and RSQ2), and the requisite motivations for these research sub-questions are provided in Table 5.1.

Table 5.1 SLR research sub-questions

Research Sub-Questions	Motivation
What are the enablers of mobile commerce and banking among the elderly in developing countries?	To identify the reported factors that serve as enablers for the elderly towards the adoption of mobile commerce and banking
What are the barriers to mobile commerce and banking among the elderly in developing countries?	To identify existing barriers hindering the elderly from adopting commerce including mobile banking

The systematic review focused on the last 10 years of research, consequently reviewing scholarly work done from 2009 to 2019. Applying a systematic review enabled the researcher to follow a transparent research process towards studying the patterns and evidence from previous studies (Nightingale, 2009). The approach used is based on the guidelines proposed in Dyba, Dingsoyr and Hanssen (2007) and Kitchenham (2004). To this end, the following process was followed:

1. Defining the search terms;
2. Selecting the sources (digital libraries) on which to perform the search;
3. Application of search terms on sources; and
4. Selection of primary studies by application of inclusion and exclusion criteria on search results.

According to Nightingale (2009), a SLR is conducted to address the research questions using published and unpublished research studies. This method remains plausible for its ability to provide evidence on a particular phenomenon across different environments (Kitchenham, 2004). Even though the method required more time and effort, it fits the study objectives and the setting.

5.4 RESEARCH OUTLINE

The SLR followed the PRISMA framework and the articles were sourced from commonly used research databases. The study followed the guiding elements that are in line with the PRISMA model (Pankomera & van Greunen, 2018).

5.4.1 Search strategy

A systematic review is often guided by the search criteria, allowing the retrieval of relevant studies and eliminating the bias. Among a large number of populated studies, only a few studies are relevant to the research question, with the majority being irrelevant. The author is required to examine the publication titles and abstracts in other cases to determine the relevance of the article. The approach adopted in this study involved looking at both published and unpublished research papers in the last 10 years (2009-2019) and focusing on the relationship between mobile banking, mobile commerce and the elderly in developing countries such as SA. The following databases were searched to retrieve the relevant articles that meet the search criteria:

- ACM Digital Library
- IEEE Xplore Digital Library
- Science Direct
- ISI Web of Knowledge
- Google Scholar was also used, even though most of the articles were duplicates from the above-mentioned databases.

5.4.2 Inclusion and exclusion criteria

Inclusion and exclusion criteria were pre-defined to ensure fair treatment of articles and to avoid bias. The papers that met the following criteria were included as part of the analysis:

- Studies published between 2009 and 2019;
- Studies investigating mobile commerce and elderly; and
- Studies published in English.

The following papers were excluded from the analysis:

- Research studies that exclusively focused on mobile commerce;
- Studies that fell out of the study period of 2009-2019; and
- Studies not published in English.

The search terms and synonyms used are summarised in Table 5.2.

Table 5.2 List of search keywords

Type	Category	Keyword (s)
1	Mobile Banking	Mobile banking m-banking m-banking
2	Mobile Commerce	Mobile Commerce M-commerce m-commerce
3	Elderly	Elderly Senior citizen Seniors Older adults Older people
4	Developing countries	Developing countries

Based on the research question that the study seeks to answer; the search terms and the combinations thereof that were used in this SLR are shown in Table 5.3.

Table 5.3 Search strategy

Keywords in Search Document title	Search Operator	Keywords in Search Document title	Search Operator	Keywords in Search Document title
"Mobile banking"	And	"Elderly"	And	"Developing Countries"
"m-banking"		"Senior citizen"		
"mbanking"		"Seniors"		
"Mobile commerce"		"Older adults"		
"Mcommerce"		"Older people"		
"m-commerce"				

5.4.3 Search process

The search strings play a significant role in assisting the researcher to select a related set of existing research studies (Hussain *et al.*, 2019). It is recommended that the investigator should firstly study the main concepts and terminologies in the mobile commerce area and consider different keywords used in the research questions. Consequently, the study used different Boolean operators ('OR' and 'AND') to prepare the search string. As shown in Table 5.3, shows the search string is joined by the "AND" operator. Figures 5.2 and 5.3 show how the search was conducted using some of the keywords. Mobile commerce, mobile banking and elderly were the major keywords used to screen the search records.

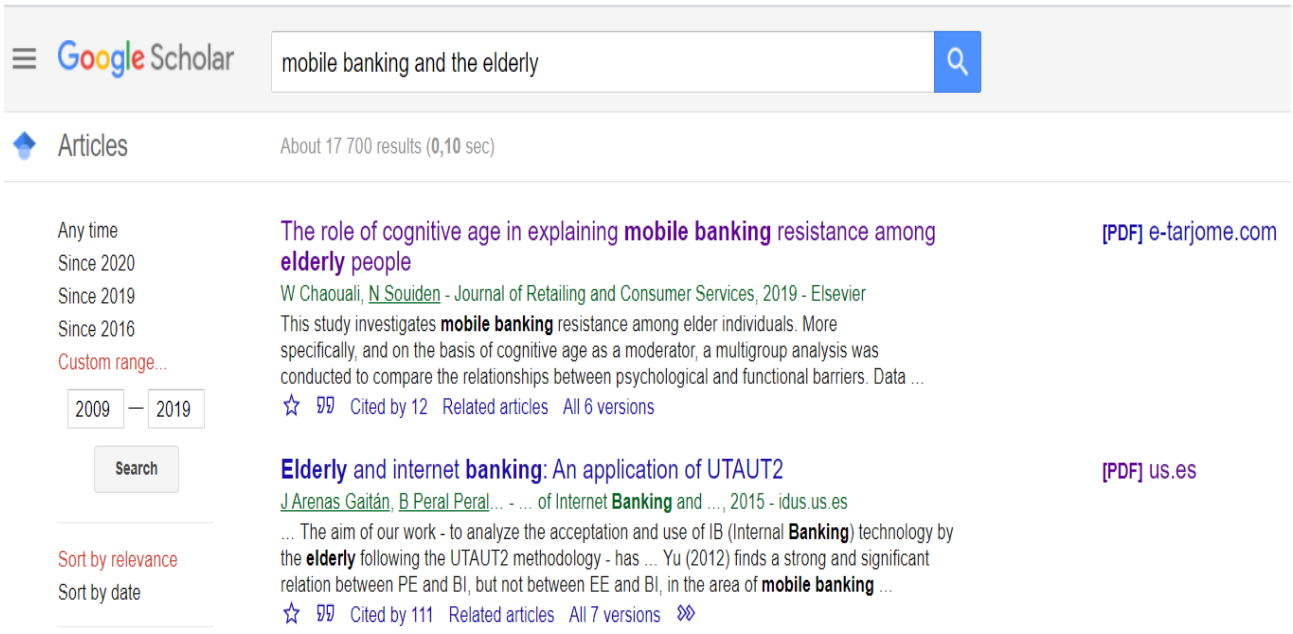

Figure 5.2 Google Scholar search page

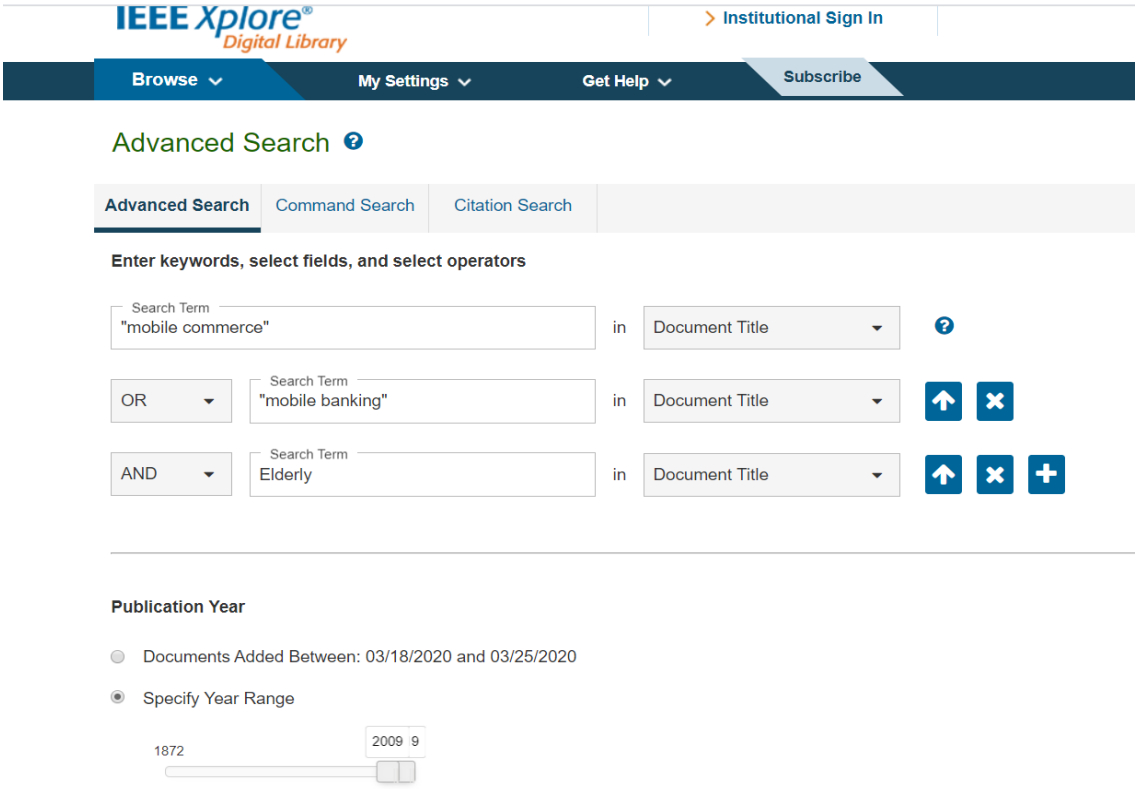

Figure 5.3 IEEE Xplore Digital Library

5.4.4 Data collection and analysis

The order of steps followed in this SLR process is depicted in Figure 5.4. Using search strings, a total of 1898 articles were retrieved. No additional articles were generated from other sources. All duplicate articles were thereafter removed from the dataset. All the studies that were retrieved, their titles and abstracts were scrutinised to check if they met the inclusion criteria. All the articles that did not meet the inclusion criteria were subsequently excluded, resulting in a total number of 248 articles that were deemed eligible. From the list of studies that were eligible for inclusion, 237 of those were excluded on the following grounds:

- The articles did not investigate mobile commerce or mobile banking; and
- The articles were not targeted at elderly banking.

Finally, 11 articles were deemed fit for final selection for the study. The focus of the study was to find studies that were conducted in developing countries. However, during this process, it was established that not only is the topic overlooked, but the few studies that have been conducted were mainly focused on developed countries. Of the 11 studies that

were reviewed, 6 were conducted in developed countries with only 4 focusing on developing countries. One study was conducted as a literature review focusing on m-commerce and the elderly and was directed towards measuring the current state in both developing and developed countries. Mcgaughey *et al.* (2012) argue that the elderly is the fastest-growing group in developed countries, and therefore very few studies have focused on developing countries. Due to limited articles that were eligible for inclusion, all 11 studies that included both developed and developing countries were considered and analysed.

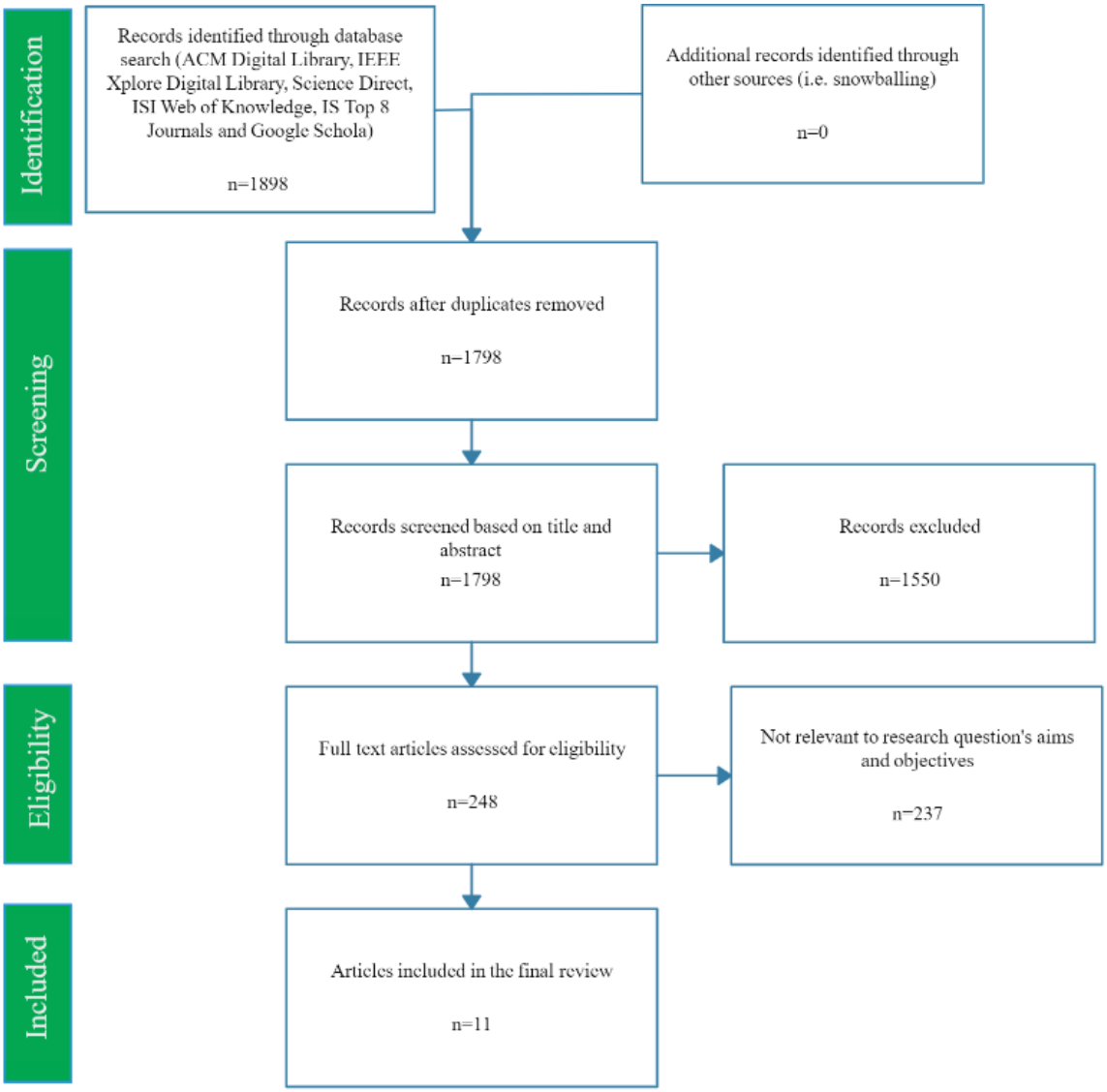

Figure 5.4 PRISMA chart depicting the number of articles included in the SLR

Table 5.4 below shows the details of the research studies that were reviewed in this SLR. These studies were selected because they were closely related to the research questions and the objectives of understanding the barriers and enablers for mobile banking and

commerce towards adoption by the elderly. The studies were selected based on their title, abstract, and conclusion.

Table 5.4 List of mobile banking studies that were reviewed

No.	Author (s) and Year	Title	Type of Research Design	Summary of the Findings	Publication Outlet	Country	Nature of country based on GDP
1	Ayaratne, Ryan and Cripps (2017)	Mobile banking adoption by senior citizens in Perth	Quantitative	Results showed that the intention of senior citizens to use m-banking is strengthened by familiarity with technology and how well-equipped they are in terms of resources and knowledge. The study suggested that the applications need to be clear, understandable, user-friendly, and not require a lot of mental effort to learn.	2nd Business Doctoral and Emerging Scholars Conference	Australia	Developed
2	Touchaie and Hashim (2018)	The Influence of Dispositional Resistance to Change on Seniors' Mobile Banking Adoption in Malaysia	Quantitative	The results revealed that "dispositional resistance to change" has a significant negative effect on seniors‟ intention to adopt m-banking.	Journal of Soft Computing and Decision Support Systems	Malaysia	Developing

No.	Author (s) and Year	Title	Type of Research Design	Summary of the Findings	Publication Outlet	Country	Nature of country based on GDP
3	Choudrie *et al.* (2018)	Understanding and conceptualising the adoption, use and diffusion of mobile banking in older adults: A research agenda and conceptual framework	Systematic Literature Review	The study found that trust is often a challenge when it comes to online communication. Furthermore, the study revealed that there are limited studies investigating relationships of "older adults" with mobile banking and smartphones. Research studies on this phenomenon are suggested.	Journal of Business Research	United Kingdom	Developed
4	Chaouali and Souiden (2019)	The role of cognitive age in explaining mobile banking resistance among elderly people	Quantitative	This study investigated mobile banking resistance among the elderly. The following barriers were identified: tradition and image barriers affected the elderly usage of mobile banking and value. All the barriers that were identified influenced resistance behaviour. The study highlighted the relationship between psychological and functional barriers and their influence on resistance behaviour.	Journal of Retailing and Consumer Services	France	Developed
5	Mosolotsane (2013)	An Empirical Investigation into	Quantitative	It was established that elderly citizens are not comfortable to use innovative banking services	Student Thesis	South Africa	Developing

No.	Author (s) and Year	Title	Type of Research Design	Summary of the Findings	Publication Outlet	Country	Nature of country based on GDP
		Factors Affecting the Use of Banking Technologies by Elderly Citizens		due to lack of trust and confidence to use such technology. In addition, elderly citizens preferred human interaction when it comes to banking activities.			
6	Mcgaughey *et al.* (2012)	M-Commerce and The Elderly: The Current State of Affairs	Literature Review	It was found that there is a need for more empirical research to determine what opportunities interest this demographic group to use mobile commerce.	SWDSI Proceedings 2013	Globally	Developed and developing
7	Sindwani and Goel (2014)	Acceptance of technology-based self-service banking Among mature customers	Quantitative	The study identified the following barriers to mobile banking and other technology-based banking among mature bank customers of India: security, privacy, financial risks and lack of technical knowledge.	PriMa: Practices and Research in Marketing	India	Developing
8	Gurtner *et al* (2014)	Designing mobile business applications for different age groups	Quantitative	The findings indicated that convenience, perceived quality, enjoyment, perceived ease of use and perceived usefulness influence the acceptance of mobile business applications. Convenience and ease of use were found to be important enablers amongst older individuals.	Technological Forecasting and Social Change	Europe	Developed

No.	Author (s) and Year	Title	Type of Research Design	Summary of the Findings	Publication Outlet	Country	Nature of country based on GDP
9	Kolaki (2017)	Mobile Payment Use and Mobile Payment Transactions by Older Adults	Qualitative	The findings suggest trust and lack of user-friendliness as barriers.	Student Thesis	Greece	Developed
10	Senali (2017)	Mobile Banking Adoption by Senior Citizens in Australia	Quantitative	The findings from the pilot study revealed the following barriers: declining health, fear of hackers, psychological decline and limitation of technology.	Unpublished study	Australia	Developed
11	Jayachandran (2019)	E-Banking or Branch Banking? Preference of Senior Citizens in Kerala	Quantitative	Branch banking was found to be the most approachable form of banking among the elderly since it offers personalised dealings. The majority preferred to withdraw cash from the ATM.	The IUP Journal of Bank Management	India	Developing

Table 5.5 Articles on mobile commerce, banking and the elderly and the year of publication

Name of Journal	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Journal of Soft Computing and Decision Support Systems										1		1

Name of Journal	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Journal of Business Research										1		1
Journal of Retailing and Consumer Services											1	1
The IUP Journal of Bank Management											1	1
2nd Business Doctoral and Emerging Scholars Conference									1			1
PriMa: Practices and Research in Marketing						1						1
Technological Forecasting and Social Change						1						1
Student Thesis					1				1			2
SWDSI Proceedings 2013				1								1
Unpublished study									1			1
Total	**0**	**0**	**0**	**1**	**1**	**2**	**0**	**0**	**3**	**2**	**2**	**11**

The article search was focused on articles published between 2009 and 2019; therefore, the study only focuses on developments in the last 10 years. The mobile banking technology is still emerging in other parts of the world. The number of articles published during each year of the scoping period is presented in Table 5.6 and Figure 5.5.

Table 5.6 Annual distribution of selected articles during the review period

Year	No. of studies conducted
2009	0
2010	0
2011	0
2012	1
2013	1
2014	2
2015	0
2016	0
2017	3
2018	2
2019	2
Total	**11**

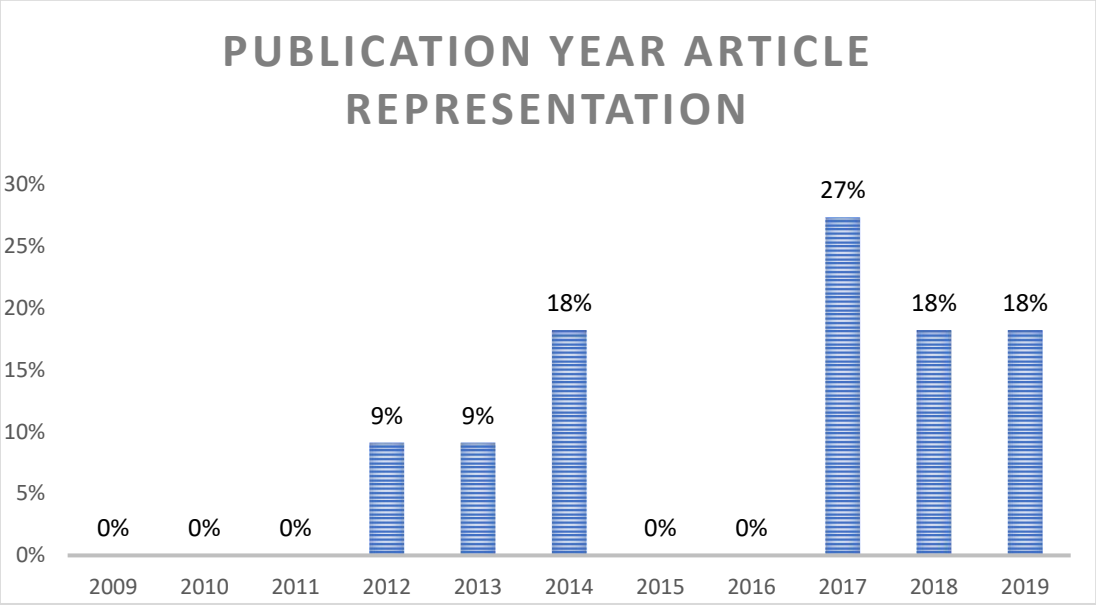

Figure 5.5 Percentage distribution of selected articles during the review period

The distribution of selected articles across the different types of research outputs is presented in Table 5.7 and Figure 5.6. The articles that were included in the final review included peer-reviewed and published articles, theses as well as unpublished work. Of the 11 articles that were review, 55% were published in journal publications.

Table 5.7 Distribution of selected articles according to the type of research output

Sources	Article Representation
Journal Articles	6
Articles from Conference Proceedings	2
Students' Thesis	2
Unpublished	1
Total Articles	**11**

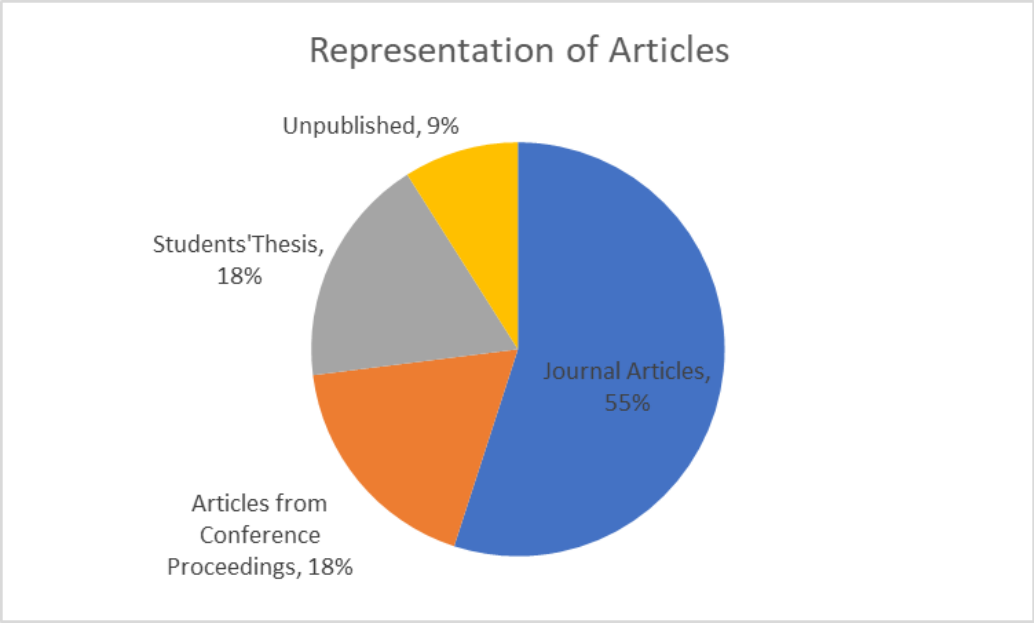

Figure 5.6 Distribution of selected articles according to the type of research output

The research studies included in the review focused on investigating different behaviours of the elderly with regards to mobile platforms such as mobile commerce and mobile banking. Table 5.8 and Figure 5.9 show a distribution of the selected articles in terms of the research design adopted in these articles. The majority (73%) of the studies adopted a quantitative research design approach, with only 18% having been conducted as SLRs. Only 9% of the selected articles adopted the qualitative approach.

Table 5.8 Research Design article representation

Study Design	Article Representation
Quantitative	7
Systematic Literature Review	3
Qualitative	1
Total Articles	**11**

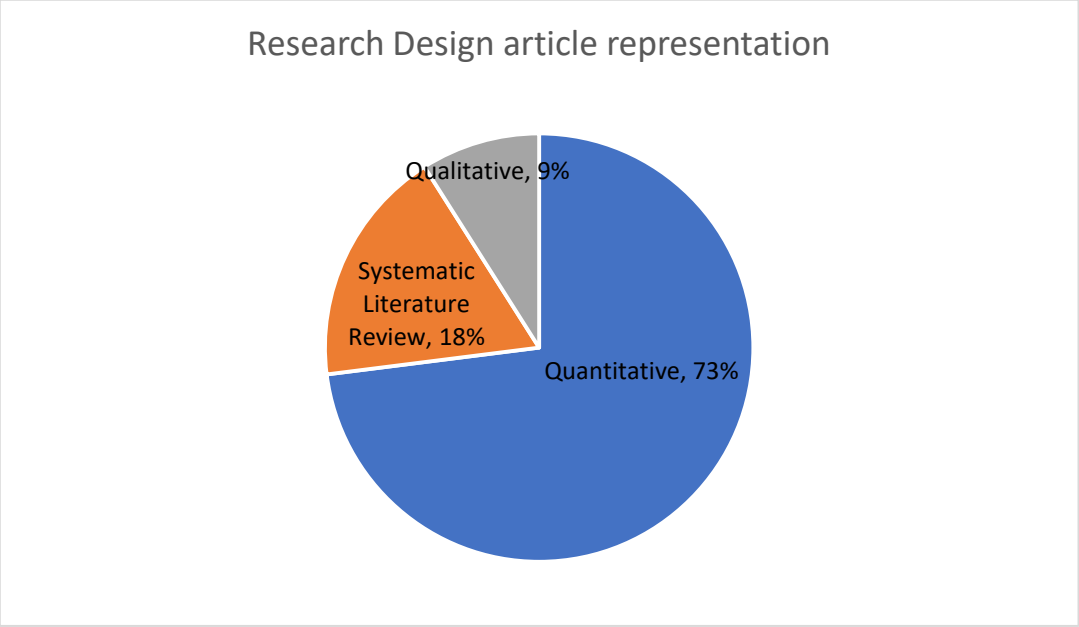

Figure 5.7 Research Design adopted by studies

Studies focusing on mobile commerce and the elderly have been inconsistent. Table 5.9 and Figure 5.10 shows that such studies have been conducted across 8 regions with SA accounting for 9% of the studies conducted in the African continent.

Table 5.9 Country distribution of selected articles

Country	Article Representative
India	2
Australia	2
Malaysia	1
United Kingdom	1
France	1
South Africa	1
Europe	1
Greece	1
None	1
Total	**11**

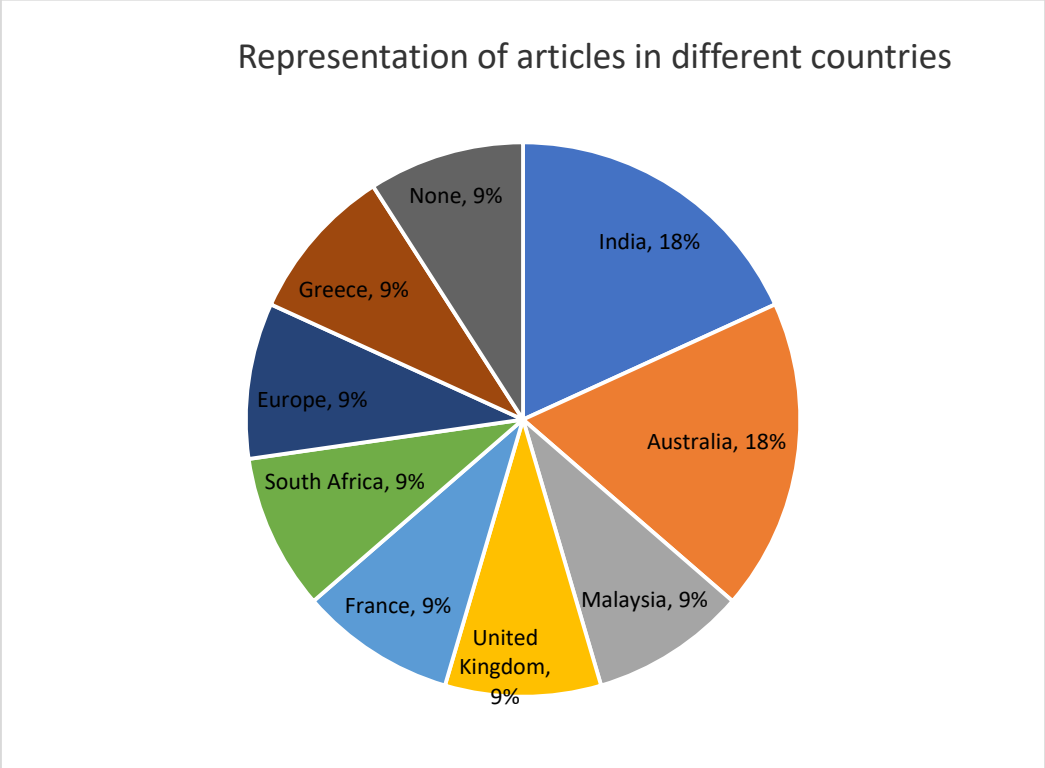

Figure 5.8 Country distribution of selected articles

Figure 5.9 indicates that 55% and 36% of the studies were conducted in developed and developing countries, respectively; the balance of the studies was unclassified. The undertaking of such studies in developing regions is crucial to support emerging technologies for the benefit of the citizens and economies of these countries.

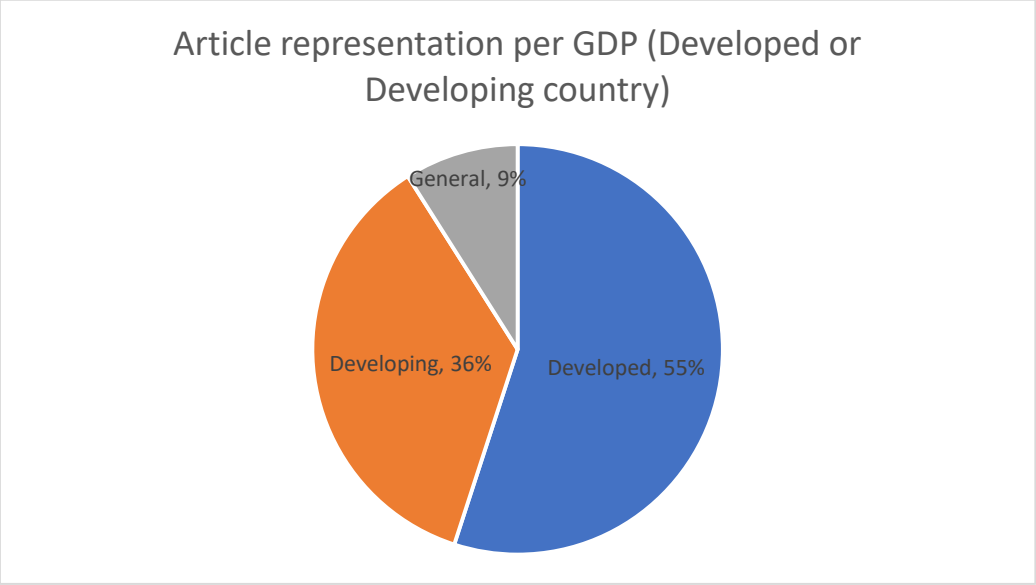

Figure 5.9 Distribution of articles according to the development of the country

Table 5.10 Regional distribution of the selected articles

Continent	Article Representative
Asia	3
Europe	4
Africa	1
Australia	2
None	1
Total	**11**

Figure 5.10 below presents interesting information. Out of the seven continents in the world, studies were mainly conducted in four continents. Even though the distribution is not even, the majority (36%) of studies were conducted in the European continent. This is interesting in the sense that most countries here are developed and belong in the list of first world countries. In addition, this is where technology adoption is further progressed.

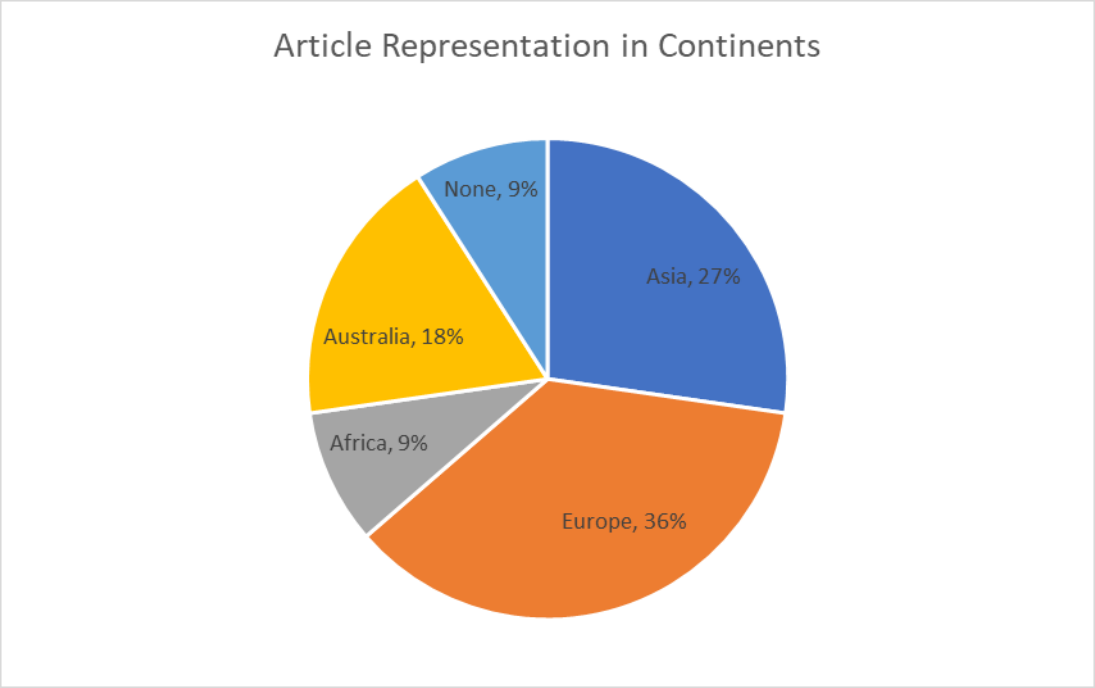

Figure 5.10 Regional distribution of selected articles

5.5 ANALYSIS OF ARTICLES

Ayaratne, Ryan and Cripps (2017) investigated why and how current senior citizens aged 55 and above in Perth (Australia) choose to use m-banking. Data was collected through a survey of 70 participants, and the TAM-UTAUT framework was adopted for the research study. The study found performance expectancy, facilitating conditions and, perceived ease of use as enablers for senior citizens to continue using mobile banking. Although the majority of senior citizens owned a smartphone and were aware of mobile banking, they did not use their device. Furthermore, it was found that no research had previously been undertaken on what influences this group (the elderly) to adopt mobile banking.

In Kuala Lumpur (Malaysia), Touchaie and Hashim (2018) investigated the effect of personality trait “dispositional resistance to change” (DRTC) on mobile banking adoption in senior citizens aged 50 and above. The data was collected from 384 non-users of mobile banking using a survey method. The study found that DRTC has a significant negative effect on intention of senior citizens to adopt mobile banking. Individuals with high DRTC are not willing to change and would prefer to follow familiar methods regardless of the benefits that come with mobile banking. Similar to what was reported in previous studies, it was found

that very few studies existed that investigated IT adoption by senior citizens and that this was regarded as the first study to investigate this component of “DRTC”.

Choudrie *et al.* (2018) conducted a study to understand and explain the factors that influence the adoption, use and diffusion of mobile banking among “older adults” (i.e. 50 and above) in the United Kingdom. The study used a literature review as a data collection method. The study noted a scarcity of studies on how older adults relate to mobile banking. Based on the literature reviewed, the researchers proposed a conceptual framework depicted in Figure 5.11. In developing this framework, the researchers used factors that were used in previous studies, and resistance to innovation as well as scepticism (trust) with regards new technologies was noted as barriers to the adoption of mobile banking by the older adults.

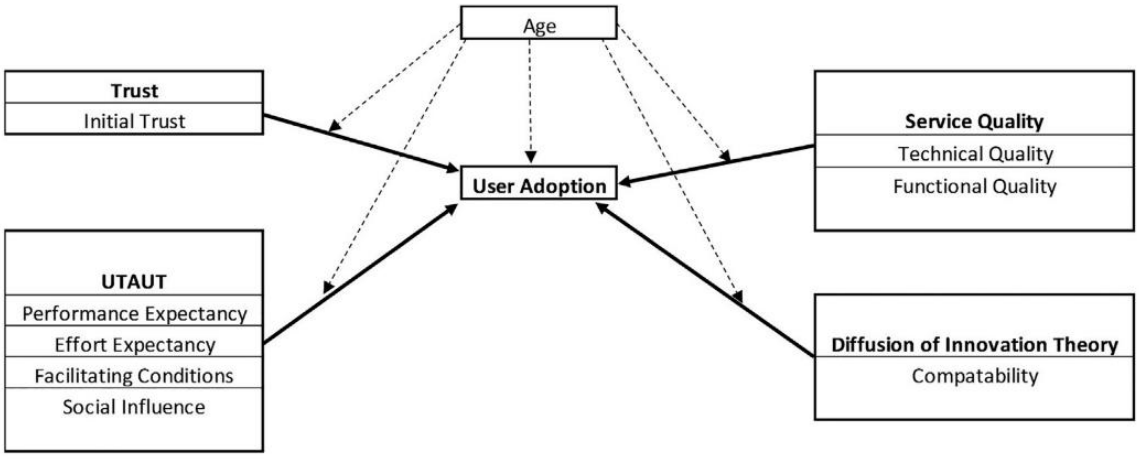

Figure 5.11 Conceptualising of the adoption in terms of trust, diffusion, quality and age
Source: Choudrie *et al.* (2018)

An empirical study focused on an investigation of factors affecting the use of banking technologies by elderly citizens was conducted by Mosolotsane (2013). The primary aim of the study was to identify the barriers limiting the use of mobile banking by elderly citizens. The study adopted a quantitative research method approach and the data was collected from 66 elderly using a survey questionnaire. The study findings revealed that the elderly citizens were not comfortable with banking products and technologies and identified a lack of trust and confidence as barriers limiting the adoption of mobile banking. Furthermore, when it comes to banking, the study revealed that the elderly citizens preferred human interaction and worry about trust and security issues. Mosolotsane (2013) notes that the

elderly are not aware of or exposed to information about new technological banking products and services.

Sindwani and Goel (2014) investigated technology-based self-service banking (TBSSB) among mature users (i.e. individuals aged above 50 years of age) in India. The study described TBSSB as the banking services that customers use independently without any interaction with bank employees such as ATM banking, internet banking and mobile banking. The purpose of this study was to find the factors that affect the adoption or intention to adopt TBSSB by mature customers. Data was collected from 152 participants using a questionnaire. The study identified security, privacy, financial risks and lack of technical knowledge as major barriers to the acceptance of technology-based banking by mature customers. The group of barriers that were identified in this investigation are listed in Table 5.11. The authors suggested educational programmes and training for mature users with regards to usage.

Table 5.11 Barrier grouped into categories

Factors and Items
Factor 1: Security and Trust Barrier
High financial risk is associated with e-banking services
Lack of privacy in e-banking services
Fear of incomplete transactions in e-banking
Lack of security in e-banking
Factor 2:Awareness Barrier
Lack of knowledge about the products offered by e-banking
Traditional banking offers more benefits as compared to e-banking
Lack of technical knowledge about using e-banking
Feedback management system of e-banking services is unknown
Factor 3: Socio-Cultural & Legal Barrier
Absence of interpersonal relations with banks employees in e-banking
e-banking is not consistent with my cultural values, beliefs and norms
Lack of user protection laws make it difficult for me to use e-banking
Factor 4:Convenience Barrier
Lack of access to e-banking services
It is time taking and difficult to learn various e-banking modes
e-banking system is not user-friendly

Source: Sindwani and Goel (2014)

Chaouali and Souiden (2018) investigated the mobile banking resistance among the elderly individuals in France. The study was undertaken to explore the phenomenon of resistance among elders by:

- shedding light on how functional and psychological barriers affect mobile banking resistance; and
- studying the interplay that is likely to occur between them.

The participants in this study were 55 years old and above who are non-users of mobile banking and have at least a single bank account. Data was collected from 425 participants using a survey method. The study focused mainly on cognitive age as a moderator, and analysis was conducted to compare the relationship between psychological and functional barriers. The results stemming from the study indicate that tradition and image barriers affect

usage, value, and risk barriers. In turn, all barriers influence resistance behaviour. The study found that cognitive ageing results in psychological barriers and functional barriers, which in turn lead to technology resistance. Heterogeneity between cognitively young elders and cognitively old elders regarding their perceptions of mobile banking barriers was observed. It was suggested that cognitive age should be prioritised over biological age.

In Greece, Kolaki (2017) undertook a study on older adults aged 55 and older. The study adopted a qualitative approach with argumentation and investigation on two models, TAM and UTAUT. The study was aimed at understanding the use of mobile payment by the older adults by answering the following questions:

- What motivates older adults to use mobile payment transactions?
- How do older adults use mobile payments in their everyday life?
- What do they experience during a mobile payment transaction?

The study identified the following barriers: trust, lack of willingness, resistant to change, age; lack of technological affinity. Kolaki (2017) reports that the will of the users to accept mobile payment technology depends on social influence to navigate through its constant use. The researcher noted that the usage of TAM or TAM2 models helped to quantify and point out the importance of trust among the elderly users, and it does not accommodate age a factor that is regarded as crucial in the aspect of assessing perceived usefulness or trust.

Mcgaughey *et al.* (2012) performed a literature review to understand the state of mobile commerce and the elderly with a view to uncover the challenges encountered by the elderly when using mobile commerce. It was observed that senior citizens have different needs and that there is nothing much that has been done in this regard. The study identified the following non-demographic factors that influence the intention to use mobile commerce: ease of use, perceived usefulness, convenience, and enjoyment. Furthermore, it was noted that although research focusing on the use of cellular technology by the elderly is increasing, the use of m-commerce by the elderly is still lagging. The paper argued that empirical research to identify mobile banking opportunities that are of interest to the elderly should be pursued.

Gurtner *et al.* (2014) investigated drivers that influence the adoption of mobile business applications and how they differ among the rising segment of the digital natives and the

increasing share of the greying market. The authors define the digital natives as those aged 25 and younger while the greying market was individuals aged 50 or 55 and above. The study proposed a new theoretical model and tested it in a sample of 653 participants (with different ages) using structural equation modelling and multi-group analysis. The model that was proposed proved to be a good predictor of intention to use and actual use of mobile business applications. The study identified convenience, perceived quality, enjoyment, perceived ease of use and perceived usefulness as drivers for mobile business applications. The analysis of the study revealed that convenience and ease of use are more important to older individuals.

Senali (2017) conducted a pilot study on mobile banking adoption by senior citizens in Australia. The aim of the study was to understand how the elderly (i.e., individuals aged 55 years old and older) in Australia can be encouraged to adopt mobile banking. The data was collected using a survey question. According to the results of the pilot study, the barriers that were noted include declining health, fear of hackers, lack of knowledge, psychological decline and limitations of technology.

Jayachandran (2019) investigated the banking preferences of senior citizens in Kerala (India). Data was collected by surveying senior citizens aged 50 and above. It was found that branch banking was the preferred method of banking due to personalisation. Behind this preference was lack of enthusiasm on the banker's part to inform and explain these services to the senior people. It is worth noting that by applying personalisation in technological banking, applications will enable the adoption of these technologies by the elderly to grow. Furthermore, the findings revealed attitude and resistance to innovative banking as barriers to the adoption of mobile banking.

5.6 FINDINGS

It is important to understand why elderly individuals choose to adopt or reject mobile commerce applications (Gurtner *et al*., 2014). However, the elderly have been described as a consistent group whereby most of them struggle with technology, and to design and develop technology that can specifically be used by the elderly is considered significant (Jia, Lu & Wajda, 2015). Understanding the use of technology by the elderly can guide potential interventions aimed at improving and stabilising the quality of life of this growing segment of

the population (Gell *et al.*, 2015). Elderly appreciation of mobile banking is yet to be experienced globally, overcoming issues around resistance. Even though the study is aimed at delivering first hand insights on the elderly and their relationship with mobile banking, criticism has been levelled at ANT research studies for personally prioritising successful actors for study at the expense of other key players (Adaba & Ayoung, 2017).

5.6.1 What are the enablers for mobile commerce and banking among the elderly in developing countries?

Digital transformation and innovation can be used to generate more profit for organisations. However, encouraging mobile services such as mobile shopping and banking are more impactful and can play an influential role in responding to the challenges of social inclusion, poverty and inequality in developing countries (Asongu & Odhiambo, 2019). Singh, Srivastava and Srivastava (2010) identified the following drivers of mobile banking: perceived usefulness, perceived ease of use. The ease of use, convenience, efficient and trust have been reported to be influencers of mobile banking adoption (Bhatt and Bhatt, 2016; Chawla and Joshi, 2018).

5.6.2 What are the barriers to mobile commerce and banking among the elderly in developing countries?

Traditional banking is the most preferred method of transacting by consumers. With the growing need to survive in the digital era, it is necessary to investigate the risks and barriers of using mobile banking as well as the role of the user (Mohammadi, 2015). Ageing group consumers experience several hindrances when attempting to adopt mobile technology, while technology gets more sophisticated and offer less costly and more convenient solutions such as mobile banking. After SLR, the following factors were found to affect the adoption of mobile commerce and banking by the elderly:

Pankomera and Van Greunen (2018) found illiteracy, poverty, low level of awareness, lack of trust and poor network connection as hindering factors. This study confirmed the findings by Asfaw (2015), which revealed illiteracy and financial illiteracy as challenges facing older adults. This age group may need guidance or tutoring when using various technologies. Chaouali and Souiden (2018) studied the resistance of mobile banking by the elderly using age as a moderating role. Based on the results generated from this study, barries such as

tradition, image, price-to-performance, and risk barriers were found to influence the usage of mobile banking. Security issues have also featured prominently among the elderly, consequently trusting the bank personnel to handle their money affairs safely is the safer option for this population segment. Bhatt and Bhatt (2016) found that security issues and technical problems are a barrier to the willingness of consumers to adopt mobile commerce. Participants in the Phoenix Marketing International (2017) study indicated that they resist technology because of security and lack of comfort and familiarity. Odera (2013) also highlights security as the biggest challenge facing mobile commerce. Research reports have associated security with privacy, confidentiality, integrity, availability and authentication (Panjwani & Cutrell, 2010; Chen, Zhang & Lee, 2013; Reaves, Bowers, Scaife, Bates, Bhartiya, Traynor & Butler, 2017; Chen *et al.*, 2018). Despite mobile banking bringing a lot of conveniences, most of the bank clients are still not prepared to use this platform due to some security issues (Goyal *et al.*, 2012), and security features are frequently requested by the elderly in the research studies (Koskela and Väänänen-Vainio-mattila, 2004).

In a study conducted by Levy and Simonovsky (2016), participants raised a lack of support and advice as a barrier to using services on such a platform. Gatsou *et al.* (2018) found that the majority of the elderly face difficulties with tasks involving transacting online. Furthermore, 83% of participants were unable to find certain icons due to their small size. Also, when assessing complications associated with mobile trends together with services offered (Shaikh & Karjaluoto, 2015), the elderly feel uncomfortable to use mobile technology. Gell *et al.* (2015) admit that previous research studies on technology usage by the elderly displayed low numbers of internet and computer use matched with other groups, confirming that the elderly are uncomfortable to use technology.

Samudra and Phadtare (2012) suggest that SMS services, which are a subset of mobile banking, are not user-friendly. For every transaction, there is a code that needs to be executed with different instructions. Remembering different codes can be difficult for elderly users, and more user-friendly software needs to be provided by banks (Samudra & Phadtare, 2012). Designers of technology products with such strategic choices fail to capitalise on the elderly segment as they represent unique consumption patterns and wealth (Chaouali & Souiden, 2019).

Based on the literature reviewed, Table 5.12 displays a summary of the enablers and barriers for mobile banking and commerce among the elderly. Influencing the elderly to use mobile technologies is significant to bridge the mobile divide (Ha, Canedoli, Baur & Bick, 2012) and to overcome social and financial exclusion. The commercial businesses should encourage their consumers to use mobile applications and should put their focus on increasing the level of ,satisfaction, which increases loyalty and customer retention (Albashrawi & Motiwalla, 2017).

Table 5.12 Summary of enablers and barriers based on the SLR

Enablers	Author	Barriers	Author
User-friendliness	Ayaratne, Ryan and Cripps (2017)	Security issues, Resistance to change	Lian and Yen (2014); Sindwani and Goel (2014); Senali (2017)
Consumer behaviour and attitude	Motwani, 2016	Trust	Dass and Pal (2011); Diako (2011); Mosolotsane (2013); Lian and Yen (2014); Choudrie *et al.* (2018)
Convenience	Kargin, Basoglu and Daim (2009); Gurtner *et al*.(2014)	Privacy	Sindwani and Goel (2014)
Perceived ease of use	Kargin, Basoglu and Daim (2009); Gurtner *et al*. (2014); Kolaki (2017)	Lack of personalisation	Diako, 2011; Jayachandran (2019)
Perceived value	Boontarig *et al.* (2012)	Complexity, lack of technical knowledge, Lack of familiarity	Sindwani and Goel (2014); Kolaki, 2017; Senali (2017); Touchaie and Hashim (2018)
Perceived quality		Fear of hackers, declining health, lack of knowledge, psychological decline and limitations of technology.	Senali (2017)
, Enjoyment	Mcgaughey *et al.* (2012); Gurtner *et al*. (2014)	Illiteracy and financial illiteracy	Asfaw (2015); Pankomera and van Greunen (2018)

		Lack of willingness to explain from the banks	Kolaki (2017)

5.7 CONCLUSION

In this Chapter, a SLR was conducted to address the following question: *What are the enablers and barriers for mobile commerce and banking among the elderly in developing countries?* This Chapter presented the research findings on the SLR which was conducted as part of the study. Due to the lack of studies in this area, only 11 studies were selected for the final review. From the studies that were reviewed the following were observed:

- Various countries use different age criteria to qualify individuals as elderly;
- Most studies were conducted in developed regions (a reason for including these studies was explained);
- The majority of the studies adopted a quantitative approach, and a gap for interpretive studies was noted;
- Most studies were conducted in developed countries, and the significance of this study was noted;
- Very few studies have focused their attention on enablers or drivers, and the majority investigated the barriers; and
- All studies highlighted a gap in studies that are focused on mobile banking and the elderly.

It is evident from the literature review that not enough interest has been shown by researchers on studies relating to the elderly and mobile commerce and banking, which was described by Mutambara (2016) as grey literature. In comparison to barriers hindering the adoption of mobile commerce, very few enablers of the adoption of mobile banking by the elderly were identified. Trust appeared to be the most cited barriers. Since the current generation of the elderly was born before the digital era, an absence of trust or lack of interest with regards to new technologies and innovation is prevalent. Nevertheless, the elderly seem to be interested in solutions that will contribute towards the improvement of their lives. Complexity, lack of technical knowledge and lack of familiarity were noted as additional barriers for the adoption of mobile banking by the elderly. No studies relating to gender differences in respect to the adoption of mobile banking by the elderly were noted in

the literature review undertaken. It is suggested that additional work should be conducted to increase the marketing strategies and awareness of mobile commerce and to minimise the barriers towards adoption. Interestingly, most studies selected for the final review adopted a quantitative approach, with a single study adopting a qualitative approach. Choudrie *et al. (*2018) previously articulated similar views. Consequently, the findings in this Chapter introduce new knowledge in this area of research.

The next Chapter presents findings from interactions with the elderly. In chapter 6, an attempt is made by the researcher to make sense of the interactions to extract enablers and barriers for mobile banking among the elderly. The data is presented using ANT moments of translation, and by elaborating on how actors came together to form a network.

CHAPTER 6

6 RESEARCH FINDINGS: FACTORS INFLUENCING THE ADOPTION OF MOBILE BANKING – AN ANT PERSPECTIVE

This research study explores how the elderly conceptualise, relate and interact with mobile banking technology. The goal is to understand how the newly established actor-network resulting from the new technology, in particular mobile banking, come to existence. ANT was adopted to facilitate the data collection process and as a guide for data analysis (Walsham, 1995). Influenced by ANT, data should not be seen as an inert object meant for human interpretation, but rather as actors with potential properties (Desai *et al.*, 2017). ANT emphasises on the equal agency of people and things including data. In this study, the data collected produce properties as a result of interview sessions with other actors, specifically the elderly. The analysis in this Chapter refers to the description of how actors act independently in the network, and how they can be influenced by other actors that exist in the network.

6.1 ACTORS

Mcbride (2003) defines actors as entities that act as intermediaries between other actors, not only limited to humans, but also non-humans such as technology artefact and other objects. ANT is thus used to trace the association of actors within the network (Cresswell, Worth & Sheikh, 2010), which is viewed as a set of heterogeneous associations (Walsham, 1997). Actors should be encouraged to use their abilities to act and be actively involved in the network (Harry, Sewchurran & Brown, 2014). Applying ANT means that all the factors (both human and non-human) influencing adoption of mobile banking are seen as actors that together form a network. To understand the adoption of mobile banking by the elderly, it is important to understand the type of interaction taking place between the actors and the network. It is also important to understand the influence of non-human actors that are involved in the network, such as money and mobile banking application. Table 6.1 lists the key actors that were identified in this study and their interest in establishing the mobile banking actor-network. In addition, their problems and anticipated roles in the actor-network are explained in the moments of translation (section 6.6).

Table 6.1 The key actors in this study

Actants	Their Interest
Human Actors	
Elderly consumers	They need to transfer money anytime and anywhere, to see their balance accounts and manage their accounts timely, to trust in technology to develop their activities (Malaquias & Hwang, 2016).
Engineers (App Developers)	Inscribe into the artefact the way it is used and the intention it is used for.
Community	A secure and convenient method of banking.
Family members and friends (of the elderly)	Motivate for the use of mobile banking (Blažun *et al.*, 2014). They help in setting up the banking platform and use.
Bank agent and staff (e.g. bank Tellers and customer service)	To have income, also an opportunity for bonuses or incentives. A certain percentage of the revenue generated from technology innovations contributes to salaries.
Non-Human Actors	
Banks (banking institution)	To increase revenue and profit Establish a competitive advantage (introduce new financial products) To attract new consumers To improve access to financial services To see returns from investment in infrastructure.
Customer location	Connectivity, technology attitude and beliefs
Bank App	Used to facilitate the interaction between the bank and the consumer
ATM	Used to facilitate the interaction between the bank and the consumer
Money	It moves from one account to the next in a form of digital money
Mobile device (e.g. smartphone, tablets/ipad)	Host the bank app May act as an enabler or barrier for mobile banking
Mobile network providers	To increase revenue (cost of network data to download and access the app), bank apps run using a mobile network. Telecommunication (mobile) network providers play a key role in implementation of

Actants	Their Interest
	mobile banking. Thus, every single mobile banking consumer is a business opportunity for them (Behl *et al*., 2016).
Bank account	Profiles assigned to the elderly Access to certain products and services

Figure 6.1 below depicts the interpretation of mobile banking actor-network using the graphical syntax as suggested by (Silvis & Alexander, 2014).

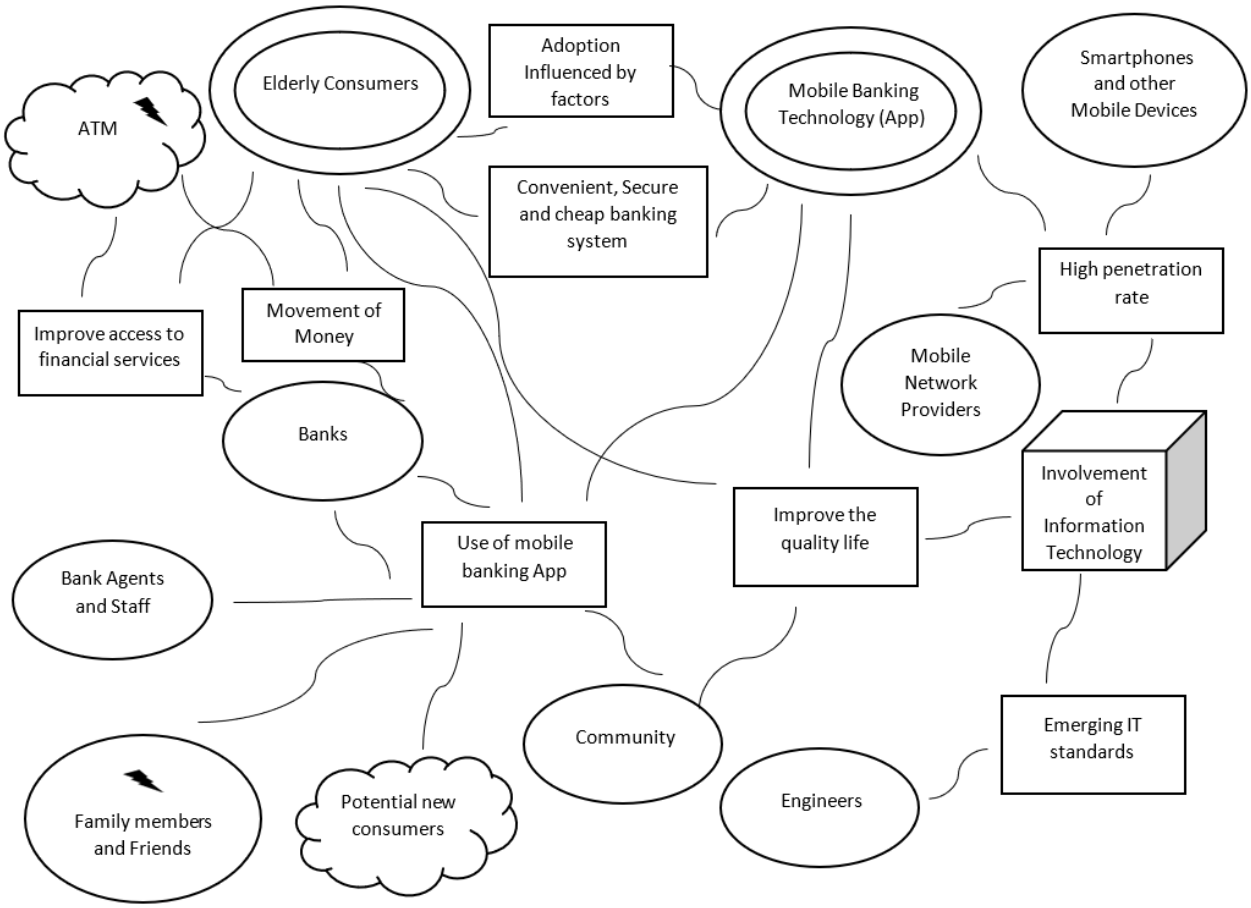

Figure 6.1 Mobile Banking Actor-Network Model

The above model is based on the actors identified in this study and their interest as shown in Table 6.1. In the diagram, the “Elderly consumers” and “Mobile banking Technology” are actants that directly have a bearing on the primary aim of this research (Silvis & Alexander, 2014). The mobile banking app is introduced by the banks to improve access to financial services. However, adoption and use depend on the number of factors that influence the decisions of the elderly consumers. The elderly were interviewed to identify these factors and Figure 6.2 below shows the generated themes and codes from the interview sessions.

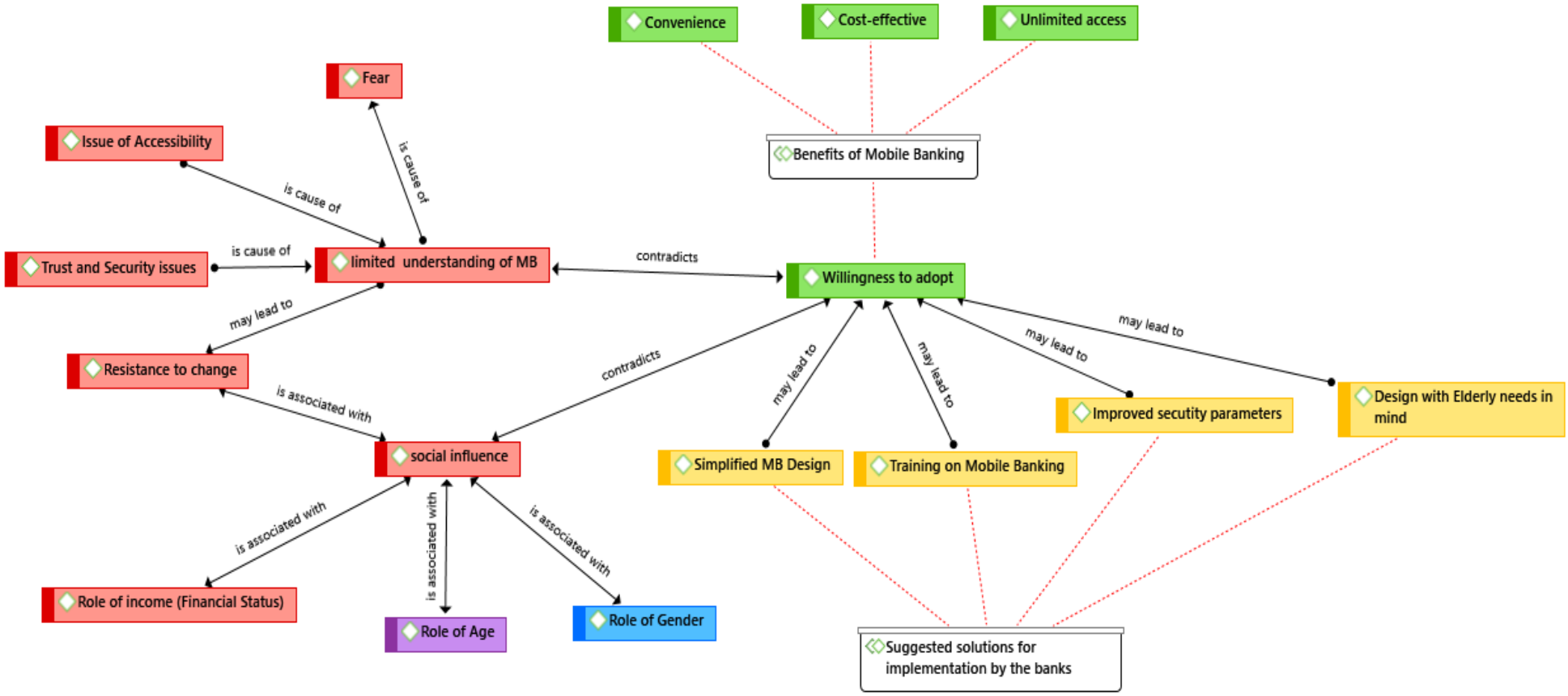

Figure 6.2 Situational analysis using themes and codes from interpretive data

The themes depicted in Figure 6.2 were extracted from the transcribed data to address the research question. The diagram shows the relationship between different themes and how they affect the adoption of mobile banking

Table 6.2 below shows a summary of how thematic analysis was conducted applying an ANT lens.

Table 6.2 Demonstration of data (ANT) analysis using quotes from the collected data

Quotation from transcribed data	Themes/Category	Interpretation using ANT
"*is when you use the phone to bank, whether you are at home, in the taxi, anywhere you are you get bank services"*	Understanding of Mobile Banking	The elderly saw mobile banking as an alternative means of banking.
"I have no clue what it is, ..Internet Banking what banking mobile banking or something that has to do with a cellphone"	Limited understanding of Mobile Banking	It emerged from the interactions that the elderly have a limited understanding of Mobile Banking. i.e. Problematisation
"As a businessman, I do not need to go directly to a branch or ATM to pay my bills and employees".	enablers of mobile banking	Convenience came as a strategy to enrol new users. i.e. Interressment.
"so when you sit here with this thing, you don't even know really how to work with it and you working with money and hell lots of money and then you scared to do it, you scared who's gonna hack or you going to send to the right person and whether are you doing a right thing. So, it easier if you're an old person to go into a bank teller and they help you"	Functionality, fear, trust	Difficulties in operating the technical actors (non-human) Mobile banking technology is deemed to be a barrier in enrolment and threatens the stability of the network.
"I'm afraid of someone looking into my account and stealing money without my knowledge"	Security and trust issues	Difficulties in operating the technical actors (non-human) Mobile banking technology is deemed to be a barrier in enrolment and threatens the stability of the network.
"they should put the security parameters; then maybe will try it and 3D authentication I think it's an ideal system"	Suggested solutions	Solutions to mobile banking will assist with adoption and keeping the actors in the network, i.e. translation.

Quotation from transcribed data	Themes/Category	Interpretation using ANT
"I told my other friends about it, that you don't have to stand in the queue to pay your rent, to pay your Telkom account. I told them to go to the bank and they can put it there for you." *"I've heard many benefits from family members such as efficiency".*	Social influence	There are actors who advocate on behalf of non-human actors.
"Well it all good when everything works but it not always available"	Challenges with accessibility/availability	Betrayal among actors put the network in an unstable situation such as issues with connectivity due to network problems. Such issues also affect enrolment.

6.2 PERCEPTIONS ON MOBILE BANKING TECHNOLOGY

Connectivity and mobile devices have created a space where mobile banking can play and attract other actants to join the network. Technology innovation has introduced banking solutions to the unbanked and previously disadvantaged at a minimal cost. Banking institutions were not included in data collection, focusing mainly on the interviews with the elderly consumers about mobile banking which was guided by the interview protocol. During the focus groups and individual sessions, the elderly shared their perceptions regarding their behaviours towards mobile banking.

Most of the respondents were aware of mobile banking but did not use it. For example, one of the respondents said: *"I have heard about it, but I am not using it. Mobile banking is where people use their phones to bank"*.

Another respondent added the following about mobile banking: "*is when you use the phone to bank, whether you are at home, in the taxi, anywhere you are you get bank services. You*

can deposit, put notice, anything you need from the bank. You do not need to go queue at the bank."

Based on the responses of the above-mentioned respondents, it can be concluded that the elderly have some form of understanding with regards to mobile banking, however, their understanding is limited.

Some of the elderly respondents appeared to know very little or nothing about mobile banking. When asked about mobile banking and whether they use it the following respondents replied as follows:

Quote 1: "*I have no clue what it is internet banking what banking mobile banking or I know it something that has to do with the cellphone.*"

Quote 2: "I *didn't know that you can use a phone to bank."*

One respondent stated that due to problems they face mobile banking would be an ideal solution for them*. "I have an ear problem; I cannot hear properly when they are talking"*

Although only a minority of the interviewees use mobile banking, the study established that they are aware of the benefits of mobile banking such as convenience and cost-effectiveness. One respondent explained: "*It saves on my banking charges and standing in long queues at the branch*".

The elderly are aware of the benefits or enablers of mobile banking In support of this statement one respondent said: "*It does have the advantages compared to old times*". However, it appears there are issues hindering the adoption of mobile banking. To this end, another respondent commented: "*I can use it (mobile banking) but I am scared I will lose the phone. I've already lost 2 phones and cards. I'm scared people will get my PIN."*

In this study, mobile banking is at the centre of how elderly clients of the bank interact with this technology, and the perceptions of the elderly on this matter are deemed significant establishing the factors influencing the adoption of mobile banking. Mobile banking is increasingly being used to facilitate various financial transactions across different actors across the world to make banking more convenient, cost-effective and safer. It is evident

from this study that the elderly have different opinions when it comes to mobile banking. Their perceptions are based on lived experiences and from their social environment. This stance is supported by the following perspectives on mobile banking which ranged from *"Mobile banking is doing the same things you would do at a bank from your phone*." to *"I just tell them to hire a child to teach them how to use mobile banking."*

While other respondents expressed their opinions on the complexity of the technology by proclaiming "*From what I have seen, it is the complicated technology especially the cellphone*", one respondent is quoted as saying "*They want to try and cut back on staff numbers, one because they have to pay them*". Lastly, by mentioning that "*My friends are still stuck with traditional banking because they do not understand the new system*", one respondent appears to be ahead of the group.

6.3 ENABLERS TOWARDS THE ADOPTION OF MOBILE BANKING BY THE ELDERLY

After transcribing and analysing the qualitative primary data, the following factors were identified as enablers of mobile banking:

Convenience: it was noted by the respondents that convenience translates to an opportunity for the elderly to conduct banking at any time or place expedient to them. One of the respondents said: "*It saves you a trip to the bank*". Having not to wait for the bank to open was viewed as a benefit mostly appreciated by the respondents. Mobile banking has made it possible to move money between the banked and the unbanked, thus making it convenient to transfer or receive money from different beneficiaries. The creation of such opportunities is a swift response to banking and financial exclusion challenges that have been in existence over many years. In support of this notion, one respondent proclaimed: "*As a businessman, I do not need to go directly to a branch or ATM to pay my bills and employees*." With that being said, this statement seems to suggest that some of the employees do not have a bank account. It is noteworthy that the elderly perceived mobile banking as a technology that offers convenience. To this end, another respondent added the following: "*When you need to transfer bigger amounts or large amount, you do not need to carry that large amount*."

Safety: In addition to convenience, the elderly perceived this method of banking (mobile banking) to be safe to an extent that one respondent commented as follows: "*I would definitely use it. Why would you expose yourself like that and move around with money and expose yourself to crime and everyone? There is no need to carry cash. It not necessary these days*". Moving around with money resulted in many individuals being victims of crime. Mobile banking has become a safer option for individuals.

Lack of queues: Before the existence of the internet and mobile banking, it was common for many people to spend their lunch breaks queuing at the bank waiting for their turn to be served. The study respondents were highly appreciative of this benefit of lack of queues. One respondent asserted: "*I said, you do not have to stand in the queue, that's a bigger benefit for me*". The respondents mentioned that there is no longer a need for them to wake up early in the morning to go stand in the long queues at the bank, even though others negatively viewed mobile banking by linking it to loss of jobs.

Cost-effectiveness: the costs associated with mobile banking are often questioned, however, the respondents in this study acknowledged that mobile trends save them travel money (taxi fare or petrol costs) and bank charges. A respondent declared: "*There is a free deposit and saves me my gas money*". It is quite clear that the respondent was referring to petrol cost when mentioning "gas money".

Willingness to learn affects translation at interessment phase. Most human actors noted that they are willing to try and learn how to use mobile banking technology. Guidance, availability of information and exposure during this stage is required to convince the actors to get involved in mobile banking. Below are some of the quotes indicating the willingness of the elderly to learn:
Quote 1: "*I would be keen to learn but it changes all the time, now I must learn this and that."*
Quote 2: *"I really need to know how it works, if it a go-to (what is being used now) and it is coming full force. The concern is too fast and mobile banking is very difficult."*
Quote 3: "*I am open to try it but I do not know if I will grasp it straight away, I could try"*

The above-listed factors were identified as factors supporting the adoption of mobile banking by the elderly, which contribute to the interessment phase of moments translation.

6.4 BARRIERS TOWARDS ADOPTION OF MOBILE BANKING

It is alleged that the relationship between mobile banking and the elderly can be understood by engaging the actors on their perspectives regarding the mobile banking system. The identification of reasons behind the non-adoption of mobile banking allows the barriers hindering the elderly to be easily identified. The actors were asked about the problems or challenges they face with regards to mobile banking. In response, several barriers were cited by the elderly during the interviews. One respondent said: "*It comes with a lot of frustrations and other sorts of problems"*. This indicated that there are barriers that need attention with regards to mobile banking technology and the elderly. Consequently, these issues affect the enrolment of actors and the stability of the network. The themes that emerged as barriers towards the adoption of mobile banking are as follows:

- **Lack of understanding:** To establish a successful and stable mobile banking network requires correct alignment of actor roles in the current network and after new actants join the network. In this case, the success of the network depends on the collaboration between actants mentioned in the study. However, it can be "problematised" that in as much mobile banking as a digital bank is out to bring affordable and convenient banking as suggested by other authors, the elderly consumers are not using it because most do not understand it. During the interviews with the elderly, there was a gap identified that pointed out a lack of understanding of mobile banking. This interesting quote from one of the respondents showed that the elderly have some issues with technology not particularly mobile banking *"I think it's an intolerance towards old people, we do not know what they mean, we not the same like our grandkids we are not good with technology and the technology is too advanced".*

  This is how one respondent doubtfully described mobile banking: *"isn't it banking outside, you don't have to go to the tellers anymore?"* Some claimed they know what mobile banking is but their explanations proved otherwise. Like this explanation given by one of the respondents: *"I do know what it is, mobile banking is when you go the bank, but you must be careful no one takes your phone."*

These insights from the elderly indicate that there is a gap in understanding what the technology comprises of only a minority of the actors using mobile banking. Out of those who used it, the majority were assisted by their children. The preference of banking amongst this group of individuals was traditional banking, meaning whenever they need to perform a financial transaction they had to go to the bank. It was also established that the limited information the elderly had, was sourced from their family members or other members of the society. While they have heard about it, many of them indicated that they are not using it. None of the information came from the banks.

- **Lack of information**: while lack of understanding was an issue for some users, other users were worried about lack of information. One respondent said," *ahhhhhh eish, the problem is knowledge and information. If you can get the information, then you can. They need to do awareness because there are too many scams, so that you can be confident to use mobile banking."*

- **Fear**: Technology may come across as intimidating for many potential users; this is what was established in this study. Making mistakes such as putting the wrong account number and sending money to a wrong person is one of the issues that constrain older users from using mobile banking. One of the respondents commented: "*Yes, I am afraid of someone looking into my account and stealing money without my knowledge".* As a result of this fear, traditional banking remains the preferred method of banking for the elderly.

- **Security**: Hacking was mentioned more than twice in the conversations with the actors. One respondent said: "Y*ou are working with money and hell lots of money and then you scared to do it, you scared who's gonna hack or you going to send to the right person".* This suggests that the society has convinced the elderly that mobile banking is not secured and that it is risky to use this method of banking. In support of this statement, another respondent added: "*Mobile banking is not secured, I might lose my money and I might forget to close it and someone will steal my money*." The elderly are wary of the safety of their money, framing security as a crucial factor that needs immediate attention.

- **Complexity:** The elderly viewed mobile banking as a complicated matter and that "*technology is too advanced*" (mentioned by a respondent from a focus group) for them. The respondents mentioned that it is complicated, fast-paced and they cannot keep up with the technology. Another respondent added: *"It is complicated because you push too many numbers for options".*

  Other respondents indicated that they face issues relating to downloading mobile banking applications. *You see I can use WhatsApp but when it comes to downloading, I can't*". Making the mobile banking available through downloading of the requisite applications discourages the elderly particularly when they cannot understand what they are supposed to do or when they are unable to navigate through the application and the fear of sending money to wrong people creeps in.

- **Accessibility issues**: The following issues were identified as challenges relating to accessibility: network and data issues; long procedures; and lack of clear instructions. Connectivity remains an issue across all technologies, particularly within marginalised communities. Accessibility to mobile banking requires connectivity through a mobile device, and this is often difficult or impossible because of poor connectivity and unavailability of data. The elderly mentioned that the procedure of using mobile banking is often long and it consumes a lot of their airtime or data and thus resulting in them not completing the relevant transactions. A respondent added, "*The procedure is long, and you have to wait for a while to get a response and your airtime get utilised, by the time you get the response all your airtime is utilised*". In this particular case, it can be assumed that the elderly respondent was referring to cellphone banking where airtime is used to access, and process banking options provided through USSD codes. The respondents also mentioned that the procedure involves the use of terminology that they do not understand, and it becomes a problem for them especially when there are no instructions or someone to guide them through the process of making the relevant transactions. A respondent noted: "*It depends on the changes, especially for the banking and the terms are difficult to understand*. *The need to make it easier to access*".

- **Resistance to change**: The following interesting comment was made by one of the respondents: *"You know, you must realise one thing, we were born BC (Before Computers)".* At this point, it was difficult to make assumptions behind this statement. While there was a group of respondents that was willing to learn and use mobile banking, on the contrary, others mentioned that they are old school and thus prefer the old traditional methods of banking. One of the respondents said "*I feel what they are trying to do is just drop all this personal communication. You are used to being personally looked at and served. That's the era we came out of".* This statement suggests that the elderly are not ready to transform and move away from traditional ways of doing things. Furthermore, this indicates human interaction is preferred over the self-service type of banking. For this reason, new technological accomplishments are often overshadowed by non-adoption especially among the elderly.

- **Demographic factors**: Under demographics, the study immediately revealed that role of age, the role of gender and role of income and social influences are the major contributors to low adoption of mobile banking by the elderly. The elderly believe they are too old to try new things or for sophisticated technology referencing that it not a social environment they grew under. While it may benefit them, social influences also play a role in influencing the elderly not to adopt.

- **Role of social influence/family members**: Social influence can be for adoption or against adoption. The views that were expressed by the elderly were mainly negative towards information that is communicated about mobile banking. This motivates the elderly not to adopt mobile banking, and thus serves to highlight the power of social influence and word-of-mouth.

- **Age health decline:** during interactions with the elderly, it was evident that the respondents are of the view that being old affect their use of technology. One respondent said: "*We are, but we getting old and we forget.*" Another respondent said: "*We old now, we do not like to do things that are complicated for us, of which we will fail to operate".* They indicated that the banks are not catering for their needs as old people. A respondent stated, "*We have slow brains and it does not work like four, three, two, one". So, they don't have the tolerance levels to explain to us.*" The

other respondent added: "*I think they need to consider the older people because our brains do not reflex-like they used to"*. Not only are these issues concerned with age, but they also raised health decline as a barrier. It is quite evident that there are issues for consideration by the banks pertaining to the elderly clients and their needs.

- **Role of gender** was also noted as a barrier towards the adoption of mobile banking. Whereas most of the male respondents remained silent during the interviews, the female respondents indicated that their husbands were the ones acquainted with banking technology. One respondent indicated that her partner was influencing her to use mobile banking. *She said, "No I can't use it, but I use to do it when my husband was alive"*.

- **Role of income and financial status** also formed part of the discussion. As pensioners, the elderly did not see the need to use mobile banking due to not having enough money or whatever amount in the possession gets spent very quickly. More than one respondent acknowledged that they do not have enough money to use mobile banking or to buy data. One respondent commented: *"I do not think it warrants, you see, for now, the money that I have is too little. Look at what I am getting as grant and what I get after they have deducted what they need to. At most I am left with about R300. So that is not much."*

- **Role of Language**: Language appeared to be a barrier for the actors in this study. During the focus group meetings, the respondents quoted that they face difficulties when using mobile banking because of language and terms being used. One respondent said: "*Asiyi-understandi nje (we do not understand it at all). You see me, all I know is to go to the bank and bank my money. But I do swipe my card. I don't even buy airtime on my phone".* Another comment came from another respondent: "*You do not understand the terms or words they use on the side, and they've got no time to explain to you".* It appears the respondents share the same sentiments regarding the terminology being used by the banks based on this additional comment from the respondent: "*The language and terms they use are too difficult to understand".*

Considering the diversity of clients who have access to bank accounts, it is vital to consider profiling the potential mobile banking clients and design and market the services based on these profiles.

Figure 6.3 shows a sample of quotes that were interpreted as barriers towards the adoption of mobile banking. The quotes were extracted from interview sessions with the elderly and depict challenges hindering the adoption among the elderly.

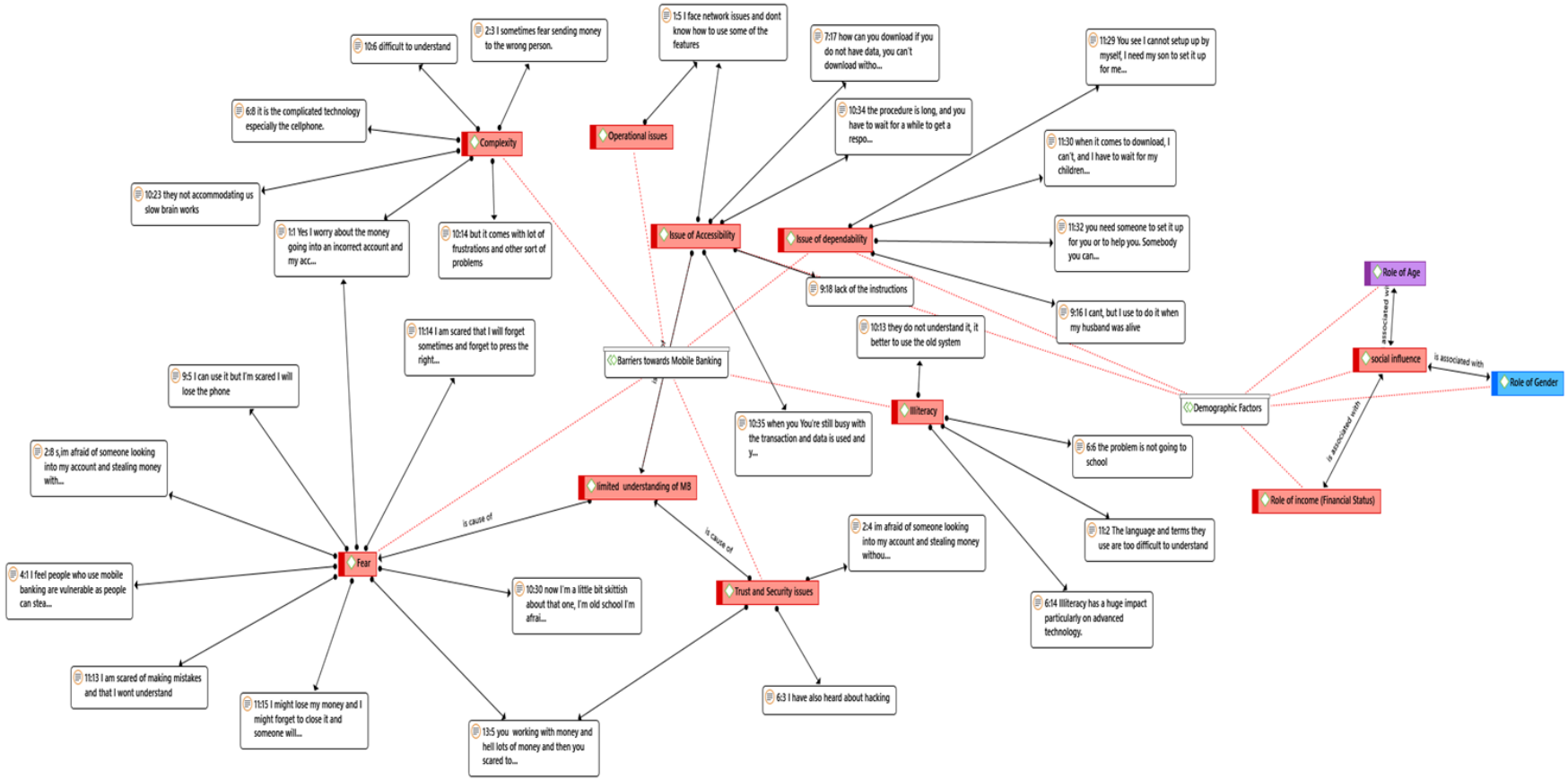

Figure 6.3 The elderly perceptions on barriers of mobile banking adoption

6.5 SUGGESTED SOLUTIONS FOR IMPLEMENTATION BY THE BANKS

After considering the barriers mentioned above, the elderly respondents recommended strategies that could assist the banks to enrol new users and keep the current actors mobilising the network. Although the actors were willing to adopt mobile banking, banks and their associate agents still need to revisit their artefacts and consider the needs of different users regarding new technology and converged services. This is what respondents had to say regarding adopting new strategies for the elderly: *"They should put the security parameters; then maybe will try it and 3D authentication I think it's an ideal system."*

The other respondent mentioned: *"I think the exposure, presentations, that way it can work. People can adjust. When we grew up, there was no lotto, but people are playing it. With a bit of time exposure and sitting down with people educating them, they can adopt. I cannot say. I cannot say the problem is technology, there are a lot of things that are new to people, but they are using it".*

It is common knowledge that the current generation of the elderly is less familiar with technology, and the adoption of any new technology takes time depending on how it is introduced to people. For the actors to join their allies and enrol into the network, they need to see or be convinced that joining the network is in their best interest. There is an opportunity for the elderly to live an independent life considering the present technology trends. In this study, the majority of the respondents are dependent on their family members, friends and carers to complete their daily tasks. These associates have taken upon themselves to help setting up technology and navigation. They also speak on behalf of the technology. Due to the issue of dependability, such technologies can only be used in the presence of these individuals and thus eliminating some benefits presented by the technology.

6.6 MOMENTS OF TRANSLATION

Callon (1999) cites two important ANT concepts that are used for analysing and discussing the findings, namely: four moments of translation (including problematisation, interessement, enrolment and mobilisation) and inscription. These concepts are dominantly used in this study to interpret the experiences of the elderly. Through translation, the ANT

expresses stories about how actants or objects, actors, come to existence and remain in the form they are in. Furthermore, Callon (1986) argues that the moments in translation do not always follow a chronological order, there is a chance that they may overlap in certain cases. Looking at this situation, the inscription takes the first stance in forming this network.

Inscription and Problematisation - The group of elderly appeared to be divided in terms of their perceptions towards mobile banking. Depending on how IT artefacts are inscribed, the elderly have their reservations particularly where mobile banking is concerned. Shim and Shin (2016) describe inscription as the process of creating technical artefacts that secure the actor's interests. Using ANT, the interests of the actors may differ widely and may favour or constrain the technology (McBride, 2003). The important task at this stage was to gather the understanding of mobile banking by the focal actors and to determine if they are using it and conclude that their interest are inscribed on the technology in question. In this case, mobile banking is seen as the non-human actor (or IT artefacts) inscribed with several benefits that extend to various products and services offered by mobile banking that serve as the obligatory passage point (OPP), where all the other actors foretold to have interest in this network would need to go through to satisfy their interest. Introducing mobile banking services was thought to be easy for banks because the OPP (mobile banking application) hosted on mobile devices and carried by mobile network provider was not difficult to rollout due to the high number of smartphone ownership. Although the respondents studied created an impression that they were informed on the issue of mobile banking, only a very small minority was using this banking platform. Additionally, there was a group that was not at all aware of the mobile banking platform.

Problematisation, which is often referred to as the first stage in moments of translation, is the process whereby the actors regard their project as being crucial to other actors (Abdallah, Dwivedi & Rana, 2017). According to Mpazanje, Sewchurran and Brown (2013), this is when the focal actors are willing to change the way things are done by sharing their interests with other actors that may appear to have similar interest. The banking sector has historically been relying on operating in physical structures (i.e., branches) that are supported by many ATMs where clients can withdraw physical cash. As far as Jayachandran (2019) is concerned, accessing banking products and services at a branch is preferred by the majority of the elderly clients. Many of the elderly clients' preferences are attracted to

the human interaction element that comes with interacting with banking, and they find this mode of banking to be much more convenient and safer. Mobile banking offers a problematisation of traditional banking among the elderly where the banking could be convenient, secured, and cost-effective and available at their place of comfort. As defined by the focal actor, problematisation offers mobile banking to the elderly together with the benefits that are inscribed in them while increasing the revenue stream. Problematisation, in this case, is an attempt to increase the adoption of mobile banking by subscribing the elderly to a mobile banking network or finding means to convince them that it is in their interest to adopt mobile banking.

The OPP for the focal actor was to encourage the uptake of mobile banking by the elderly; this means elderly consumers must have interests that are aligned closely to the OPP of the banking institutions. The banks need to align their interests with those of the elderly consumers by addressing the issues raised by this group to persuade the elderly to adopt mobile banking. Implementing these solutions will mean that the network is redebated and reconsidered to accommodate the elderly and their interests. If the interests for all the actors are perfectly aligned, passing through the OPP would be considered successful.

Interressment - In this actor-network, interessement and inscription were provided through convenience, cost-effectiveness and elimination of queues. These are the interest inscribed in the technology on behalf of the actors. However, the majority of the elderly were not convinced of the interest inscribed in the IT artefact. They did not see mobile banking as being convenient and cost-effective, hence the adoption numbers were very low. The elderly cited a number of problems associated with mobile banking such as lack of security and privacy, and onerous procedures that consume a lot of airtime and mobile data. Due to the complicated service that is not coupled to user guidelines, the elderly felt their interest was not inscribed on the mobile banking technology. The interest of the elderly was not aligned to that of mobile banking and the banking sector. This means the actors have to renegotiate their interest and association in the network. Subsequently, unsuccessful interressment was recorded, and the next stage of translation “enrolment” within the mobile banking actor-network had to be negotiated.

Enrolment - Enrolment can be described as a “group of multilateral negotiation" (Callon, 1986). According to Mcbride (2020), aligning the interests of the actors within the network

through negotiation, translation, and inscription, the actor-network is established as actors persuade others to enter the network. The stability of the network in the network and associations depend on the negotiation process (Arif *et al*., 2017). Even though mobile banking is inscribed with a number of benefits, it is also framed with barriers. Nevertheless, the elderly can be portrayed as end-users or actors who would be interested in performing financial transactions using the mobile banking app at an affordable cost and convenient time as defined by other actors.

Similarly, many elderly clients encourage their friends to use mobile banking. As more actors join the allies, the network acts as a middleman to facilitate the associations. The mobile banking network may be extended through an increasing number of users, thus rendering the network to be more established.

Since the network is renegotiated, enrolment strategies are then proposed to address the barriers hindering the adoption of mobile banking that were raised by the elderly during the focus group meetings and interviews. The primary purpose was to promote a lock-in, where mobile banking technology becomes socially acceptable to the elderly, thus creating a stable environment for expansion. Strategies are proposed to align the interest of the elderly with those of mobile banking where the elderly can accept the artefact and increase the adoption rate. In this stage, translation can be achieved by making the IT artefact (mobile banking technology) less complicated, more secured, as well as introducing shortened procedures, easier methods of authentication and verification, language flexibility or terms that are easier to understand and by including educational training on the platform as well as products offered. It is through these strategies that actors will be convinced to join and also retained in the network. The inscription of the interest of all actors involved will result in a successful enrolment. It is envisaged that convincing the elderly about the benefits of mobile banking will lead to an improvement in the adoption of mobile banking technology by this market.

Mobilisation - This is the fourth and final stage of moments of translation. The objective in this process is the successful alignment of actors (Abdallah *et al*., 2017), and stabilisation of the actor-network and maintenance of the formed relationships (Harry & Brown, 2014). During this phase, the advocates speak on behalf of the other actors (Harry, Sewchurran & Brown, 2014). It is during this stage that the proposed solutions are accepted. Mobile

banking has not been portrayed fairly, thus leading to some network not being formed or actors leaving the network. Previously, through social influences, the elderly have been misinformed about mobile banking. Negative information from different sources has influenced the elderly not to use mobile banking, leading to the network being unstable and the majority of the elderly not joining the allies. The elderly mentioned that they have heard about hacking and fraudulent activities happening on mobile banking platforms. Therefore, security has been a leading concern. This has resulted in the elderly fearing to use mobile banking or being depended on their family members and relatives to act as an interface when they need assistance to navigate the mobile banking applications. Future studies can investigate and determine whether the proposed solutions were accepted and implemented as intended by the actors.

Summary of moments of translation - Mobile banking was pioneered from mobile technologies and network connections. The ANT states that the involved actants must actively maintain its network or the network will fail. In this case, the actors and their interests were identified. The immediate concerns that came to light were the existence of a misalignment of interests between the actors. While mobile banking is usually available for use by different clients, it remains either not adopted or under-used by the actors. The elderly felt that the banks can do more to inscribe their interests in the IT artefact. Communication and awareness could eliminate many barriers that lead to actors not joining the network of factors that leave the network unstable. Benefits that are inscribed into mobile banking needs to be communicated by the banks. This will ensure that the elderly clients receive information from reliable sources and are afforded an opportunity to ask questions. To enable the elderly to use mobile banking technology, banks should offer the requisite training. Interessement strategies deployed need to favour both the elderly and mobile banking. Although mobile banking is available inscribed with benefits, it will require a significant review on behalf of the elderly to ensure translation happens. A summary of findings using ANT' moments of translation is illustrated in Table 6.3.

Table 6.3 Summary of ANT analysis

Moments of translation	Findings
Inscription /Problematisation	• Mobile banking has been embodied with financial products and services such as money transfer, viewing bank statement and paying bills.

Moments of translation	Findings
	• Mobile banking has been framed with the number of benefits such as convenience for users to explore. • Mobile banking was introduced as a means to move around digital money between different users and merchants. • The elderly clients are not using mobile banking because the adoption of mobile banking among the elderly is generally very low.
Interessment	• Very few elderly users view mobile money as a convenient way of banking. • Banks tend to offer mobile banking to the users without necessarily segmenting and targeting specific markets. There is no customisation or personalisation of the platform. • Banks inscribed the mobile bank application (artefact) with various products and services. • The banks view mobile banking as a solution to reach the under-banked and unbanked.
Enrolment	• There are barriers that affect the enrolment of actors into the network due to the existence of a number of barriers influencing the actors such as security, fear and complexity. • The studied users and potential users have suggested strategies for enrolling other key actors based on their needs such as secured platform, training and easier authentication or verification.
Mobilisation	• Family members and other elderly users have become advocates of mobile banking through word-of-mouth advertising, and thus influencing other clients to use mobile banking. • Family members act as an interaction interface, in cases where the elderly clients require assistance with the use and navigation of the banking application. • The issues that need to be resolved that affect clients that have already been enrolled include running out of data. • The network is not yet stable. The relationships within this actor-network are being negotiated and debated. • Solutions are proposed to keep the current actors enrolled. • Some elderly bank clients are not willing to use mobile banking.

6.7 CONCLUSION

This Chapter presented the findings of the primary data. The findings presented in this Chapter were based on the themes that were extracted from the interactions with the elderly respondents. Thematic analysis was used to analyse data using ANT concepts to understand the lived experiences of the participants using ANT terms, where data was coded using the interesting quotes captured during the focus group sessions and individual interviews. The actors were identified together with their interests. In this Chapter, the enablers of and barriers to mobile banking for the adoption of mobile banking among the elderly were identified and explained using actual quotes from respondents. The ANT moments of translation were then used to make sense of the data. The next Chapter discusses the findings from this Chapter and the SLR discussed in chapter 5.

CHAPTER 7

7 DISCUSSION

In this Chapter, ANT is employed as an interpretation tool to make sense of the data presented in Chapters 5 and 6 in relation to the extant literature.

7.1 INTRODUCTION

The purpose of this study was to investigate the enablers and barriers of mobile banking for adoption by the elderly. Secondary data was collected using a SLR. In addition, primary data was collected using focus group meetings and individual interviews to answer the research questions. In this Chapter, findings on the enablers and barriers towards the adoption of mobile banking by the elderly are discussed. Lee *et al.* (2015) identified five major actors participating in the provision of mobile banking services: banks, mobile banking technology, mobile carriers, customers, and mobile phone manufacturers. Additional key actors participating in the mobile banking network were identified in this study. The discussion that follows revolves around these actors.

7.2 ACTORS AND THEIR PERCEPTIONS OF MOBILE BANKING

The primary challenge faced by the elderly is to adjust and respond to the demands of a modern world including the use of modern technologies and to be connected (Ordonez, Yassuda & Cachioni, 2011). Mcgaughey *et al.* (2012) are of the view that the elderly are not a homogeneous group of people and their needs are also different. The behaviour of the elderly towards technology is debatable. Laukkanen and Laukkanen (2007) mention that the elderly are more resistant to adopting technologies such as mobile banking. In the view of Chaouali and Souiden (2018), the majority of the elderly are confident and comfortable embracing the latest technologies aimed at making their lives easier, such as automated household technologies. In contrast, the findings of this study paint a completely different picture of the elderly being scared of using technology. This notion was very prominent during the interview sessions the researcher had with the elderly. Xiong and Matthews (2005) claim that the elderly are more reluctant to use banking technologies and preferred to deal with bank tellers. Similar sentiments were also expressed by the subjects of the current study. Therefore, it is safe to conclude that the elderly do not have the confidence to use advanced technology (Medhi, Ratan & Toyama, 2009; Blažun *et al.,* 2014). Most of the

elderly investigated in this study use some progressive technology such as smart home appliances and communication applications such as Skype with the assistance of their friends and family members. With regards to banking technologies, although this group still prefer to go to the bank to withdraw money, they still recognise the benefit of time-saving that comes with the utilisation of mobile banking (Blažun *et al.*, 2014). Proper incentive or reward system can be proposed to encourage the use of technology to experience the benefits in cases where personality impedes adoption (Touchaie & Hashim, 2018).

Despite mobile banking service being readily available to the elderly always, it remains unnoticed or under-utilised (Vuong, Hieu & Trang, 2020). In support of this statement, the elderly indicated that they are not using mobile banking. Mobile banking is a preferred method of banking among young people, but not as fashionable amongst the elderly (Kumar, 2020). While some elderly people are willing to try mobile banking, others indicated that based on the information that they have, they have no intention of using it. According to Mupfiga and Padare (2017), the mobile financial record gives the individual the capacity to perform regularly underestimated tasks such as saving, debit order dispute and setting up money transfers (scheduled payments) and electronic instalments. Similar sentiments were echoed by the respondents of this study by mentioning convenience, cost-effectiveness, unlimited access and lack of queues as benefits associated with mobile banking. Therefore, marketers need to address the issues of comfort and confidence in the online system to encourage the use of the mobile business application (Iyer & Eastman, 2014).

7.3 ENABLERS

The digital age has impacted the way we live and conduct business by minimising human contact and interaction in different aspects of our lives. The use of mobile technology has been framed as a coping mechanism (Seifert & Zurich, 2015), allowing individuals to be in places that are beyond their limit virtually. Similarly, mobile banking has given bank consumers more than just control over their finances; individuals can apply for financial assistance without having to go to the bank.

In the SLR section of this study, convenience, perceived ease of use and perceived usefulness, enjoyment were reported as enablers influencing the elderly to adopt mobile banking (Gurtner *et al.*, 2014). Similarly, the findings derived from the primary data also

revealed similar findings on the convenience of mobile banking. In addition to convenience, the elderly appreciated the benefit of not having to queue at the branches (Al-jabri, 2015; Sripalawat, Thongmak & Ngramyarn, 2015). In this study, the elderly similarly asserted that mobile banking is convenient because there is no longer a need for them to wait in the long queues to access services. The elderly can perform transactions via m-banking and can conclude the relevant transactions without having to queue (Sripalawat, Thongmak & Ngramyarn, 2015).

"Willingness to learn" was also noted as an enabler for the adoption of mobile banking. Sindwani and Goel (2014) found that mature customers are willing to adopt banking technologies, provided their banks are willing to offer them the necessary guidance and assistance. Touchaie and Hashim (2018) also suggest that banks should offer training and good illustrations that explains on a step-by-step basis on how to use mobile banking.

Following a SLR, ease of use, perceived value, user-friendliness were reported as additional enablers for the adoption of mobile banking (Gurtner *et al*.2014; Touchaie & Hashim, 2018; Jayachandran, 2019). Except for perceived value, similar enablers were unearthed during the interviews conducted in this research study.

It can be argued that when the users perceive the use of mobile banking as being easy, convenient, flexible, and not much effort is needed to use it, they are more likely to adopt mobile banking (Moorthy, T'ing, Yee & Ang Wen Huey, 2019). Controversially, the study also noted that the supposed benefits of mobile banking had a lesser influence on elderly consumers.

7.4 BARRIERS

Generally, the adoption of mobile banking is fraught with a number of barriers not specifically related to the elderly. Such barriers include lack of awareness of mobile banking offering; poor network connection; illiteracy; lack of trust; security issues; and complexity of the concept itself (Mlitwa & Tshetsha, 2012; Reaves *et al.*, 2017; Pankomera & van Greunen, 2018). All these barriers were mentioned by the elderly that participated in this research study. Through the researcher's interaction with the elderly, it was evident that the elderly have reservations relating to the adoption of mobile banking. As stated by Robb and Vilakazi

(2016), it is common knowledge that mobile banking technology offers several benefits to the users, enabling consumers to transact in a platform that is secure, cheap and convenient. On the contrary, the finding of this study indicates that the elderly consumers lack the knowledge and a full understanding of mobile banking including the benefits inscribed on it, thus leading to them not adopting the technology. Furthermore, it was established that elderly clients are not fully aware of the products and services that are available on the different banking applications. This seems to suggest that banks are not sharing information or being transparent about their digital services and the usage of their mobile banking technology.

The banking needs and preferences of elderly clients are still aligned to traditional banking that involves the use of branches to conduct financial transactions. As stated previously, Mosolotsane (2013) is of the view that traditional banking is a preferred method of banking among the elderly. The elderly still prefer to conduct cash withdrawals through the bank or the ATM (Blažun *et al.*, 2014; Jayachandran, 2019). Although similar findings were established in this research study, the elderly were also found to prefer withdrawing cash at the cashiers of the grocery wholesalers that have partnered with banks. During the interview, the elderly expressed that this method is cheaper and more convenient than other methods of banking.

Considering the above, resistance to change appears to be a barrier identified among the focal actors in this study. The majority of the participants expressed a preference to go to the bank and be helped by bank agents or tellers rather than adopting changes brought by technology. As previously noted by Mosolotsane (2013) that this group of consumers prefer human interactions when it comes to banking. The new technologies are betrayed by the familiarity the focal actors have with the traditional way of doing things. These findings corroborate those of Chaouali and Souiden (2019), which established that resistance to change (tradition) is among the reasons why the elderly resist mobile banking. Touchaie and Hashim (2018) also found that resistance to change has a significant negative effect on the elderly adopting mobile banking. Traditional banking has proven to be costly for both consumers and banking institutions (Robb & Vilakazi, 2016).

In light of the aforementioned issues, mobile banking is offered almost at no fee allowing the inclusion of previously disadvantaged into the banking network. While some researchers claim affordability as a challenge, others have reported it as a benefit (Lin, 2013; Sohail and Al-jabri, 2014). Although mobile banking attracts less transaction charges, the additional costs such as airtime and data have proven to be costly for most people. In the views of the respondents in this study, it is better to do banking at the grocery store since the bank charges are lesser compared to other methods of banking. This evidence can be confirmed or argued in future research. Nevertheless, a large group of consumers is convinced that "cash is cheap" ignoring the accompanying costs such as travel cost, time spent travelling to get cash and exposure to theft. With regards to affordability or cost-effectiveness, the study revealed that a combination of age and role of income or financial status can influence the non-adoption of mobile banking by the elderly. The elderly people believe that because they are old and do not have enough money, it is unnecessary for them to use mobile banking. As previously mentioned by Manuel and Veríssimo (2016), there is need for further research regarding the effect and role of age on the adoption of mobile banking.

In this research study, elderly consumers have argued for secured transactions. According to Behl *et al*. (2016), security involves factors associated with confidentiality/privacy, authentication, and integrity. Mujinga, Eloff and Kroeze (2018) maintain that some of the security outbreaks are a result of design defects and mismanagement of information systems. These concerns influence consumer views of mobile and online banking (Daştan & Gürler, 2016). Susceptibilities surrounding the banking system and the vulnerability of the elderly users put the actor-network in an unstable state, thus leading to rejection by the elderly. Similar sentiments were expressed by Agwu and Carter (2014) who feel that the majority of banking consumers remain distrustful about the benefits of offered services and the level of security. Similarly, Manuel and Veríssimo (2016) found that high perceived risk is the main factor behind the non-use of mobile banking technology.

Other than security and risk around mobile banking, the security of the mobile device itself has also been reported as a concern for the elderly. Chen *et al.* (2018) suggest that the security of the device remains a huge security matter to those consumers willing or using mobile banking. Additionally, Wazid, Zeadally and Das (2019) found that security threats have kept many consumers from adopting mobile banking. This can be interpreted as a

betrayal by other actors, negatively impacting the enrolment of new actors and stabilising the network. In relation to security issues, trust also emerged as a factor hindering the adoption of mobile banking. This factor was also noted by Sindwani and Goel (2014) and Senali (2017), who found the elderly to be very fearful of hackers. To increase the uptake of mobile banking, such factors need to be eliminated or banks need to come up with strategies to educate the elderly about safety precautions or safety measures inscribed in the artefacts. Banks have ensured that user profiles are accessed through the processes of authentication. Previously, it was mentioned that the challenge lies in designing PIN-protection systems on interfaces that are usable by those with low literacy level (Panjwani & Cutrell, 2010). Behl *et al*. (2016) postulate that mobile commerce and banking applications should provide adequate strategies and security measures so that dishonest users can be found.

The banks can avoid the above-mentioned challenges by engaging more with their clients, particularly on new developments or opportunities that are deemed beneficial to the clients. For elderly clients to adopt mobile banking technology and appreciate the benefits thereof, they will have to overcome that fear of their money and credentials being stolen by third parties. It is worth mentioning that the current cohort of elderly clients was introduced to technology during the period when the technology had already matured and evolved; therefore, any new unsecured technological developments have the potential to threaten what they are accustomed to. This becomes much more serious if the potential user lacks the requisite knowledge to use the technology. Data collected in this research study indicates that the elderly have a limited understanding of mobile banking, and are therefore more likely not to adopt mobile banking. Sindwani and Goel (2014) also found a lack of technical knowledge as a barrier to the adoption of mobile banking. Malware such as rootkit, ransomware, spyware, trojan and virus are reported as challenges that can affect the mobile banking system (Wazid, Zeadally & Das, 2019).

Laukkanen (2016) suggests that future research should pay more attention to the often-overlooked issue of demographic variables. Interestingly, demographic issues (i.e. gender, age, social influence and language) were mentioned by the elderly that participated in this research study. Through interviews, the elderly mentioned the influence of the society they lived in (i.e., their family members and relatives, friends and society in general). These

findings contradict those of Moorthy *et al.* (2019), which established that social influence had an impact on the adoption of mobile payments. However, it can be argued that this study investigated mobile banking and the elderly while the other studies focused on mobile payment and working adults.

The role of gender in the adoption of mobile banking was noted in this research study. Previously, numerous studies have indicated that male counterparts are more likely to adopt mobile and online banking technologies. Some of the female respondents in this study mentioned that their husbands are the ones who use or are familiar with mobile banking. In some cases, respondents claimed that their sons were assisting them with mobile banking and other digital technologies such as Skype. These observations seem to concur with previous studies suggesting that men have a higher efficacy towards ICT usage when compared with women (Tømte & Hatlevik, 2011). Based on the results of this study, it can be concluded that gender does play a role in the adoption of mobile banking among the elderly. The extent of the role played by gender in the adoption of technology, especially mobile banking, among the elderly population should be probed further.

Language poses a barrier for adoption of mobile banking by the elderly. SA is a nation of multiple languages with eleven languages being recognised as official languages (Brenzinger, 2017). Given the fact that English dominates the technological landscape, the issue of language has previously been identified as a barrier in the use of the internet and mobile applications (Halaweh, 2011; Harry & Brown, 2014; Touchaie & Hashim, 2018). Halaweh (2011) contends that language is a limiting factor since local native languages other than English are generally not accommodated. Jayachandran (2019) suggests guidelines on how mobile banking services should be explained in local languages. Interestingly, none of the respondents in the study conducted by Rogerson and Fairweather (2010) mentioned language as a barrier for the adoption of e-commerce since the users were able to change the default language setting. Also, the mobile money systems such as M-Pesa are the evidence that multi-languages are possible in mobile banking platforms as Kiswahili is currently available (Adama, Shehu & Adepoju, 2017).

Family members acted as the interface or intermediary when the elderly needed to use the mobile banking system. Due to a lack of understanding of the system, the elderly clients

relied on friends and family for assistance. Similarly, Luijkx, Peek and Wouters (2015) reason that the assumption that elderly are supported when using mobile banking is inadequate for the elderly to use the banking technology; they also need to be willing to request help from family members. The same outcomes were observed in the study by Medhi, Gautama and Toyama (2009), where the users did not access the banking application on their own but instead asked their peers or agents to help them perform the relevant transactions. Similarly, the SLR conducted revealed that, until now, knowledge of the perspective of elderly on technology to make provision for ageing was hindered mostly by the elderly's intention to use technology sometime in the future (Luijkx, Peek & Wouters, 2015).

Although it appears that the majority of the respondents in this research study are willing to try and learn how to use the technology in question, however, certain actors need to play an active role in ensuring the enrolment of the elderly and other actants into the network. A need exists to familiarise the elderly with mobile banking technology and thus enable them to use it. Similar sentiments were expressed by Choudrie *et al.* (2018) by advocating that users who want to adopt any new technology such as mobile commerce or mobile banking would need to have a basic understanding of that technology. Touchaie and Hashim (2018) suggest that applications or technology designers should develop elderly-friendly technologies that are simpler to use.

It has been further suggested that banks should develop and offer educational programs and training for their elderly clients on how to use the mobile banking applications and also inform them about different products that are available (Mcgaughey, Zeltmann & Mcmurtrey, 2013; Sindwani & Goel, 2014; Kolaki, 2017; Chaouali & Souiden, 2018; Touchaie & Hashim, 2018). According to Maroofi, Kahrarian and Dehghani (2013), clients are likely to consider mobile banking if they believe that learning and using mobile banking is easy. Similar views were shared by Blažun *et al.* (2014); these authors pointed out that there are differences in how the elderly use of technology and emerging activities should rather be focused on ensuring the availability of demonstrational and promotional activities and courses to motivate the interaction between the elderly and technology. However, it needs to be pointed out that the elderly would not appreciate the technology that needs a mental effort to learn (Ayaratne, Ryan & Cripps, 2017). Products and services embodied in the artefacts are

generally inaccessible to the elderly due to the inability of this population group to use the mobile banking applications. In this study, social influence proved to be significant in influencing the decision to adopt and use mobile banking. It appears all the information about mobile banking that is possessed by the elderly came from their social networks.

It has been established in this research study that lack of understanding is one of the main issues behind the low adoption of mobile banking amongst the elderly and it, therefore, constitutes a barrier. The elderly are not fully aware of the opportunities embedded within mobile banking technology and most barriers stem from a lack of understanding on how the mobile banking technology system works and how it can be used to their advantage. In light of the concerns raised by the respondents, solutions and strategies for implementation by the banks have been proposed by the respondents themselves. The respondents in this study indicated that technology should be designed and introduced in a way that will be easier for them to understand, while at the same time paying attention to their needs. Assistive technology has been suggested as one of the strategies that banks can consider or explore. In support of this strategy, Evangelos and Mitsopoulos (2000) assert that assistive technologies are significant to many elderly and disabled people since they are unable to use mobile business platforms. Wazid, Zeadally and Das (2019) suggest awareness programs to educate mobile banking users particularly the elderly about various threats involved in mobile banking.

7.5 SUMMARY OF MOBILE BANKING BENEFITS APPRECIATED BY ELDERLY AS PER RESEARCH QUESTIONS

The study aimed to answer the research question “What are the factors influencing the adoption of mobile banking?” After interacting with the elderly and conducting a systematic review, the factors displayed in Table 7.1 were identified. The factors are presented with ANT stage(s) at which they influence the adoption of mobile banking. The supporting evidence is presented in section 7.7 of this Chapter.

Table 7.1 Factors influencing the adoption of Mobile Banking

Factors	ANT Concepts				
	Inscription /Problematisation	Interessment	Enrolment	Framing	Mobilisation
Enablers					
Convenience					
No queues					
Unlimited access					
Perceived ease of use					
Cost-effective					
User-friendliness					
Consumer behaviour					
Perceived value					
Will to learn					
Barriers					
Lack of understanding and familiarity					
Fear					
Security					
Illiteracy (including financial illiteracy)					
Trust					
Resistance to change					
Issue of dependability					
Demographic factors (role of age, gender, income and social influence)					
Lack of information (technology itself, use, products and services)					

It is evident that technology providers are disinclined to invest in the structures necessary to enable mobile banking transaction (Dennehy & Sammon, 2015), unless they are demanded by the consumers. This study found that there were more reasons for the elderly not to adopt mobile banking than promoting the adoption. The mobile banking actor-network failed to

convince the elderly consumers of its benefits such as convenience and cost-effective and thus enrolment could not happen. The group cited that mobile banking was not easy to use and the procedure to complete financial transactions was lengthy due to the amount of information required resulting in extra cost incurred. It can be emphasised that the potential users would like to have their interest inscribed to the artefacts. Švecová and Odlerová (2018) argue that even though some digital immigrants lack trust in new technologies, these technologies can be used as tools for improving standards of living and can further help the elderly who are physically weak and with memory deficits.

7.6 PROPOSED DESIGN GUIDING PRINCIPLES

Current studies have indicated that providers of mobile technologies need to concentrate on varying self-concept surrounding elderly clients (Hoffmann *et al.*, 2012) rather than exclusion. Tatnall (1999) maintains that once a network is formed, it is not guaranteed that the network will be unshaken, they remain unreliable and unstable due to new actants joining the network. The gap identified in forming the network includes the limited understanding of mobile banking by elderly negatively affecting the chances of adoption and use. This gap can be linked to a weak moment of translation. The application of ANT in this scenario helped the researcher to understand how new technology is integrated or introduced to the actors. The elderly may not appear to be more innovative, but they are willing to try new and better ways of doing things depending on their needs being met. In the process of developing a successful actor-network, there is a need for comprehensive intéressement strategies directed at addressing the problematisation. Based on the interaction with various actors, below are the guiding principles to be considered by mobile banking application providers:

- **Use of understandable terminology**

Understanding of terminology appeared to be a major motivator for considering mobile banking by the elderly. In many networks or relationships, it can pose some form of intimidation and undermining when interacting in the language you not acquainted to or language that you cannot understand. While in most cases this results in communication breakdown, it is also framed as the number one reason behind relationship failure. Designers and developers for both mobile banking technology and products need to use simple terminologies that would be easier for the elderly consumer to comprehend.

- **Shortened Mobile Banking procedures**

Previous studies have cited that prolonged procedures are an issue for this group of users. The respondents in this study asserted that it is difficult for them to keep up with the long mobile banking procedures as it requires fast thinking and response to the questions posed and they no longer have that spontaneous effect. It needs to be recognised that "*old people do not reflex like they use to before*" (respondent in this study) when they were younger, there are age-related issues that need to be considered. Shorter and easier methods of mobile banking usage stand a greater chance in stabilising the network.

- **Easier and secure methods of authentication or verification**

Accessibility is an important issue for older users. While the elderly do not appreciate being asked too many questions when calling the bank for assistance, it was also clear that they would appreciate fast and easier methods of authentication to gain access. One respondent commented, "*my son does not even put his pin; he just looks at his smartphone and gains access*". While this may indicate that the elderly are aware of technologies that are available and can be assistive to them, it also suggests that there is a lack of consideration when it comes to elderly needs and technology designs. Remembering a series of numbers or character combination can be a daunting task for these potential users. Use of human characteristics such as face recognition, fingerprint scanners or other easier methods is recommended as a method of authentication for elderly users. Sharma and Mathuria (2018) developed a mobile banking prototype to simulate the accessibility of mobile banking using fingerprint authentication as a login method. After running a sample test the application showed to be very secure and user-friendly.

- **Bigger icons, buttons and font**

Operating the mobile device on its own is discouraging for older users. With everything displayed on the small screen, it puts the interaction process on the spot. The app icons have been reduced to fit on the screen and the elderly have problems using these icons (Leung, McGrenere and Graf, 2011). The designers or engineers need to run their investigation to find ways how the button and icons can be adjusted for the elderly without further navigating complications.

- **Use of Assistive technology**

The elderly have different needs that should be catered for such as visual impairment, cognitive decline and hearing problems, which are among the common challenges faced by the elderly. Implementation of assistive technology and Artificial Intelligence (AI) can be valuable in responding to these challenges. Technologies such as voice navigation can be beneficial to those who have limited vision.

- **Training and Awareness**

This issue might not be directly linked to design guidelines, but it was a commonly mentioned theme and a relevant principle to consider. The respondents linked it directly to their willingness to adopt and use mobile banking. It came out strongly that the elderly are willing to try mobile banking provided someone shows them how to use it. The potential adopters suggested some form of training on the technology and product and services offered by the financial institutions. Each bank needs to rollout awareness campaigns to increase the level of exposure and educate people about their products and services as well as different banking methods.

7.7 MOBILE BANKING ADOPTION MODEL – FOR THE ELDERLY

Investigating the adoption of technology by the elderly has proven not to be an easy undertaking. An elderly oriented model is needed to address the research questions focusing on mobile technology adoption by the elderly. Some of the most popular models used to investigate mobile banking adoption include the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT) model. However, these models are too generic with no particular focus being directed towards the elderly. Arenas-Gaitán, Peral-Peral and Ramón-Jerónimo (2015) emphasise that most of these models were developed many decades ago and, therefore, may no longer be relevant for the current climate. Furthermore, these models are used to measure the intention to use and technology acceptance (Mathieson, 2020). It is worth mentioning that several authors have tried to extend TAM by developing a model that is more suitable for a study of the elderly (Luijkx, Peek & Wouters, 2015) and introducing Senior Technology Acceptance Model (STAM) in the research field. STAM can be defined as a model that is aimed at predicting the acceptance of mobile phones by older adults, including social influence (Biljon & Renaud, 2016).

Other authors have also proposed other variants of the TAM such as the Theory of Planned Behaviour (TPB) and the Theory of Reasoned Action (TRA) models, which describe online banking and other mobile banking activities (Gathongo, 2019). However, these theories remain inadequate in situations where the specific emphasis is placed on older people (Gathongo, 2019). These models have not taken into consideration the fact that the elderly group consists of diverse individuals with different needs ranging from different aspects of their lives to their buying and banking behaviours (Ramo´n-Jero´nimo, Peral-Peral & Arenas-Gaita´n, 2013).

Incorporating these needs is important when designing mobile technologies for this group of clients. A model for the adoption of mobile banking by the elderly, which is proposed in this study, is depicted in Figure 7.1. The aim of the model is not to quantify but to describe how each different factor impacts or contributes towards the mobile banking actor-network and the relationship that exists amongst the actors. The factors included in the proposed model were extracted from the focus group meetings where the elderly shared their perspectives regarding mobile banking. Some of the factors were adopted from previous studies investigating the adoption of mobile banking.

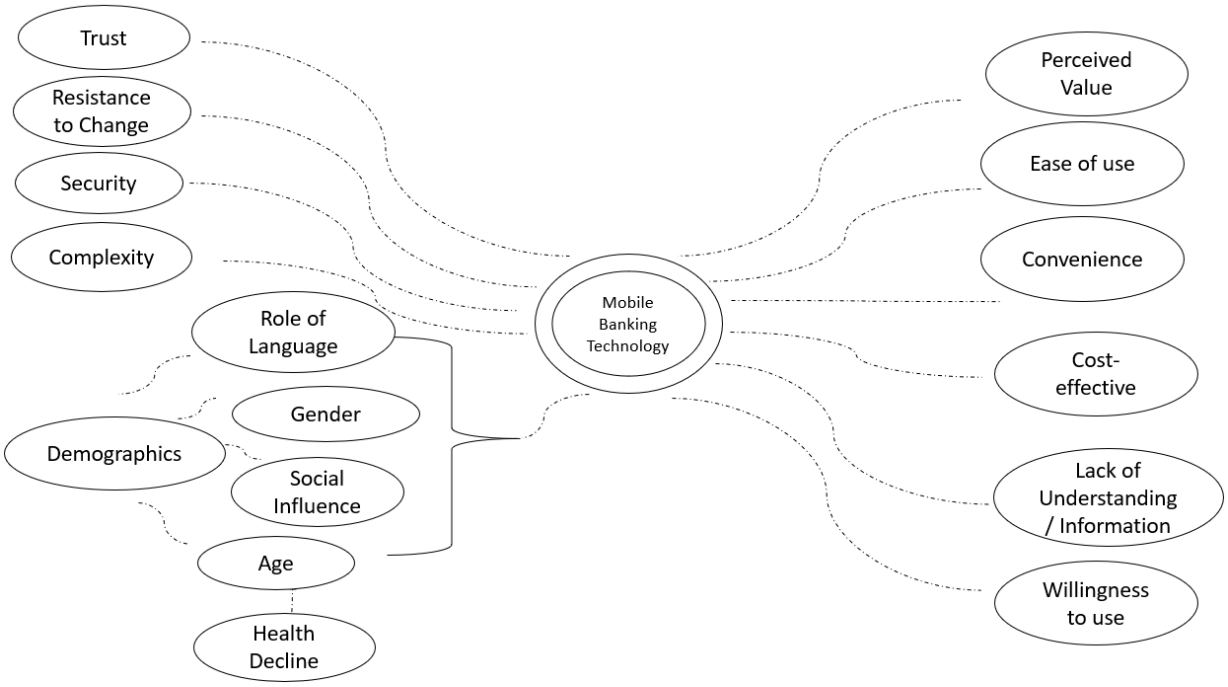

Figure 7.1 Proposed Mobile Banking Adoption Model for the Elderly

It is envisaged that the proposed model will help conceptualise and contribute towards an understanding of the elderly and their adoption of mobile banking. The factors that form part of the model are known to affect the adoption of mobile banking. Whereas some of the factors were adopted from acceptance models such as TAM, the majority of these factors were cited in the literature by other scholars. Observing “Ease of Use” as a TAM factor, in this study affects mobile banking adoption on inscription, framing and mobilisation stage.

Blažun *et al.* (2014) report that lack of knowledge and interest are reasons why the elderly are not using technology. Although some of the factors included in the model were adopted from studies that focused on technology in general, they are nevertheless applicable to the non-adoption of mobile banking by the elderly. The respective contributions of these factors outlined in Figure 7.1 are discussed individually below, and how they impact the mobile banking actor-network.

Demographics affects adoption at the enrolment and framing stage.

It has been proven that demographic variables such as age, gender and social influences are capable of influencing the adoption of mobile technology both as independent or moderating variables (Sharma *et al.*, 2017; Chaouali & Souiden, 2018). Under demographics, three factors were considered in this model, namely: age, gender, social influences and role of language. Arenas-Gaitán, Peral-Peral and Ramón-Jerónimo (2015) argue that the existing technology adoption and acceptance models have failed to provide a converged understanding of the impact the variables have on adoption, even though these demographic variables have been included in existing models. As far as gender is concerned, inconsistent reports have emerged on its effect on the adoption of mobile banking. In contradiction to the findings of this research study, the SLR conducted by Mcgaughey *et al.* (2012) found no significant differences in attitude toward or intent to use m-commerce related to gender, education, age, or income levels.

Age

Considering the age of the participants and the era of technology, it was not shocking that respondents thought technology was not for them and that they would struggle to use it. Not enough effort has been directed by ICT practitioners towards the implementation of age-friendly design guidelines for mobile applications for the elderly (Almao and Golpayegani, 2019). Age has been studied in mobile banking adoption studies (Kumar & Lim, 2008;

Chaouali & Souiden, 2018; Vasudeva & Chawla, 2019), and it has been assumed that current elderly populations groups are not familiar with technology or lack the requisite technology experience. While such reasons were provided in previous studies, respondents in this study indicated that they are too old for technology. However, age alone may not be the reason for mobile technology rejection (Arenas-Gaitán, Peral-Peral and Ramón-Jerónimo, 2015), there is a need for the other elements proposed in this model.

Health decline

A decline in health is a hindering factor for the elderly considering the change they must embrace in their bodies. Therefore, the elderly group and technology cannot be generally investigated without considering this factor, it is not only the age that impedes the elderly from adopting mobile banking (Ramo´n-Jero´nimo, Peral-Peral and Arenas-Gaita´n, 2013) but also the factors brought by the ageing process. Ageing presents physical and health impairments such as mobility issues and vision (Laukkanen & Laukkanen, 2007; Choudrie *et al.*, 2018). Laukkanen *et al* (2007) mention that biophysical ageing may lead to physical and health impairments. It is necessary to appreciate and understand the changes that occur as an individual ages (Jia, Lu & Wajda, 2015). Health decline as a concept has not been included in the models that examine the adoption of mobile technology by the elderly. In the views of Touchaie and Hashim (2018) and Choudrie *et al.* (2018), the main reason behind qualifying the individual as elderly at an age of 50 is that the signs of health decline start to show at this age, together with cognitive skills influencing their performance of certain activities including online activities. Considering the mentioned challenges, it is recommended that the effect this factor has on the adoption of mobile banking should be well understood.

Role of gender

Ramón-Jerónimo *et al.* (2014) cited a gender gap on the adoption of internet banking particularly amongst the elderly. Men appeared to be the ones frequently using internet banking and, thus like to adopt new technology trends (Mcgaughey, Zeltmann & Mcmurtrey, 2013). This view of males being likely to adopt any technology seems to resonate with Lian and Yen (2014). Female consumers tend to be more cautious about online and mobile technologies. Choudrie *et al.* (2018) reiterate that males have a high preference for shopping and banking online when compared with females. Although no comparative studies involving

male and females have been reported in the context of the use and adoption of mobile banking, it can be safely assumed that these views apply to mobile banking. However, during the interviews, the focal actors did mention that their male counterparts were more acquainted with mobile banking. On this basis, it can be concluded that gender does play a role in the adoption of mobile banking.

Social influence

This element can be linked to the construct of "Subjective Norms", which was developed by Mathieson (2020). Subjective norm is when a consumer considers the normative expectations or behaviours of others as important such as family, friends, and colleague, to decide whether they use mobile banking services or not (Vuong, Hieu & Trang, 2020). Accordingly, individuals who have a close relationship with the members of the society are likely to be influenced by their perceptions of mobile banking services. The information they receive from these individuals and how they frame this technology can be deemed as an important contributory factor towards its adoption.

Security affects adoption at the framing stage. Chen *et al*. (2018) posed this question: "Are mobile banking apps secure?" Security has been continuously reported as a barrier to the adoption of e-commerce. Particularly in mobile banking, security threats have kept many consumers from adopting this technology (Wazid, Zeadally & Das, 2019). For Laukkanen *et al.* (2007), the most concern that keeps the elderly from adopting mobile banking relates to security in conducting the transaction and the loss of their smartphones. These issues were also shared by the respondents in this research study.

Trust affects mobile banking adoption at the framing stage. Dass and Pal (2011) found a lack of trust as one of the barriers to the adoption of mobile banking. Trust has proven to be an important factor in many mobile banking adoption studies (Sindwani & Goel, 2014). In this actor-network, it can affect consumer behaviour concerning the adoption of mobile banking technology. Mobile banking is perceived as having high risk and lacking security when compared with internet banking (Chen *et al.*, 2011, 2018). Consumer trust in mobile technology needs to be developed and maintained through a deeper understanding and mitigation of the actual and perceived risks (Sharma *et al.*, 2017).

Complexity affects the inscription, framing and mobilisation. Considering the ageing issues and lack of familiarity, the respondents perceived mobile banking technology as a

complex solution due to limited skills. Complexity refers to the degree to which technology innovation is perceived to be difficult to understand and use (Chauhan, Gupta & Jaiswal, 2018). Complexity has been reported as an issue when using smartphones that host mobile applications (Mcgaughey, Zeltmann & Mcmurtrey, 2013; Harry & Brown, 2014; Biljon & Renaud, 2016). Singh, Srivastava and Srivastava (2010) suggest transactional issues, navigation problems and small screen size as factors that increase complexity. Furthermore, Al-jabri (2015) states that the adoption of technology depends on its complexity. Thus, it is significant to include complexity of the proposed model.

Lack of understanding / information affects the inscription, framing and mobilisation. The elderly do not have adequate information on mobile banking and its functionality**.** Laukkanen (2010) found that the "role of information" and guidance provided by the bank institutions has the strongest effect on reducing consumer resistance to innovation in banking technologies. Borg and Persson (2010) report that lack of customer understanding affected the sales of Wizzit banking services. Laukkanen and Cruz (2010) assert that information and understanding are crucial when there is a new invention proposed or diffused. Without adequate information and instructions, the technology becomes inoperable (Almao & Golpayegani, 2019). The respondents in this study also indicated a lack of understanding as one of the reasons they did not adopt mobile banking. It is crucial to understand how lack of information or understanding influence the adoption of innovation.

Role of language affects the inscription, framing and mobilisation. English is a primary language used in many Western countries where new technologies originate. It is the predominant language for the development of IT and e-commerce, and it is also the main language used on the web (Vatanasakdakul & Tibben, 2004). Users of technology, in particular mobile banking, come from different cultural and geographical backgrounds. When consumers are not consulted, it becomes difficult to understand whether they have problems with the language or to assess their level of knowledge about mobile commerce (Halaweh, 2011). For many, language can be a problem, especially when trying to understand the dominant language used in technology; this is followed by technical terms in different sectors such as mobile payment (m-payment) in the banking sector. Knowing the effect of these will allow the providers of mobile technology to use simple language and terms (Hussain, Abubakar & Hashim, 2014). Furthermore, technology can allow some level

of flexibility, such as the ability to translate to home language (Harry & Brown, 2014) depending on user's preference.

Resistance to change affects the inscription and enrolment. Arenas-Gaitán, Peral-Peral and Ramón-Jerónimo (2015) cited resistance to change as the main factors influencing the adoption of mobile banking. The elderly, marketers and sociologists have been identified as being agents that are resistant to change (Gilly & Zeithaml, 2019). There is an aching need to understand why technologies and innovations are being resisted than adopted (Laukkanen, 2016). Some of the existing models such as the extended TAM have included "resistance to change" as a variable (Baabdullah & Alalwan, 2019). Reasons behind this variable include fear relating to the loss of control (Touchaie & Hashim, 2018). Similar views have been established in this research study where respondents indicated that there is nothing wrong with the way they are currently handling their banking activities (referring to traditional banking).

7.8 CONCLUSION

The study relies on the ANT to interpret the perspectives shared by the focal actors and results from prior studies. It is evident from this research study that the number of elderly clients using or adopting mobile banking to fully exploit all the available banking products and services appears to be very low. This can be interpreted as a great loss for the elderly consumers and those offering these services. The results presented herein have shown that, even though mobile banking provides convenient and cost-effective banking system for non-elderly consumers, it does not present enough opportunities to influence the elderly towards the adoption of mobile banking.
Non-provision of adequate information to the elderly does not make it easy for them to adopt mobile banking. The respondents suggested some solutions that can assist banking institutions to develop a mobile application that appeals to the elderly population group.

CHAPTER 8

8 CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

This Chapter offers a conclusion to the study by elaborating major findings and their connection to the research objectives. Furthermore, the Chapter highlights some key contributions and recommends areas to focus on for future research. Lastly, the researcher offers details on how the current research objectives were realised in light of the achieved results.

8.1 RESEARCH OVERVIEW

The intention of conducting this research study was to explore the elderly-mobile banking network using ANT, to uncover enablers and barriers towards the adoption of mobile banking. Specifically, the study focused on identifying critical success factors for the adoption of mobile banking using a SLR and interviews (both group and one-on-one based). A SLR was conducted in the area of interest to collect secondary data. Additionally, the elderly respondents were interviewed about their mobile banking behaviours; the aim here was to collect the primary data. Data was then analysed to extract enablers and barriers for mobile banking among the elderly.

Chapter 1 provided background information about technology and its impact on the individuals, particularly their behaviour towards mobile banking behaviour. Additionally, the aim and objective of the research were presented; this was followed by the research questions that were formulated to address the aim and objectives of the research study. Furthermore, an explanation of the significance of the research and identification of potential beneficiaries of the research study, the assumption and limitations were presented. Chapter 2 of this study focused on the literature review, where prior studies that contributed towards assisting in describing and explaining the key areas were reviewed. Specifically, the following key areas were reviewed: Mobile Banking Defined, Mobile Banking Technologies, Mobile Banking Diffusion, and South African Mobile Banking and The Elderly.

The theory underpinning the research was discussed in chapter 3. Chapter 3 elaborated on the contribution of and how this theory was applied in this research study. The research methodology that was adopted in this study was presented in chapter 4. The Chapter also described the nature of the study and its philosophical stance. Furthermore, it elaborated

how data was collected and analysed. In chapter 5, a SLR was presented. Chapter 5 explained the process and guidelines that were followed to retrieve and consider the articles for review. The PRISMA diagram indicating the process flow was also presented. An analysis of articles that were included for final review was also conducted. In total, 11 articles were included and reviewed to uncover the enablers and barriers of mobile commerce and banking that exist amongst the elderly. Key recommendations from the authors of the reviewed papers were also noted. Chapter 6 presents an analysis of and findings from the primary data. Based on the research questions, the themes that were coded after transcription were analysed linking them to the research questions. The Chapter identified all the actors (human and non-human) that are involved in this mobile banking network. The findings were presented using ANTs' moments of translation. The key factors that influence the adoption of mobile banking by the elderly were also presented. The seventh Chapter of this study discussed and synthesised the findings from the SLR that were presented in Chapter 5 as well as the findings from primary data that were presented in Chapter 6. The Chapter provided the arguments based on existing knowledge and new knowledge with regards to enablers and barriers. Solutions and recommendations were also presented for the different stakeholders. After presenting the design guiding principles for consideration by the stakeholders, the mobile banking adoption model was proposed. Lastly, Chapter 8 (i.e., this Chapter) concludes the Research Report. An overview of the findings of this study is presented before highlighting contributions of this research study and opportunities for future research.

8.2 REVISITING THE RESEARCH PROBLEM

Technology has been adopted in many different forms, with a capacity to transform how ordinary activities are performed. Transformation in the banking sector have offered the consumers an opportunity to bank without any physical or time limitations in a cost-effective manner. Mobile banking was introduced to offer simplified and convenient banking solutions. Based on the Federal Reserve Report, the elderly own smartphones and have access to bank accounts, but they are not using mobile banking.

8.3 LINKING THE STUDY OBJECTIVES TO THE RESEARCH FINDINGS

The main aim of the study was to understand the factors influencing mobile banking adoption by the elderly. In the following sections, an attempt is made to characterise this research study based on the research objectives that were formulated in Chapter 1.

- ***Objective 1*: To identify enablers and benefits of mobile banking amongst the elderly**

After analysing the data that was collected, the following factors were identified as benefits and enablers of mobile banking among the elderly: convenience; no queues; unlimited access; perceived ease of use; cost-effectiveness; user-friendliness; consumer behaviour; perceived value; and willingness to learn. These enablers were extracted from the interviews with the elderly. Furthermore, these enablers were also cited by scholars in articles that were used for the SLR (Mcgaughey *et al.*, 2012; Mosolotsane, 2013; Kolaki, 2017; Senali, 2017; Touchaie & Hashim, 2018; Jayachandran, 2019). The enablers were discussed in more detail in Chapters 5 and 6, and also summarised in Chapter 7.

- ***Objective 2*: To identify challenges and barriers hindering the adoption of mobile banking by the elderly**

Following an analysis of secondary and primary data in Chapters 5 and 6, respectively, the following barriers towards the adoption of mobile banking were identified and discussed in Chapter 7: lack of understanding and familiarity; fear; security; Illiteracy (including financial illiteracy); trust; resistance to change; dependability; demographic factors (i.e., the role of age, gender, income, and social influence); and lack of information (i.e., technology itself, use, products and services).

- ***Objective 3*: To identify the possible solutions and suggestions for consideration by banking institutions**

Based on the barriers presented under Objective 2, the elderly suggested potential solutions and strategies that could help them to better understand and use mobile banking. The solutions were presented and discussed in Chapter 7 based on interviews with the elderly and data acquired from the literature.

The elderly mentioned that banks do not provide them with full information about their products and services including “converged services”. As part of the solution to tackle this

challenge, the elderly proposed training, awareness campaigns, and sharing of information relating to mobile banking.

The elderly argued for safer and secure mobile banking technology. Based on the information that was previously shared with the elderly, the vulnerability of the system and reports of hackers have hindered them from using or adopting banking technology. All the variables such as factors such as fear, trust, and privacy are variables linked to the main issue of security. The banking institutions need to share with the elderly measures that have been put in place to ensure the security of mobile banking.

The elderly also called for a simply designed system that uses a language and terminologies that are easy to understand. The elderly indicated that they do not understand mobile banking technology and often find themselves in situations whereby there is no one available to help them to use the technology, especially when family members are not present.

The elderly highlighted their inability to design and remember the passwords needed to meet the security requirements and criteria. Easier methods of verification such as the use of biometrics were, therefore, proposed by the elderly as a potential solution for tackling such challenges.

The elderly also proposed a shortened version of mobile banking that is specifically targeted at them. They indicated that long procedures tend to become too much for them to handle and remember what they were doing. They mentioned that this results in an additional cost of data stemming from spending too much time on a single transaction. The use of assistive technologies was also proposed as the solution to issues associated with ageing and health decline.

In a nutshell, this section explained the critical solutions highlighted by the elderly and the design guiding principles were thereafter proposed.

- ***Objective 4*: to propose the guiding principles to be considered by mobile banking technology providers**

Mobile banking literature has suggested a few design solutions to enable the elderly to use mobile banking without any impediments. The guidelines were proposed in this research study based on data that was presented in the literature and acquired from the elderly through one-on-one interviews and focus group discussions. The proposed guidelines are linked to the solutions presented in Objective 3. Training and awareness were cited by several scholars as an important factor in the successful adoption of new mobile technology (Mcgaughey *et al.*, 2012; Mosolotsane, 2013; Touchaie & Hashim, 2018; Gathongo, 2019; Anu & Soju, 2020). In summary, to achieve Objective 4, the study proposed the following design guiding principles, which were explained in Chapter 6:

- Use of understandable terminology and flexibility of language;
- Shortened mobile banking procedures;
- Easier and secure methods of authentication or verification;
- Bigger icons, buttons and font;
- Use of assistive technology; and
- Training and awareness.

8.4 RESEARCH UNDERTAKEN

The achievement of the aim of the research study was guided by the following MRQ:

> ***What factors influence the adoption of mobile banking among the elderly in South Africa?***

The above MRQ was answered using primary and secondary data. After all the interviews were conducted and other sources consulted, it was concluded that the elderly are not using mobile banking and several barriers were highlighted. The mobile banking technology has benefits attached to it; such as convenience, affordable, security and availability with no time and location limitations. Nevertheless, the adoption rate has been reported to be low among the elderly. A qualitative research study was undertaken to address the research question stated above and both primary and secondary data was collected.

A SLR was conducted to collect the secondary data to respond to the MRQ. Following the proposed guidelines for conducting an SLR, 11 articles published between 2009 and 2019 were retrieved and analysed. The articles that were selected for the SLR met the inclusion criteria and were deemed appropriate and useful to address the MRQ. The results of the SLR were presented in Chapter 5. Primary data was collected using semi-structured interviews (focus groups and individual) and the findings were presented in Chapter 6.

The identified enablers and barriers to the adoption of mobile banking by the elderly were discussed and summarised in Chapter 7. Based on the results derived from both primary and secondary data, it appears the elderly did not see any value in using the mobile banking system. While some of the respondents were hindered by personal reasons, a resistance to change and lack of interest among the elderly was also observed. Customisation for this group of the population is recommended in terms of products and marketing strategies. Furthermore, it can be concluded that the elderly were misinformed about mobile banking. The evidence presented in this study suggests that banking institutions have not taken it upon themselves to educate the elderly about their products and services. Although banks are in the business of making money, they also have the responsibility of providing good service to their clients including the elderly. Although the elderly are willing to adopt mobile banking, they are also influenced by how mobile banking technology is designed to meets their needs and interests. As much as specific recommendations for implementation by banking institutions were documented by the researcher, these recommendations are also applicable to other financial institutions conducting businesses on mobile platforms. Various suggestions were provided by the elderly to improve mobile banking and increase its adoption and use by incorporating assistive technology into mobile banking, awareness and training, and strategies to improve security. It is envisaged that the banking institutions will consider and implement them. The solutions and suggestions were compiled as design guidelines principles, and thereafter proposed as a solution to influence the elderly to adopt mobile banking.

8.5 FINDINGS OF THE RESEARCH IN TERMS OF EACH OF THE RESEARCH SUB-QUESTIONS

8.5.1 Findings on the research question

The study answered the following sub-questions (SRQs):

SRQ1: What are the enablers supporting the adoption of mobile banking?

SRQ2: What are the barriers to mobile banking adoption by the elderly?

SRQ3: What are the perceptions of the elderly regarding mobile banking?

While secondary data was used to answer SRQ1 and SRQ2, primary data was used for answering SRQ1, SRQ2 and SRQ3.

The discussion in Chapter 5 as well as information presented in Table 5.12 (Summary of enablers and barriers based on the SLR) addressed SRQ1 and SRQ2. The 11 articles that were reviewed in Chapter 5 allowed the researcher to identify the enablers and barriers for the adoption of mobile banking and among the elderly people. Chapter 6 also contributed towards addressing SRQ1, SRQ2 and SRQ3. The qualitative data that was collected in Chapter 6 was guided by the research protocol (Appendix D). The data was transcribed, and common patterns were coded into themes. Data analysis was conducted to understand the perceptions of the elderly on mobile banking and to identify the enablers and barriers of mobile banking, and thus addressing SRQ1, SRQ2 and SRQ3 in the process. All the enablers and barriers that were identified from primary and secondary sources are presented in Table 7.1 (Factors influencing the adoption of mobile banking). The reviewed literature and the data that was acquired from primary sources showed that mobile banking can improve the livelihood of the elderly by offering convenient, safe, easy to use and affordable banking that reflects the needs of the elderly. These enablers answered SRQ1 of the study. The barriers that hinder the adoption were also presented, thus answering the SRQ2. Two interesting findings were derived from this study. Firstly, according to the findings that were derived from both sources of data, the elderly lack proper and correct information about mobile banking and its potential, and this has resulted in them rejecting the technology. Secondly, the elderly are willing to try and learn more about mobile banking and its use, provided they are afforded the necessary guidance and support. These two findings can be linked to each other and can help to increase the adoption rate. With regards to the perceptions of the elderly, it is difficult to draw conclusion on this matter. Mobile banking has been socially misrepresented. Therefore, the elderly do not perceive mobile banking as being safe to use. Negative information has been shared with the elderly such as mobile banking not being secure. While the elderly rely on their family members, relatives

and friends for assistance in conducting transactions, the elderly do not have confidence in their ability to use mobile banking on their own due to security issues and fear of making mistakes.

8.6 CONTRIBUTIONS

8.6.1 Theoretical contribution

Despite the inscribed benefits of mobile banking, very few studies have been reported in the extant literature that focus on enablers of and barriers to mobile banking by the elderly. Therefore, this study contributes to closing the research gaps that have been previously identified by other scholars. Results derived from this study will contribute to the existing body of knowledge by identifying the critical success factors for the adoption of mobile banking by the elderly, particularly in the context of a developing country. The main barrier hindering the adoption of mobile banking is lack of information relating to the use, security and products and services associated with mobile banking; it is quite clear from the data that was collected in this research study that the elderly are not well informed about mobile banking and its capabilities.

Additionally, the study has shown that using ANT as a lens in IS research can be helpful especially in understanding how non-human and human actors can be successfully aligned, and also concerning new digital technology and its adoption. Furthermore, this research study highlights ANT as a theoretical framework for examining the complex relationship that exists between the elderly and mobile banking. ANT is deemed useful in facilitating the understanding of the subtle interactions amongst the various players, thus enabling a better and deeper understanding and explanation of the concepts involved (Adaba & Ayoung, 2017).

Furthermore, the study has proposed an adoption model that is intended to investigate the elderly and adoption of mobile technologies. The model was based on the primary data, secondary data and the literature that informed this study.

8.6.2 Methodological contribution

Choudrie *et al.* (2018) noted that most studies have adopted a quantitative approach; thus, a qualitative research study would be of immense benefit. Therefore, applying a qualitative

approach in this research study exposed the state of the relationship between mobile banking and the elderly using SA as a developing country model. The interpreted qualitative data allowed for the opinions and perceptions of mobile banking technology of the elderly population to be available and be used by researchers who may choose to examine this phenomenon or are interested in similar studies, academically or for business purposes.

8.6.3 Practical contribution

As a practical contribution, the study proposed a set of guiding principles to be considered by mobile banking application providers for developing mobile banking solutions that are suitable for the elderly. The institutions can use these guidelines to increase the use of mobile banking by elderly and thus expand their market. These guidelines are informed by the data and literature. Furthermore, other mobile application developers that are not in the financial sector but are providing designing mobile applications or solutions for the elderly will find these principles useful. Understanding the key factors is important when designing, improving, and implementing mobile banking technology that contribute to improving the lives of the elderly. The adoption of mobile banking among this age group is generally low and unsatisfactory, and reaching the elderly population group constitutes a step in the right direction for addressing the prevalent digital banking divide. Countries facing similar situations may learn from this study and adopt some of the solutions suggested in this study.

8.7 LIMITATIONS

In light of the contributions mentioned above, this study had the following limitations:

i. The study was conducted in a cross-sectional manner (i.e., data was analysed from a representative population at a specific point in time), and future studies can look at conducting such research over an extended period;
ii. The research study was limited to SA and was focused on the region of KwaZulu Natal. Besides, most data was collected in one major municipality, and other municipalities or areas were not thus considered in this study;
iii. Only 11 articles published between 2009 and 2019 were reviewed as secondary data for this research study. The literature on mobile banking adoption by the elderly is reportedly very scarce, and this left the researcher with the minimal pool of data to review;

iv. The data was only collected from elderly consumers, and banking institutions were not interviewed to obtain their views. Future studies can explore the collection of data from banking institutions and related organisations;

v. Lastly, the proposed model has not been tested or applied.

8.8 FUTURE RESEARCH OPPORTUNITIES

The study was conducted in KwaZulu Natal, SA; similar studies can be replicated in other provinces within SA or in other developing countries to yield additional insights on the adoption of mobile banking by the elderly. The study identified gender differences in terms of the adoption of mobile banking. Therefore, future studies can interrogate these gender differences further; such studies can be interesting research in the IS field by clearing any assumptions that may exist with regards to adoption of technology. Given that the views of the banks were not considered in this study, it is recommended that other researchers can investigate this phenomenon and include banks as part of the investigation. The influence of the educational background of the focal actors was also not considered. Inclusion of this criterion might also offer a different perspective on the adoption of mobile banking. Additionally, future research may be completed to test the model and obtain feedback from banking practitioners on the applicability of the model.

8.9 CONCLUSION

This research study was aimed at identifying the factors that influence the adoption of mobile banking among the elderly. Primary data was collected to uncover the perceptions of the elderly pertaining to mobile banking, and to enable the sharing and discussion of the lived experiences of the elderly towards the technology. Secondary data was also collected through a SLR to extract enablers and barriers of mobile commerce and banking from prior studies. To mitigate the identified barriers, relevant solutions i.e., (proposed design guidelines) were suggested for implementation by banking institutions. The proposed guidelines are meant to steer designers, developers and providers of mobile banking applications to consider the needs of the elderly that were highlighted during the interviews (i.e., one-on-one and focus group meetings) and in the literature. These guidelines will ensure that the technology and the products offered are in a usable and acceptable state for adoption by the elderly. It has been proven that the elderly are a unique group of the population and cannot, therefore, be studied using generic models.

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APPENDIXES

APPENDIX A: MOU WITH AGED HOME – SAMPLE

Inspiring active ageing

MEMORANDUM OF AGREEMENT
Between
The Association for the Aged
(TAFTA)

_____

(Full name) (Hereinafter referred as the Applicant)

Performing research on human subjects, and in particular elderly participants, is a privilege and should therefore be conducted with due regard for the highest ethical and professional standards. Researchers must be cognizant of the fragile physical and health status of many residents and research methodology should reflect knowledge, sensitivity and consideration for their general and specific health physical, mental, emotional, spiritual, social, cultural) needs.
*mum non nocere-first, do no harm

1. Purpose of the agreement:

Whereby TAFTA (hereinafter referred as the Organisation), provides research opportunity to the applicant for academic purposes in terms of the following conditions:

1.1 the purpose and scope of the research is declared in full by submission of a full research protocol

1.2 The research bears relevance to the organisation and is shown to potentially directly or indirectly benefit the organisation and or its clients.

1.3 The completed research protocol is to be made available to the organisation after verification by the academic institution and approval from a bona fide research ethics committee.

1.4 Research may only commence after TAFTA's research committee reviews the requested documents-see annexure list-and provides written consent.

1.5 Consent to conduct research does not automatically equate to individual consent by clients/residents/staff of TAFTA; obtaining individual written informed consent from study participants shall remain the responsibility of the researcher/s.

1.6 Alt persons who will be engaged in the field work will be identified to TAFTA, will at all times be identifiable to staff and residents and will conduct themselves in a professional and ethical manner within TAFTA premises.

1.7 All researchers conduct their research at their own risk and TAFTA will not be liable for any damages or injuries sustained on TAFTA's premises or inflicted by TAFTA residents.

1.8 Upon completion of the project or at any relevant time during the research, researchers may be called upon to present their findings to the TAFTA research or other relevant sub/committee/s.

1.9 As far as is possible, research projects should include long term and sustainable benefits for TAFTA/residents. A section in your submission should position the social responsibility dimension of the planned research project as research benefits are often futuristic, it is required that researchers discuss ways with TAFTA in which their expertise can benefit residents or clients immediately and a copy of the completed research be given to Tafta.

1.10. Researchers are requested to undertake a feedback session to the participants to inform them of the results of their findings.

1.11 Scientific or other publications emanating from the research conducted with Tafta may not be published without prior written consent by the Organisation. Identification and or acknowledgement of TAFTA in any publication may only be done after prior informed consent from the research committee of TAFTA.

1.12. Researchers are requested to provide a summary of their research which will be posted on TAFTA website.

1.13. Media coverage relating to the study that refers to TAFTA or uses audio-visual material related to property/staff/clients of TAFTA will require additional a priori written authorisation.

1.14. No financial or other compensation will be exchanged in respect of this research study without prior written agreement.

2. Roles and Responsibilities:

2.1 TAFTA agrees to make relevant resources and information required for the completion of the specified research available to the Applicant.

2.2 A minimum of six weeks is required to process/respond to requests relating to the research project.

2.3 As the staff of TAFTA are otherwise engaged, minimum reliance should be placed on TAFTA staff for the implementation of the project. Staff will avail themselves in a supportive capacity, at their convenience and subject to adequate advance notice.

2.4 The Applicant agrees to comply with the regulations and restrictions in regard of the Protection of Personal Information Act no.4 of 2013.

2.5 The Applicant agrees to conduct the research in an ethical manner with respect and consideration for all parties concerned and the Organisations' limited resources.

2.6 All ethical principles governing the conduct of research in general and with human subjects in particular are adhered to. In particular, the personal identities of staff and or clients/residents will remain confidential except in exceptional circumstances at which time special written consent will be obtained by mutual agreement.

3. **Duration of the Agreement**

This agreement will be in effect from (start date) _____ to (end date)
and may be updated at any time through written request. Either party can terminate the agreement with 30 days written notice.
For longer term research, periodic / 6 monthly progress reports will be required and annual renewal of permission should research be delayed.

4. This Agreement constitutes the whole Agreement in respect of this research study.

I_____, with Identity Document Number_____,Registered to study at _____, with student number _____,having read and understood the contents of this Agreement agree to accept and abide by the terms of the Agreement.

Applicant signature: _____

Witness_____

Signed at Durban on the_____of_____year_____

On behalf of TAFTA:

_____ _____

Name Designation

_____ _____

Signature Date

ANNEXURES

1. Copy of research protocol
2. Copy of research ethics approval letter
3. Copy of GCP ethics certificate of all researchers who will be engaging directly with TAFTA/residents (if applicable)
4. Contact details of at least two persons involved in the research, including that of the supervisor.

APPENDIX B: ETHICAL CLEARANCE CERTIFICATE

Reference number: EBIT/184/2019

Miss NT Msweli
Department: Informatics
University of Pretoria
Pretoria
0083

Dear Miss NT Msweli

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Approval is granted for the application with reference number that appears above.

1. This means that the research project entitled "FACTORS INFLUENCING ADOPTION OF MOBILE BANKING TECHNOLOGY BY ELDERLY IN SOUTH AFRICA" has been approved as submitted. It is important to note what approval implies. This is expanded on in the points that follow.

2. This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Code of Ethics for Scholarly Activities of the University of Pretoria, or the Policy and Procedures for Responsible Research of the University of Pretoria. These documents are available on the website of the EBIT Research Ethics Committee.

3. If action is taken beyond the approved application, approval is withdrawn automatically.

4. According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.

5. The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof JJ Hanekom
Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

APPENDIX C: CONSENT TO PARTICIPATE

Informed consent form
(Form for research participant's permission)

1. Project information

1.1 Title of research project: **Factors Influencing Adoption of Mobile Banking Technology by the Elderly in South Africa**.

1.2 Researcher details: **Nkosikhona Msweli, Department of Informatics, and 0606879950.**

1.3 **Research study description**

Research Objectives

- to explore the enablers of mobile banking adoption by the elderly
- to identify challenges hindering the adoption of mobile banking by the elderly;
- to identify the benefits of mobile banking amongst the elderly and
- to propose strategies for implementation by banking institutions in promoting the adoption of mobile banking among elderly

what will be required of participants?

- You are being invited to participate in the study because of your profile. You are required to partake in the focus group session to discuss mobile banking technologies.

Are there any negative consequences for me if I participate in the research project?

There are no foreseeable negative consequences for taking part in this study.

2. Informed consent

2.1 I, _____ hereby voluntarily grant my permission for participation in the project as explained to me by **Nkosikhona Msweli (Researcher)**.

2.2 The nature, objective, possible safety and health implications have been explained to me and I understand them.

2.3 I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.

2.4 Upon signature of this form, the participant will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

APPENDIX D: INTERVIEW AND FOCUS GROUP GUIDE

1. In your own understanding, what is mobile banking, do you use it?
2. What drives you to use mobile banking? Or why are you not using it?
3. What are the benefits you derive from using mobile banking?
4. What are the problems/challenges you face while using mobile banking?
5. Do you worry about anything when you are using Mobile Banking?
6. What are some of the things you would change about mobile banking?
7. Do you think banks can design better mobile banking technology for the elderly?
8. Would you advise your family or friends to use mobile banking?

APPENDIX E: DATA FROM FOCUS GROUP AND ONE-ONE INTERVIEWS

Concepts	Level of analysis	Themes
Understanding mobile banking	Individual/beneficiary	Not aware of mobile banking Minimal understanding No banking
Banking terminology	Individual/beneficiary	Difficult to understand
Age-related issues	Individual/beneficiary	Mobility Vision
Drivers/Benefit for the use of mobile banking	Individual/beneficiary	Convenience
Barriers towards the use of mobile banking	Individual/beneficiary	Trust Security It too fast to operate Fear of forgetting Fear of making mistakes No training provided Language barrier Financial Status
Resistance to change	Individual/beneficiary	Comfort and knowledge (familiarity) Change in technology
Social effect	Individual/beneficiary	Dependability (family members and caregivers) Preference of human interaction over human computer interaction Too many questions asked when calling the branch for help
Preferred method of banking	Individual	Visit the bank branch (traditional) Debit orders Cheque books ATM
Suggestions for bank	Individual/Beneficiary	Incorporate assistive technology (for those with vision challenges and hearing) Offer training Use of different languages Biometric authentication Elderly designated contact number Account verification

APPENDIX F: DATA FROM SYSTEMATIC LITERATURE REVIEW

Concepts	Level of analysis	Themes
Barriers of Mobile Banking	Individual/beneficiary	Illiteracy Security and trust issues Lack of understanding
Drivers/Benefits of Mobile Banking	Individual/beneficiary	No ques Convenience Cost-Effective Perceived ease of use
Suggestions for banking institutions	beneficiary	Training and awareness programmes