DIGITAL READINESS AND THE ADOPTION OF SELF-SERVICE BANKING TECHNOLOGIES IN SOUTH AFRICA

by

Ntswaki Petunia Matlala

Submitted for the degree

DOCTOR OF PHILOSOPHY IN MANAGEMENT

in the

School of Business and Finance

Faculty of Economic and Management Science

UNIVERSITY of the WESTERN CAPE

Supervisor: Prof: R. Shambare

CAPE TOWN

November 2022

CERTIFICATION OF THESIS

I certify that the ideas, work, analysis, results, and conclusions reported in this thesis are entirely my own effort, except where otherwise acknowledged. I also certify that this work is original and has not been previously submitted for any other award or publication, except where otherwise acknowledged.

NPMatlala

Petunia Matlala

DEDICATION

I would like to dedicate this project to family and friends.

To my husband, Victor Matlala, thank you for the unlimited support you gave me through this journey, ‘thobela mokone’ and to my children Mmathabo, Lesego, and Kabelo, this is for all of us.

To my late mother-in-law, Moyahabo J Matlala, your words of encouragement would always be engraved in my heart, may your soul rest in peace.

To my parents, my late father, Petrus, and my mother Sevenia Malebe “ke a leboga,” for your unconditional support. To my brothers and all my family at large, “baropodi ke a leboga.”

Glory be to God Almighty.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my supervisor Prof. Richardson Shambare, thank you for planting the seed of knowledge in me. You have been there providing your heartfelt support and guidance always. Your constant support and invaluable advice have always guided me in the right direction. I thank you Prof, you helped me to know various research skills and practices which further gave me an impetus to channelise my study appropriately.

To the University of Western Cape (UWC), thank you for accepting me to be part of the PhD cohort. Thank you to all administrative staff who made this journey possible.

In my journey towards fulfilling this degree, I have found mentors, a perpetual source of inspiration and role models, without outlining names you know yourselves, thank you. Your support, encouragement, and credible ideas have been great contributors to the completion of the thesis throughout the past years.

ABSTRACT

Digital technologies are rapidly transforming banking; in turn, this has changing customers' choices and preferences for interacting with banks. Digital banking channels have somewhat become a double-edged sword for the banking industry in that, on the one hand, they enhance customer convenience and 24/7 accessibility. On the other hand, these innovative technologies create a marketing challenge whereby bank managers need to learn and understand new consumer behaviours and trends for them to keep up with customer needs and to remain competitive. As such, it becomes necessary for marketers to understand consumer decision making processes related to self-service banking technologies. Of particular importance, consumers' choice behaviour related to adoption and usage patterns of banking channels become critical. Although past studies have looked at consumers' adoption of self-service technologies, rapid advances in technology dictates the need for research to revisit determinants of consumer adoption of these banking technologies.

Against this background, the purpose of this thesis is to validate and propose a framework for measuring the level of digital banking readiness and adoption of self-service banking technologies by integrating innovation diffusion theory (IDT) and technology readiness index (TRI). To address the research problem, which pertains to digital banking readiness and the adoption of self-service banking technologies, this study adopts quantitative research methodology to examine the relationship between dependent and independent variables. Data were collected using an online self-administered questionnaire from 362 South African banking consumers. Structural equation modelling was employed to test the proposed hypotheses. Results indicate that the personality antecedent is significant. It is envisaged that findings from this research will assist bank marketers in establishing a better understanding of consumer behaviour to adopt digital banking. It is recommended that banks should foster value-adding relationships with their customers to have a better understanding of their decision-making choices. Also, education and awareness campaigns should be the key focus area for financial institutions in terms of new products and services evolved.

Keywords: *Digital Banking; Mobile Banking Digital Readiness; Adoption; Customer Behaviour and Innovation*

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

ATM	Auto Teller Machine
BI	Behavioural Intention
Covid-19	Coronavirus Disease of 2019.
IDT	Innovation Diffusion Theory
PCR	Perceived Creditability
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
R^2	Coefficient of Determination
SA	South Africa
SEM	Structural Equation Modelling
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
URL	Uniform Resource Locator
USSD	Unstructured Supplementary Service Data
UTAUT	Unified theory of acceptance and use of technology
4IR	Fourth Industrial Revolution

GLOSSARY

Adoption: the acceptance and usage of innovation by consumer. Typically occurs when adopters consider adoption to provide relative benefit over non-adoption *(Rogers, 1995)*.

Digital banking: are financial services which rely on digital technologies for their delivery and use by consumers (Sardana & Singhania, 2018).

Innovation: the process of making changes to something established by *introducing something new (Rogers, 2003).*

Technology: in commercial banking it comes in the form of Electronic Networks and Electronic Funds Transfer Systems (Lestari & Ardianti, 2019).

CHAPTER 1
INTRODUCTION

1.1 Chapter overview

This chapter presents the research background and the rationale for the research. It introduces the objectives; study aims and highlights the theoretical and practical value of the present study. It also provides a brief introduction to digital financial services literature. Finally, the chapter presents the outline of the thesis.

1.2 Introduction

The world has gone through many changes in recent decades due to technology. The advent of the personal computer, expansion of processing power, global interconnectivity through trade, diplomacy, and migration, and the increased skills of a global workforce have all forced businesses to re-think their business models (Louw & Nieuwenhuizen, 2019). With the growth and increased adoption of the internet over the past few decades, many opportunities for business digitalisation and new digital business model formulation have arisen (Louw & Nieuwenhuizen, 2020; Sibanda, Ndiweni, Boulkeroua, Echchabi & Ndlovu, 2020). As a result, businesses worldwide have transited and reconfigured with the advent of the Fourth Industrial Revolution (4IR), with banks being no exception to the rule.

The banking industry is vital to social and economic development by providing efficient financial solution services (Magboul & Abbad, 2018). Digital banking is an evolving delivery channel in the banking industry and became popular due to convenience (24/7 availability), even in areas without a brick-mortar banking presence and reduces their operating costs by limiting the number of physical stores. Nowadays, Information and communication technology (ICT) connectivity is crucial to business success (Lestari & Ardianti, 2019; Chiemeke & Evwiekpaefe, 2011). These changes affect the quality of a bank's services, performance, reputation, and ability to outperform competitors (Sibanda et al., 2020; Hussaien, 2020; Kitsios, Giatsidis & Kamariotou, 2021). Unlike the phenomena of digital banking technology readiness and adoption in developing countries it is still in the infancy stage of many developing nations (Kwateng, Atiemo & Appiah, 2018; Persaud & Azhar, 2012).

Since the evolution of automatic teller machines (ATMs), banks have gradually shifted to adopt digital banking channels resulting in increased self-service banking technologies (Kitsios et al., 2021; Sibanda et al., 2020). A sizeable number of banking transactions are now conducted

on most personal's computers, smartphones and feature phones. The plethora of possibilities, plus the saving of time and cost, and the ease of use of these applications constantly grant the consumers visits brick-and-mortar branches. In addition, banking consumers are allowed to have real-time information about the valuation of their investment products, and the banks' rewards. Schreieck and Wiesche (2017) indicate that many uncontrollable external forces (digital divide, and telecommunication infrastructure) affect the development of the banking industry. As such, there is a considerable technology access gap between developed and developing countries (Magboul & Abbad, 2018).

Digital banking is an innovative service delivery mode that offers diversified financial services like cash withdrawal, funds transfer, cash deposit, payment of utility and credit bills, cheque book requests, and other financial enquiries (Lee & Kim, 2020a; Merhi, Hone, Tarhini & Ameen, 2020; Larkotey, 2012). Suddenly, banks could provide unique banking channels catered to different customers' uniqueness, regardless of their geographic locations. It has not only managed to allow the full range of banking services to consumers but introduced new services that were previously not offered in physical branches. Digital banking has taken services to remote areas where conventional banks have been physically absent. Digital banking is accomplished through the internet with specific information and a consumer password (Mahansaria & Roy, 2019).

Multiply studies discussed digital banking adoption within the South African market as highlighted in Table 1.1. From these studies, it is apparent that these authors have mostly conceptualised digital banking as a single technology such as mobile banking (Alafeef, Singh & Ahmad, 2012; Bankole & Cloete; Assensoh-Kodua, Migiro & Mutambara, 2016), Internet banking (Maduku, 2014; Aguidissou, Shambare & Rugimbana, 2017; Ramavhona & Mokwena, 2016), and cell phone banking (Shambare, 2011; Brown et al., 2003), and ATMs (Morake, Khoza & Bokaba, 2021).

However, there is a deficiency of research focusing on digital banking channels holistically in the South African context. Thus, this research aims to contribute to the body of knowledge a stream of literature on technology readiness, behavioural intention, and adoption of digital banking. By determining which variable between perceptions and personality has the greatest predictive power in influencing the adoption of digital banking in South Africa. Further to assist bank marketers in establishing a better understanding of consumer behaviour to adopt digital banking across South Africa.

1.3 Literature review: Digital banking environments

Digital banking provides consumers access to transact banking services via the ATMs, cell phones, and smart devices (Alkhowaiter, 2020; Sardana & Singhania, 2018; Kitsios et al., 2020; Kouladoum, Wirajing & Nchofoung, 2022; Alnemer, 2022; Ghani, Ali, Musa & Omonov, 2022). Even though, Yang, Li, Ma, and Chen (2018) supported that in some developing countries the main advantages of digital banking are saving costs, attracting new customers, serving more clients, and obtaining more opportunities. Multiple studies argued that the effective benefits of digital banking are still not realised (Bakare, 2015; Matlala, 2016; Shambare, 2011).

South Africa, as a developing country faces many challenges in applying digital banking fully due to weak telecommunications and networking infrastructure, a lack of well-designed training packages for the staff, and a shortage of timely banking service delivery (Ammar & Ahmed, 2016). Despite the significant adoption of digital banking globally, limited previous studies reported this issue in developing countries such as South Africa (Brown et al., 2003; Shambare, 2012; Shambare et al., 2012; Maduku, 2014; Matlala, 2016; Ramavhona & Mokwena, 2016; Mujinga, Eloff & Kroeze, 2016; Aguidissou, Shambare & Rugimbana, 2017; Phiri, 2017; Nkoyi, Tait & van der Walt, 2019).

Table 1.1: Overview of past studies findings

Author	Topic	Sample size	Factors with the greatest influence on adoption of digital banking
Brown et al. (2003)	Determinants of Internet and Cellular phone banking adoption in South Africa.	142 Internet banking and 162 cell phone banking	Perceptions of internet banking
Shambare (2012)	Predicting consumer preference for remote banking services in South Africa and Zimbabwe: The role of consumer perceptions versus personality variables	1040 South Africa and 788 Zimbabwe	Personality and perceptions
Shambare et al. (2012)	Internet banking adoption in South Africa: An exploratory study	249	Self-efficacy and trialability
Maduku (2014)	Customer's adoption and use of e-banking the South African perspective	394	Trust
Matlala (2016)	Consumers' adoption of app-based banking in the city of Tshwane	136	Perceived compatibility
Ramavhona & Mokwena (2016)	Factors influencing Internet banking adoption in South African rural areas	160	Perceived compatibility, trialability
Mujinga et al. (2016)	Online banking users' perceptions in South Africa: An exploratory empirical study.	324	Risk and convenience
Aguidissou et al. (2017)	Internet Banking Adoption in South Africa: The Mediating Role of Consumer Readiness	1516	Complexity and perceived risk
Phiri (2017)	Investigating the Factors Influencing Consumers' Adoption of Mobile Banking Services in Tshwane	120	Perceived risk
Nkoyi et al. (2019)	Predicting the attitude towards electronic banking continued usage intentions among rural banking customers in South Africa	139	Perceived ease of use and perceived usefulness

Source: Developed for this research

1.4 Literature review: Conceptual frame development

1.4.1 Consumer behaviour

Considering the diversity of digital banking channels and the need for integration, banks need to understand the consumer behaviour in buying financial services by providing a seamless

and consistent experience across all digital banking channels (Mainardes, Rosa & Nossa, 2020). In seeking to make adoption decisions, consumers want to discover, research, evaluate their options, and make their decisions seamlessly (Gautam, Jain & Tripathi, 2017), it is important for banks to fully invest in a balanced digital presence that makes banking simply and faster.

1.4.2 Digital banking technologies

Consumers are the end users of self-service technologies (SSTs) owing to which their behaviour towards SSTs has been considered as one of the utmost vital as it has been widely implemented in multiple industries like the air transport industry, learning and banking (Marr & Prendergast, 1993; Suwannakul, 2021). Literature on banking self-service technology is well established (Meuter et al., 2000; Brown et al., 2003; Shambare, 2012) and many findings are cited as illustrated in Table 1.2:

Table 1.2: Previous researcher recommendations

Recommendations	Author
One way to reduce SSTs failures is to include customers in the design phase.	Meuters (2000)
Need for further training.	Shambare (2012)
Providers should consider closely the social context of the innovation, and the subsequent banking needs of the typical user.	Brown et al. (2003)

Source: Developed for this research

While the idea of technology holds great promise for future simplification and automation. For instance, the current generation of international payment systems PayPal is based on smart card technology (for use in e.g., bank cards, credit cards, and electronic purses). However, Rogers (1995), argued that getting customers to use technological innovations is not straight forward process. Prendergast (1993) asked the question, “Should banks be spending any resources at all in trying to encourage new users of banking technologies?” It, therefore, makes a good case for banks to identify factors that influences the adoption of SSTs banking technologies. In other words, a bank will gain competitive power to understand consumer behaviour in transacting using digital banking channels over alternatives (Dehnert & Schumann, 2022).

1.4.3 Conceptual framework

The researcher's primary approach is to investigate digital readiness and adoption of self-service banking technologies focusing on IDT (Rogers,1995); TAM (Davis, 1989), and TRI (Parasuraman, 2000) models. According to the literature, perception and personality are considered two independent antecedent variables of the vital concepts in consumer adoption (Castaneda, Rodriguez & Luque, 2009; Ajzen & Fishbein 1980; Fishbein & Ajzen 1975).

Besides maintaining two IDT and four TRI variables, one construct was added, namely structural assurance. Second, we propose a direct effect of IDT and TRI on technology adoption. The hypotheses suggest that more technology-ready customers are more likely to use a specific technology, as most studies have proposed a positive relationship between the two independent variables and technology adoption. Thirdly, the researcher incorporates mediators for IDT and TRI effects theoretically grounded in the TAM literature.

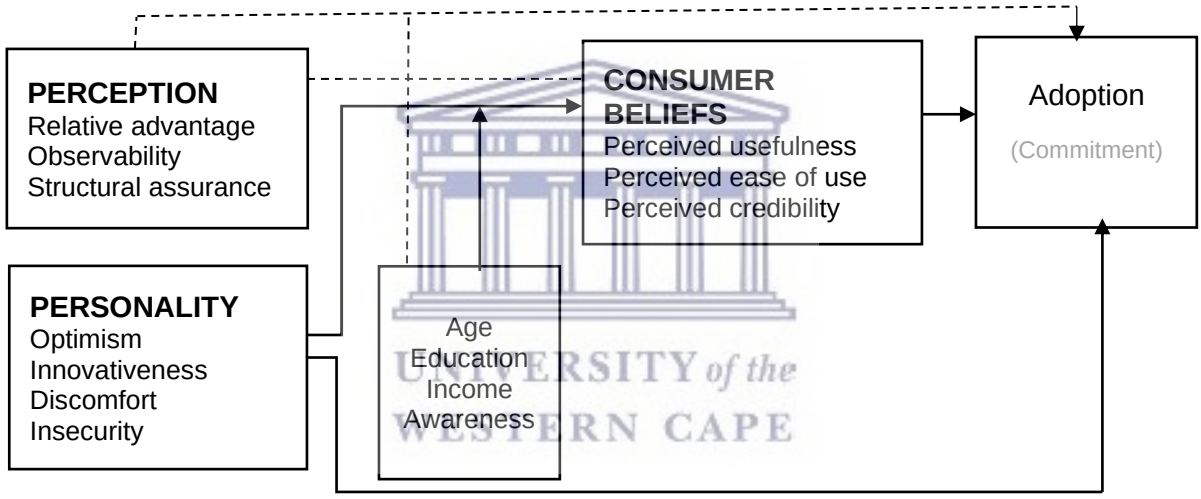


Figure 1.1: Proposed model for the study
Source: Developed for the study

1.4.4 Application of moderation in the conceptual framework

This thesis uses moderators to provide better explanatory powers of the variables (Kim, Tao, Shin & Kim, 2010). A moderator is an independent variable that affects the strength and direction of the connotation between another independent variable and an outcome variable (Lai, 2017). The study describes a methodological approach by incorporating tests of moderator variable effects in the context of structural equation models.

Though Baron and Kenny (1986) suggest that multi-group analysis be used in a structural model context. The study builds on this suggestion by describing a procedure for incorporating moderator variable effects on relationships between constructs into a structural equation model and statistically testing these effects using multi-group analysis. Moderator variables are illustrated in Table 1.3:

Table 1.3: Moderator variables

Age	Age strengthens perceived usefulness, perceived cost, and perceived system quality and in turn, moderates' attitudes toward the intention to adopt mobile banking.	Riquelme and Rios (2010)
Education	The decision to adopt an innovative technology is governed by the degree of knowledge or information one has on how to use it appropriately.	Liebermann and Stashevsky (2002)
Income	Researcher found that technology anxiety decreases as income level increases.	Lee et al. (2010)
Awareness	Technology adoption is more significant for consumers that are aware than those that are not aware.	Taylor and Todd (1995)

Source: Developed for this research

1.5 Research question

The research question is formulated as follows:

> *Which variable between perceptions and personality traits has the greatest predictive power in influencing the adoption of digital banking in South Africa?*

1.6 Hypotheses

To support the investigation of the stated research question, the following hypotheses were formulated:

H1: Perception attributes have effect on consumer's belief in digital banking:

H1a: Relative advantage has effect on consumer's perceived ease of use.

H1b: Relative advantage has effect on consumer's perceived usefulness.

H1c: Relative advantage has effect on consumer's perceived credibility.

H1d Relative advantage has effect on consumer's behavioral intention to adopt.

H1d: Observability has effect on consumer's perceived ease of use.

H1e: Observability has effect on consumer's perceived usefulness.

H1f: Observability has effect on consumer's perceived credibility.

H1g: Observability has effect on consumer's behavioral intention to adopt.

H1h: Structural assurance has effect on consumer's perceived ease of use.

H1i: Structural assurance has effect on consumer's perceived usefulness.

H1j: Structural assurance has effect on consumer's perceived credibility.

H1k: Structural assurance has effect on consumer's behavioural intention.

H1l: Perceived usefulness has effect on consumer's behavioral intention to adopt.

H1n: Perceived ease of use has effect on consumer's behavioral intention to adopt.

H1m: Perceived credibility has effect on consumer's behavioral intention to adopt.

H1o: Perceived ease of use has effect on perceived usefulness.

H1p: Perceived ease of use has effect on perceived credibility.

H2: Personality attributes have effect on consumer's belief in digital banking:

H2a: Insecurity has effect on consumer's perceived ease of use.

H2b: Innovativeness has effect on consumer's perceived ease of use.

H2c: Optimism has effect on consumer's perceived ease of use.

H2d: Insecurity has effect on consumer's perceived credibility.

H2e: Optimism has effect on consumer's perceived credibility.

H2f: Perceived ease of use has effect on consumer's perceived credibility.

H2g: Insecurity has effect on consumer's behavioural intention.

H2h: Innovativeness has effect on consumer's behavioural intention.

H2i: Optimism has effect on consumer's behavioural intention.

H2j: Perceived credibility has effect on consumer's behavioural intention.

H2k: Perceived usefulness has effect on consumer's behavioral intention.

H2l Perceived ease of use has effect on consumer's perceived usefulness.

H2n: Discomfort has effect on consumer's behavioral intention.

H2m Discomfort has effect on consumer's perceived credibility.

H2o: Discomfort has effect on consumer's usefulness.

H2p: Discomfort has effect on consumer's perceived ease of use.

H2q: Optimism has effect on consumer's usefulness.

H2r: Innovativeness has effect on consumer's usefulness.

H2s: Innovativeness has effect on consumer's perceived credibility.

H2t: Insecurity has effect on consumer's usefulness.

In addition to the above hypotheses, the following hypotheses were developed in line with the proposed conceptual framework:

H3: Consumer's belief variables mediate the relationship between perception and adoption:

H3a: Relative advantage and adoption through perceived ease of use and perceived usefulness.

H3b: Relative advantage and adoption through perceived ease of use and perceived credibility.

H3c: Relative advantage and adoption through perceived credibility.

H3d: Observability and adoption through perceived ease of use and perceived usefulness.

H3e: Observability and adoption through perceived ease of use and perceived credibility.

H3f: Observability and adoption through perceived credibility.

H3g: Structural assurance and adoption through perceived ease of use and perceived usefulness.

H3h: Structural assurance and adoption through perceived ease of use and perceived credibility.

H3i: Structural assurance and adoption through perceived credibility

H4: Consumer's belief variables mediate the relationship between personality and adoption:

H4a: Insecurity and adoption through perceived ease of use and perceived usefulness.

H4b: Insecurity and adoption through perceived ease of use and perceived credibility.

H4c: Insecurity and adoption through perceived credibility.

H4d: Innovativeness and adoption through perceived ease of use and perceived

H4e: Innovativeness and adoption through perceived ease of use and perceived credibility.

H4f: Optimism and adoption through perceived ease of use and perceived usefulness.

H4g: Optimism and adoption through perceived ease of use and perceived credibility.

H4h: Optimism and adoption through perceived credibility

H4i: Discomfort and adoption through perceived ease of use and perceived usefulness.

H4j: Discomfort and adoption through perceived ease of use and perceived credibility.

H4k: Discomfort and adoption through perceived credibility.

H4i: Innovativeness and adoption through perceived credibility

H5: Age moderates the relationship between personality and consumer beliefs.

H6: Age moderates the relationship between perception and consumer beliefs.

H7: Income moderates the relationship between personality and consumer beliefs.

H8: Income moderates the relationship between perception and consumer beliefs.

H9: Education moderates the relationship between personality and consumer beliefs.

H10: Education moderates the relationship between perception and consumer beliefs.

H11: Technology awareness moderates the relationship between personality and consumer beliefs.

H12: Technology awareness moderates the relationship between perception and consumer beliefs.

1.7 Aim of the study

The study's aim is to identify the extent of technology adoption frameworks usage in predicting consumers' behavioural intention to adopt digital banking.

1.8 Research objectives

This paper investigates the following research objectives:

RO1: To determine which variable between perception and personality has the greatest predictive power in influencing the adoption of digital banking in South Africa.

RO2: To assess the role of demographics and technological awareness in moderating the relationship between two independent variables (perception as antecedents of IDT and personality as antecedents of TRI) and consumer beliefs.

RO3: To assess the role of consumer beliefs in mediating the relationship between two independent variables (perception as antecedents of IDT and personality as antecedents of TRI) and adoption.

1.9 Research contribution

The study makes theoretical and practical contributions. These are briefly discussed next.

1.9.1 Theoretical contribution

The study contributes to consumer behaviour research, particularly in the African context, by providing insight into the following:

I. Theoretically, this study offers an alternative lens to view the concept of consumer digital readiness and adoption of self-service banking technologies by using consumer decision theories (Engel et al., 1978; Bettman, 1979) as the underpinning theory. In line with the other authors (Shambare, 2012; Venkatesh, Thong & Xu, 2012) the predictive power of these study antecedents is perception (Black et al., 2001; Rogers, 1995) and personality (Agarwal & Prasad, 1998; Parasuraman, 2000).

II. By proposing age, gender, income, education, and technological awareness as a moderator in the relationship between the two antecedents (perception and personality) and consumer beliefs.

III. The proposed research methodology is likely to stimulate research on the effects of SEM-AMOS to analyse digital banking readiness which is presently

underrepresented in South Africa (Taoana, Quaye & Quaye, 2021; Venter de Villiers, Chuchu & Chavarika, 2020).

Since most of the studies have reported on developed countries, aspects relating to consumer adoption of digital banking in African countries have been unrepresented in the literature. Against this background, this study seeks to address the paucity in the literature by focusing on the adoption of digital banking in South Africa. This in turn will steer the adoption of digital banking amongst South African banking consumers and consequently narrow it to the unbanked market.

1.9.2 Practical contribution

I. For bank marketers, this research also has several implications. First, the results show that demographic variables such as age and gender are effective predictors of SST adoption and should be embraced as segmentation variables for SST adoption.

II. Second, the mediation analysis results enable bank marketers to appreciate better both direct and indirect ways SST determinants influence digital banking adoption. The results reveal the critical roles of usefulness, ease of use, and creditability in translating the effects of determinants on digital banking adoption.

III. Third, bank marketers should realise the importance of SST adoption predictor's specific context. Results indicate that banking service firms are better positioned to secure SST adoption among their customers by considering the moderating roles of technology awareness dimensions and SST types.

IV. Finally, this study's moderation analysis results point to the importance of SST type for designing effective rollout and subsequent management of SSTs.

Furthermore, results from this study will be valuable to both marketers and researchers, especially those in developing countries, where this study draws its sample. Results from this study will benefit marketers in exploiting the prospects of digital banking holistically in SA. This study will also provide both marketers and policymakers with a set of manageable variables that can be manipulated to stimulate the adoption of digital banking.

1.10 Research methodology

Research methodology deals with distinct aspects of the research procedure, from philosophical assumptions to data analysis (Lisle, 2011). Hence, the key purpose of all research methodologies is to obtain accurate and trustful evidence for answering the research question. To rationalise a research methodology this study adapts the onion research framework (Saunders et al., 2019; Melnikovas, 2018). As shown in Figure 1.2, the framework simplifies the structure or the process of presenting the research methodology in a thesis (Agu, 2016; Bantom, 2016).

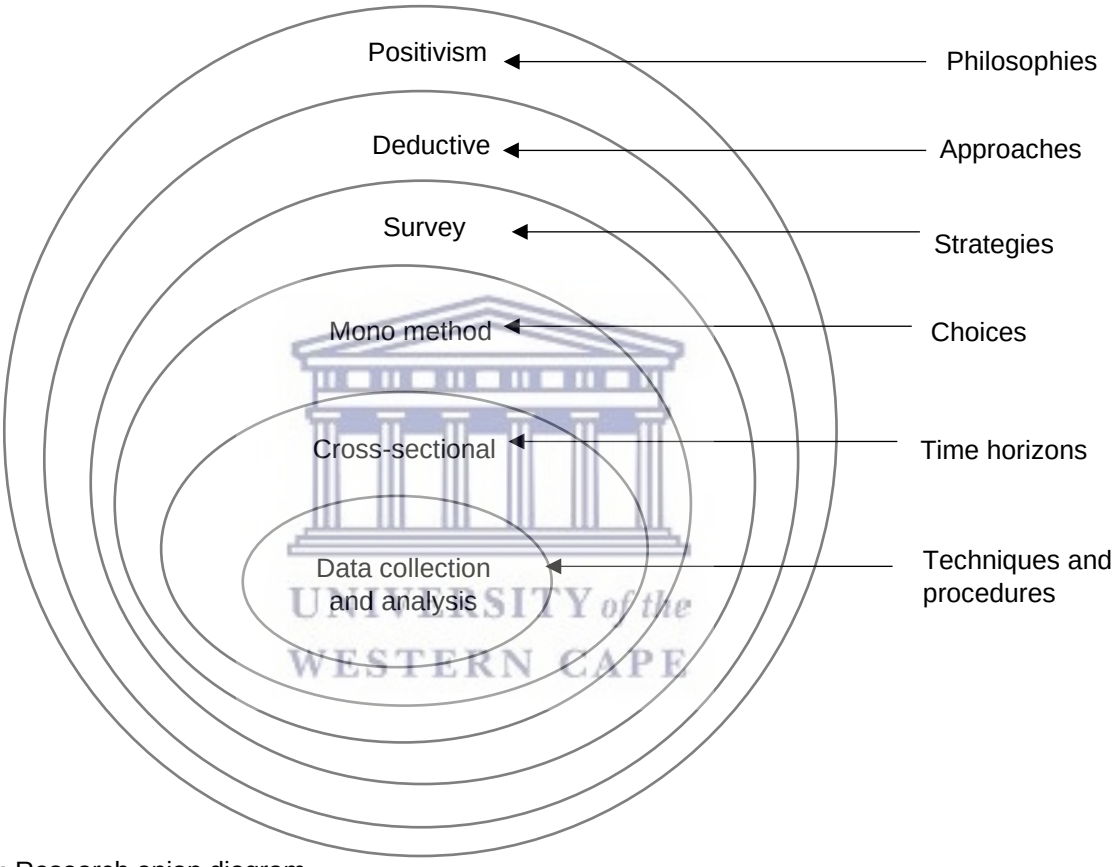


Figure 1.2: Research onion diagram
Source: Saunders et al. (2019)

The research onion framework has a multidisciplinary layer: the researcher's philosophical position, approach, research strategies, choices, research timelines, and the data collection techniques employed by the researcher. Previous studies related to mobile apps and technology (Alturki, 2021; Niemand & Chauke, 2017) used this framework to figure out consumer behaviour on the use and adoption of technologies. This framework has also been used in various research studies in a master dissertation (Ngidi, 2019; Tsumake, 2022) and a

PhD thesis (Fernández, 2019; Chipangura, 2016; Boadi, 2020) to form a research methodology framework.

1.10.1 Research philosophy

The philosophy of positivism was selected for this study, as the philosophical choice of the study is based on the fact that the researcher collected data on observable reality and searched for relationships in the data (Saunders et al., 2019; Park, Konge & Artino, 2020; Uduma & Sylva, 2015). The positivist position regards the social world as having a fixed nature, characterised by patterns of cause and effect that can be described and predicted (Park et al., 2020). It holds that the methods, techniques, and procedures used in natural science offer the best framework for investigating the social world (Chilisa, 2019).

1.10.2 Approach

According to Hyde (2000); Pathirage, Amaratunga, and Haigh (2008); Soiferman (2010); Bergdahl and Berterö (2015) asserted that deductive research initiates with the general and finishes with the specific. In other words, it goes ahead from theory to data. Hence this study adopted the use of the deductive approach as involves conceptual or theoretical structure development by applying practical observation (Ali & Birley, 1998; Pathirage et al., 2008).

1.10.3 Methodological choice

This study adopted the quantitative method as it examined the relationship between dependent and independent variables, which incorporates numerous statistical techniques. The advantage of a quantitative approach is that it places significant importance on objectives and the reliability of findings, encouraging replication (Saunders et al., 2019). The purpose of quantitative research was to obtain an in-depth understanding of the perspectives and personalities of participants.

1.10.4 Research strategy

The survey method became particularly useful in this study for several reasons. Firstly, it ensured quality in validity and reliability, as this was the methodology applied in past research (Healy & Perry, 2000; Hubbard & Armstrong, 1994; McKinnon, 1988). Secondly, a large sample across an expanded geographic coverage could easily be accessed and enhance representativeness (Blumberg et al., 2014). Thirdly, tried, and tested scales could be used to

collect data rapidly using a minimal research team, usually in line with budget constraints imposed on doctoral theses (Perry, 1998). Fourthly, the research objectives, including hypotheses, necessitated the collection and analysis of quantitative data (Field, 2009).

1.10.5 Time horizon

The survey was conducted over eight weeks (from 01 December 2021 to 31 January 2022). Hence, the cross-sectional was employed for this study. Furthermore, the thesis must be completed within a specific timeline, representing a time limit.

1.10.6 Techniques and procedures

The inner circle of the research onion is made up of 'tactics' which refers to aspects of the finer details of data collection and analysis.

In this study, three primary inquiries were discussed:

I. Sampling design

Population is defined as the total number of units (individuals, organisations, events, objects, or items) from which samples are selected for measurement (Cooper & Schindler, 2018). Table 4.2 illustrate the population and target sample that was used to collect data.

Table 1.4: Population definitions

Criteria	Explanation
Element	The element from which the information is sought. They were South African citizens
Sampling unit	The sampling unit was defined as South African retail banking consumers above 18 years with a mobile phone.
Extend	The extended research was in KwaZulu Natal and Mpumalanga
Time	The time of the sample survey was from 01 December 2021 to 31 January 2022

Source: Adapted from Malhotra (2010)

In this study, the population is represented by retail banking consumers who used or never used digital banking to transact in the South African context. The demographic characteristics were assumed variant. Therefore, the findings of this study brought a deep understanding of

consumer behavioural dynamics and the factors influencing the adoption of digital banking. In the present research, it was found that it might be more desirable for the nature and the purpose of the research to apply non-probability sampling in the form of snowballing technique. Due to time constraints financial and Covid19 restrictions, this thesis compromised the population that has no access to online technology as the data was collected on online platforms only.

II. Data collection

To complete this research, the author used primary data as it answers the structured questionnaire. A questionnaire survey was employed as an instrument for data collection. The questionnaire was pretested among various academic's professionals to ensure all items are clear. The first part of the questionnaire was for pre-screening, and the second part of the questionnaire collects the demographic data of the participants. The third part concerns the factors that affect the level of adoption of the digital banking system in the bank. The fourth part measures the behavioral intention to adopt digital banking. A total of 362 responses were received which was deemed sufficient to satisfy the minimum requirements to test the model, (Roscoe, 1975) suggested that the number of respondents should be between 30 to 500 in behavioural research.

III. Data analysis

SPSS version 28 and AMOS version 26 were used to analyse the primary data studies on digital banking. The following data analysis techniques were performed:

- ***Descriptive analysis:*** describing, aggregating, and presenting the constructs of interest
- ***Factor analysis:*** for data reduction
- ***Structural equation model (SEM)-*** measurement model: for model fit, testing reliability, and validity
- ***Structural equation model (SEM)-*** structural model*:* for testing direct, mediating, and moderating effect of related digital banking on adoption.

1.11 Validity and reliability

Validity addresses the issue of whether the researcher is measuring what they intend to measure (Saunders et al, 2019). For this study construct validity was used because is concerned with the fact that measurement questions measure the presence of those constructs such as attitude scales, aptitude, and personality you intend to measure. The content validity of the study was assured through an in-depth literature review and expert opinion (academics, industry researchers).

Further, a pilot survey was conducted to test the questionnaire. All items included in the questionnaire were suitable for further proceeding. Measurement scales used in the current study were adopted from past studies, including Perceived ease of use (Davis, 1989; Rauniar, Rawski, Yang & Johnson, 2014), Perceived usefulness (Davis, 1989; Choi & Chung, 2013; Rauniar et al., 2014), Perceived credibility (Yoo & Gretzel, 2008), and behavioural intention (Davis, 1989; Islam & Ahmed, 2020). Since the study adopted scales from several previous studies, factor analysis was done to verify the underlying structure of the variables before it proceeded with further analysis.

To ascertain the reliability of the measurement scales and to check the degree to which the items that make up the scale "hang together," Cronbach alpha coefficient is calculated. Cronbach's alpha checks the internal consistency reliability of scales. It checks if whether the items that make up the scale measure the same underlying construct (Pallant, 2020). For scale to be reliable, its Cronbach alpha value should be above 0.7 (Pallant, 2020), where other researchers have successfully used a cut-off point of 0.6 or even 0.5 (Said, 2018; Taherdoost, 2016; Shambare, 2012; Frouws & Naidoo, 2010). Where possible, the items used for the development of construct will be adapted from preceding research to ensure the content validity of the scale will be attained (Taherdoost, 2016). To assess the internal consistency for each construct, Cronbach's alpha will be used to determine the reliability of the questionnaire items.

1.12 Ethical considerations

Permission was obtained from the university committee to conduct this study. As recommended by Saunders et al. (2019), there are numerous reasons why it is vital to follow ethical norms in research, the study state that these norms endorse the aims of the research data. Privacy, confidentiality, and informed consent was taken into considerations when collecting data for this study.

To protect research participants from any potential negative impact arising from this study, this thesis follows the regulations and guidelines stipulated by the University of Western Cape (UWC) Research Ethics Committee. To maintain high ethical standards, the following measures were adhered to:

(1) ***Informed consent*** – all respondents and participants were notified of the nature of their participation in the research beforehand. Research assistants explained to all participants exactly what they were expected to do as well as their rights as research participants, including the right to withdraw from participation at any stage of the research. After this, all respondents' consent was sought and secured prior to commencement of any interview.

(2) ***Right to privacy*** – the identities of respondents and their opinions were treated confidentially. Participants were reminded not to provide details about their identities and any other information that might suggest their identities (such as names or addresses).

(3) ***Dignity*** - the dignity and character of all stakeholders was upheld; participants were not subjected to embarrassing or unbecoming behaviour.

(4) ***Honesty*** – findings of the study have been reported honestly even when results turned out to be unfavourable or different from the author's expectations, these were represented as such.

1.13 Definition of terms

Digital banking (DB) are financial services which relies on digital technologies for its delivery and use by consumers. Sardana and Singhania (2018), argued that digital banking refers to the use of technology to conduct banking transactions smoothly. It includes commonly used terms such as electronic banking, internet banking and online banking.

Mobile banking is an emerging branch of electronic or online banking. It is an application of mobile commerce based on wireless networks and mobile devices. Govender and Sihlali (2014) defined cell phone banking as an extension of Internet banking, providing time independence, convenience, prompt response to customers, and cost savings.

1.14 Chapter outline

The outline is consistent with advice from Perry (2002); a six-chapter thesis is recommended for this study, which is the standard for doctoral theses in the marketing discipline. Accordingly, the literature review as it pertains to this research is broken down into two separate but related chapters – Chapters 2 and 3. In the former trends are reviewed in digital banking and in the latter, a synopsis is provided of consumer decision behaviour literature. The thesis chapters are structured as follows:

- **Chapter 1: Introduction** – this chapter provides a general overview of the study in terms of an introduction, motivation, rationale, and contribution of the study. Background to the study, research problem, and research question as well as the objectives of the study are also presented.

- **Chapter 2: Literature Review (Digital Banking)** – the existing body of literature is analysed as it relays to the theory and practice of digital banking. While the discussion revolves around the global perspective, particular emphasis is placed on self-service banking technologies adoption within the South African context.

- **Chapter 3: Literature Review (Conceptual Frame)** – the extant literature on consumer decision behaviour is analysed. Various predictors of digital readiness and the adoption of self-service banking technologies are reviewed. Furthermore, the theories relating to innovation adoption and conceptualisation of the research framework are outlined in this chapter as well.

- **Chapter 4: Methodology** – consistent with the conceptual model developed in Chapter 3, this study's research methodology construction is based on the theoretical concept of “research onion”, proposed by Saunders et al., (2019). The research onion is structured into six sections: philosophies; approach to theory development; methodological choice; strategies; time horizon; techniques and procedures.

- **Chapter 5: Analysis and Results** – in this chapter, the data gathered is analysed. The presentation of the results from the data analysis in this chapter focuses on South African banking customers, the study investigates the behavioural intention to adopt digital banking. To examine the model, the assumption test and the descriptive techniques were applied.

- **Chapter 6: Conclusions and Recommendations** – the study concludes with a thorough discussion of the implications of the predictors of digital readiness and adoption of self-service banking technologies in the South African banking context. Implications and recommendations, including suggestions for future research, were the highlights of Chapter 6.

1.15 Conclusion

Chapter 1 has laid the foundation for the study. The research problem, research questions and investigation questions were introduced in this chapter. In addition, justification for undertaking the research and definitions of key terms as they pertain to this study have also been presented. Finally, the research design and methodology, ethics, and research constraints were explained. Against this premise, the report proceeds with a detailed description of the research, beginning by reviewing the literature as it pertains to retail banking in Chapter 2.

CHAPTER 2
THE DIGITAL BANKING ENVIRONMENT IN SOUTH AFRICA

2.1. Chapter overview

This chapter is structured as follows: firstly, it provides an overview of the global banking industry and the effects of technological factors on the banks and highlights the South African banking industry. Secondly, it provides a brief description of retail banking. The third section highlights the digitisation of retail banking services. The fourth section describes online banking and the changing online banking landscape in South Africa. The last section concludes the need to evaluate online banking securities and their impact on security awareness.

2.2. Literature review process

The literature is divided into two parts (Chapter 2 and Chapter 3) (Perry, 2002). Chapter 2 discusses the digital banking industry, and Chapter 3 presents the theoretical framework of digital readiness and the adoption of self-service banking technologies. Figure 2.1 outlines the sequence of the rest of the chapter.

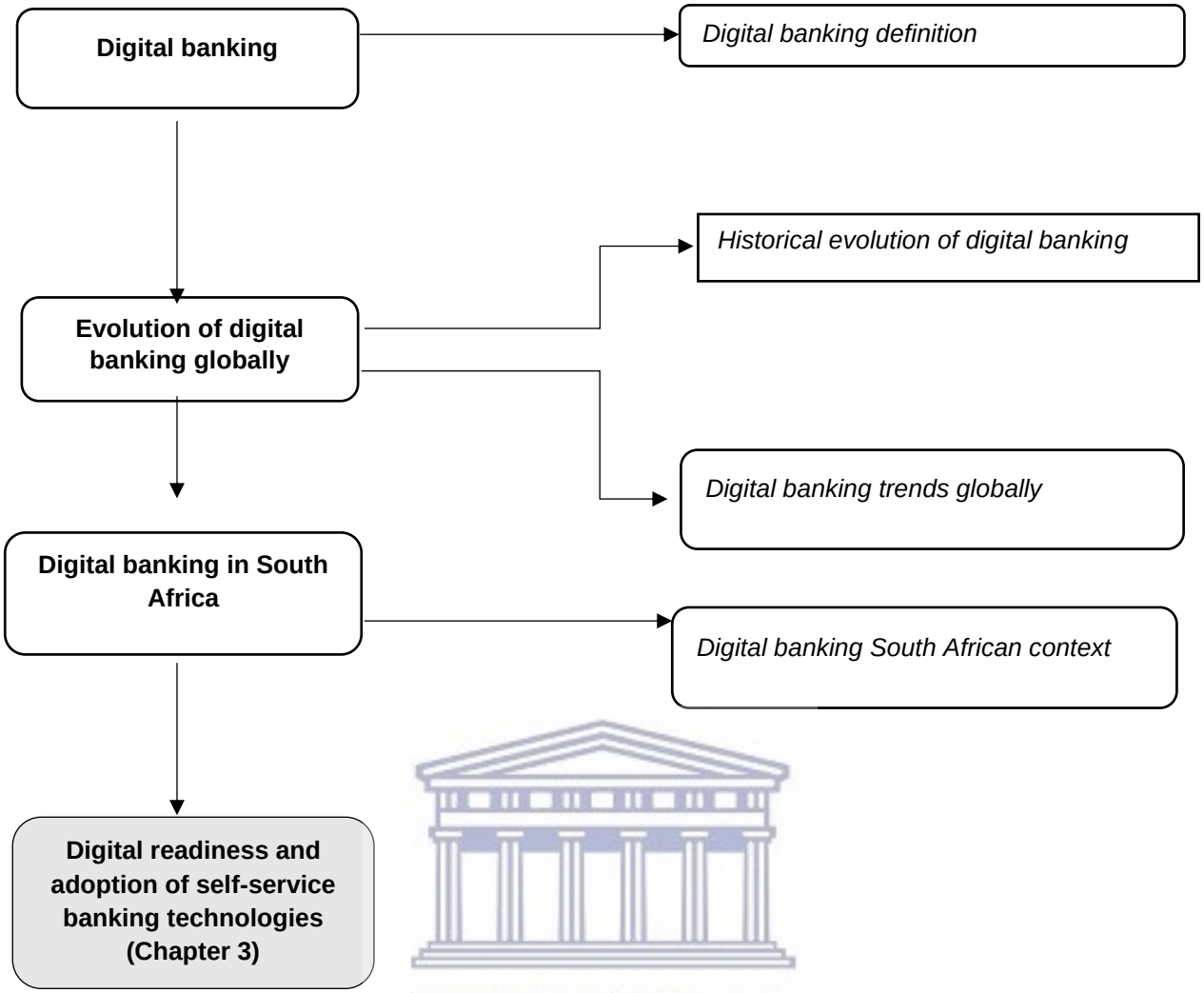


Figure 2.1: Literature review process
Source: Developed for this research

2.3. Introduction

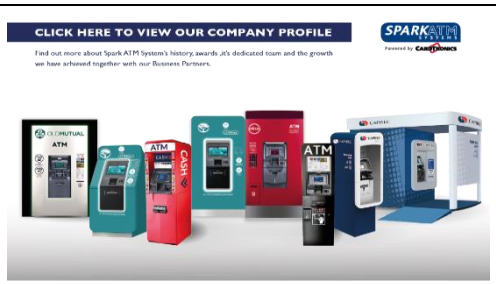
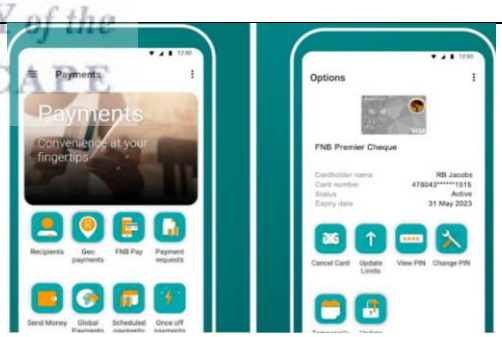
Technology has transformed and continues to transform banking (Lee & Chen, 2022). Self-service banking technologies are disrupting traditional banking (Ragnvald, 2001; Omoge, Gala & Horky, 2022), with online deposits, mobile apps, and electronic bill payments. The most fundamental change is the shift from traditional brick-and-mortar branch banking to electronic delivery channels such as withdrawals, deposits and using virtual cards at the ATMs (Gomber, Kauffman, Parker & Weber, 2018). These technological advancements are aimed at improving banks' efficiency. While this makes business sense from a supplier side, the true measure of success of digital banking platforms is predicated on consumers' willingness to accept and fully utilise self-service technologies for banking (Brown et al., 2003; Diphoko, 2003; Matlala, 2016). Therefore, bank marketers must understand customers' readiness and willingness to use digital banking. It is against this background that this thesis examines South African banking consumers' adoption behaviour toward digital banking adoption.

2.4. Defining digital banking

Digital banking is a broad term used to describe the various banking products and services that require internet connectivity such as wireless or wired technology (Sardana & Singhania, 2018). Digital banking is a process that allows a consumer to perform banking functions online. Digital banking provides consumers access to transact banking services via the ATMs, cell phones and smart devices (Alkhowaiter, 2020; Sardana & Singhania, 2018; Kitsios et al., 2020; Kouladoum et al., 2022; Alnemer, 2022; Ghani et al., 2022).

Digital banking technology denotes various services ranging from ATMs, cell phone banking, Internet banking, and, more recently, mobile banking as illustrated in Table 2.1, (Merhi et al., 2020). Digital banking is an innovative service delivery mode that offers diversified financial services like cash withdrawal, funds transfer, cash deposit, payment of utility and credit bills, and other financial inquiries (Larkotey, 2012; Shahid et al., 2022).

Table 2.1: Digital banking technologies

Digital banking technologies	Services	Features
ATM	Cash withdrawal. Cash deposit. Mini statement. Transfer of cash. Payment of bills. Recharge of prepaid mobile.	
Cell phone banking	Buy prepaid and banking. Accounts and balances. Payments and transfers.	
Internet banking	Up-to-date account activity. Check account balance. Account-to-account transfer. Person-to-person transfer. Bank-to-bank transfer. Mobile Deposit. Bill payments. Online bill pays	
Mobile banking	Accounts and balances. Payments and transfers. Buy airtime, electricity, and LOTTO. Access to coupons, vouchers, and specials. eWallet and cardless cash withdrawals. Global payments and forex. GEO payments.	

Source: Developed for this research

2.5. Evolution of digital banking globally

Digital banking has been gradually evolving in response to the customer demand for simplicity and convenience when transacting (Louw & Nieuwenhuizen, 2020). The evolution of digital banking entails prominent levels of process automation and web-based services, as well as APIs that enable cross-institutional service composition to deliver banking products and provide transactions (Kiliari & Koesrindartoto, 2019).

To understand how digital banks evolved, it is imperative first to establish the history of digital banking and where it is rooted. Figure 2.2 shows the evolution of digital banking globally.

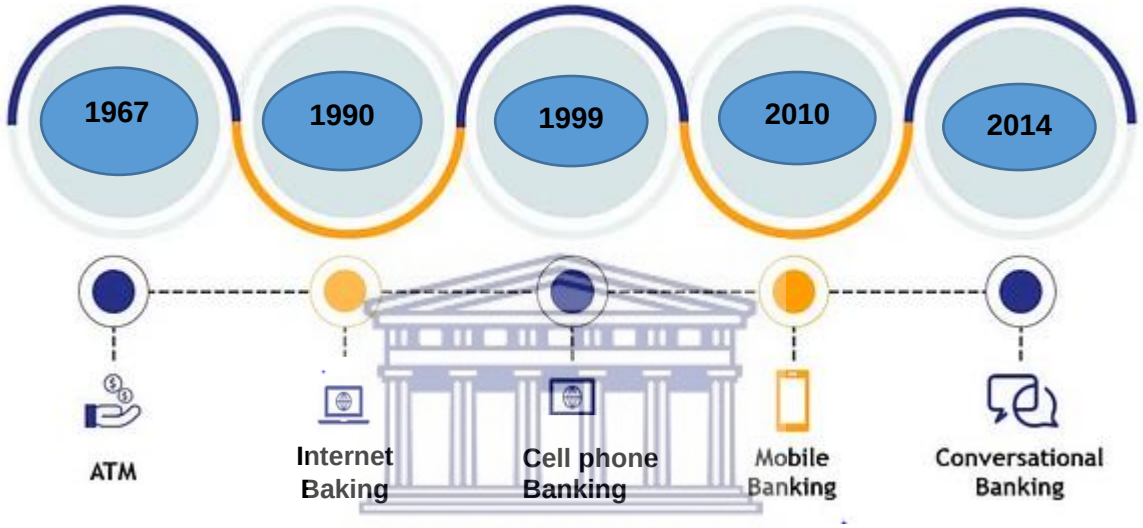


Figure 2.2: Evolution of digital banking
Source: Developed for this research

2.5.1. Auto teller machine (ATM)

ATM is an electronic computerised telecommunications device that enables customers of a financial institution to directly access their bank accounts using a secure method of communication (Chandrasekar & Lemma, 2017), order or make cash withdrawals (or cash advances using a credit card) and check their account balances without the need for human interaction (Abiola Sowunmi et al., 2014; Sridharan & Malladi, 2016). ATMs can be found anywhere, and they do not necessarily need to be connected to banks (Sridharan & Malladi, 2016).

2.5.2. Internet banking

Internet banking is defined as “a banking channel that allows consumers to do a wide range of financial and non-financial activities by using a bank website” (Lee and Kim, 2020a). These financial activities may include fund transfers, top-ups, utility bill payments, tax payments, and downloading bank statements, credit, and home loan applications. The birth of internet banking can be traced back to 1990 as illustrated in figure 2.1 when the Californian bank Wells Fargo offered the first online banking service (Aggelis, 2005). Internet banking provides an alternative delivery channel for banking operations and brings ease to banking operations (Ramavhuna & Mokwena, 2016; Maduku, 2014; Shambare et al., 2014; Lee & Kim, 2020a; Merhi et al., 2020).

2.5.3. Cell phone banking

Researchers defined cell phone banking (Shambare, 2013; Vanitha, 2013), as an electronic system that provides most of the essential financial services available daily using a mobile communication device, usually a smartphone, feature phone, or tablet. Moreover, Govender & Sihlali (2014), argues that cell phone banking is an extension of Internet banking, providing time independence, convenience, prompt response to customers, and cost savings. Cellphone banking has gradually become a vital banking channel alongside automated teller machines (ATMs), and internet banking in recent years (Alalwan, Dwivedi & Rana, 2017; Giovanis et al., 2019). Cell phone banking services via the Wireless Application Protocol (WAP) and the SMS-based Wireless Internet Gateway (WIG) technologies and Unstructured Supplementary Service Data (USSD) technology.

2.5.4. Mobile banking

The launch of smartphones (Poppe, Jaeger-Erben & Proske, 2020), brought mobile banking into apps, although text messaging had allowed for limited banking services since cell phones arrived decades earlier. Mobile banking is a service that enables bank consumers to do banking transactions using mobile device technologies such as a smartphone or a tablet (Shahid, Jamid Ul Islam, Malik, & Hasan, 2022). Mobile banking is a cost-effective solution that benefits both account consumers and financial institutions (Shahid et al., 2022). In addition to saving consumers time and money, it provides comfort and convenience (Jain & Agarwal, 2019). For banks, it reduces the costs associated with maintaining physical premises.

2.5.5. Conversational banking

Conversational banking is a bi-directional interface between a consumer and a bank, where a conversation can be initiated by either participant through a voice, text, or visual interface. The conversation banking available is SMS, chatbot, voice bots, and material robots (Deka, Sah, Shrivastava, Phukon & Routray, 2021).

2.6. Global trends in digital banking

Globally digital banking market is valued at $803.8 billion in the year 2019 and is expected to reach $1610 billion by 2027 (Mothibi & Rahulani, 2021).

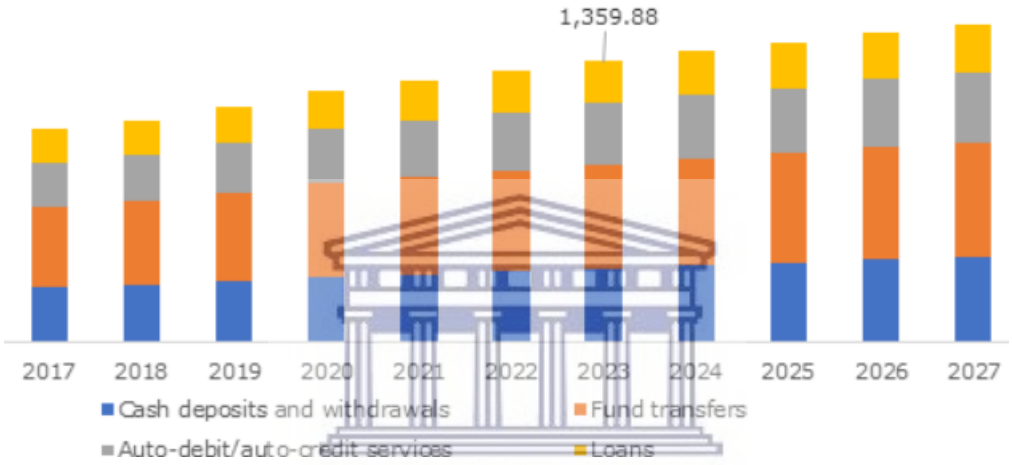


Figure 2.3: Global trends of digital banking
Source: GMINSIGHTS, 2021

According to Chironga, Cunha, De Grandis, and Kuyoro (2018) reveal that the number of Africans with bank accounts has increased from 170 million in 2012 to nearly 300 million in 2017. This figure is expected to reach 450 million over the next five years. Cash is the primary method of value exchange, as it is easy to use, widely accepted, and ingrained in a user's psyche as having value (Weichert, 2017).

Approximately 66 percent of the adult population in sub-Saharan Africa are unbanked or do not use formal financial services (Demirguc-Kunt, Klapper, Singer, Ansar & Hess, 2018). Statista (2022) shows that there is a shift, approximately 45 percent of the adult population in sub-Saharan Africa is unbanked. Moreover, obstacles to banking include distance to bank outlets (risks of carrying cash), lack of trust, daunting paperwork, and overwhelming identity and documentation requirements (Realini & Mehta, 2015). It is noted that offering consumer

oriented financial and innovative services with advanced IT infrastructure is still a big challenge for financial institutions (Lee & Kim, 2020a; Marakarkandy et al., 2017).

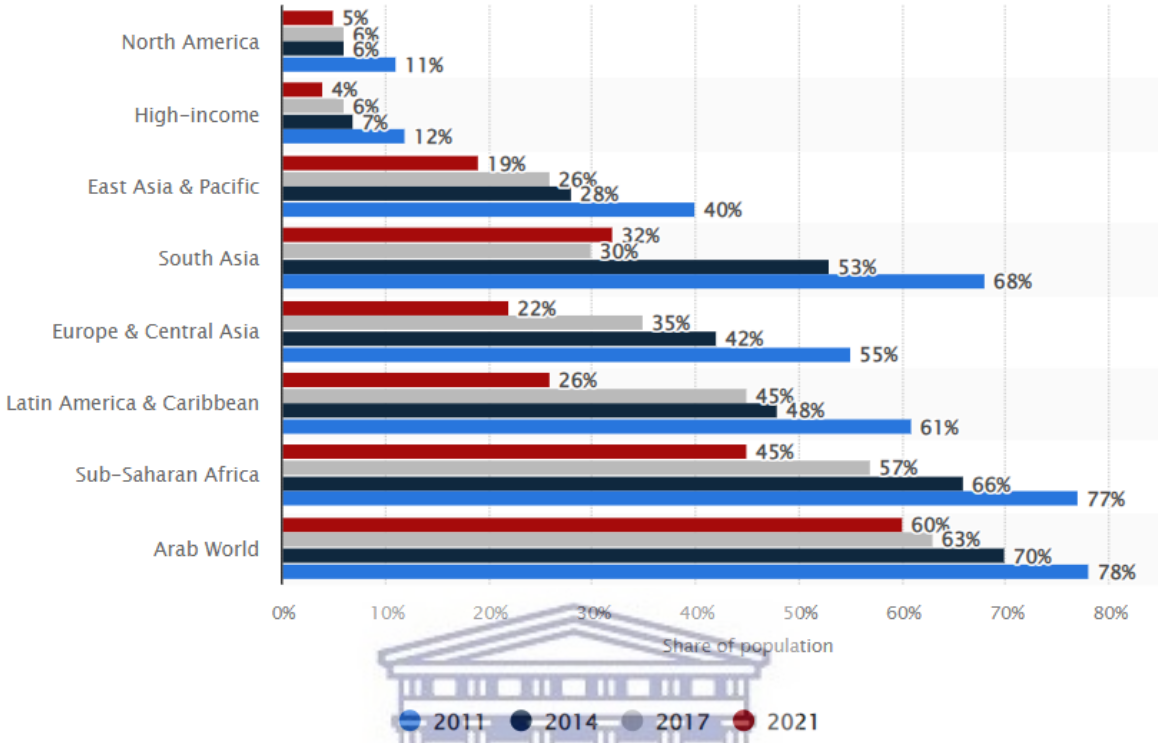


Figure 2.4: Distribution of unbanked population from 2011 to 2021, by region
Source: Statista, 2022

The wide use of mobile phones gives in an opportunity for every household to access an extensive range of banking services (Aker, Boumnijel, Mcclelland & Tierney, 2016; Mishra & Bisht, 2013; Warren, 2007). The bank customers' use of digital payments aggressively tends to be higher in areas where digital money indicates its widespread. Kenya, for example, has 80 percent of adults using digital payments, which is twice the average in developing economies (Klapper, Miller & Hess, 2019).

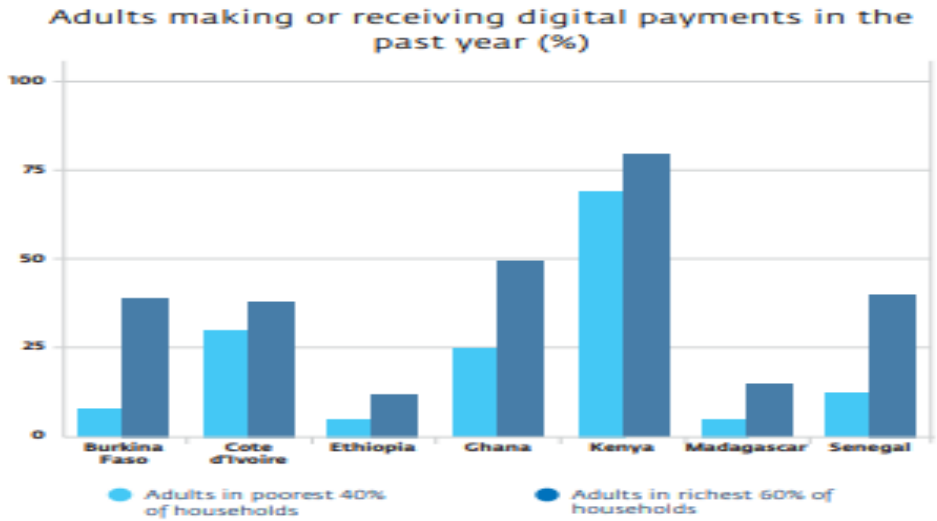


Figure 2.5: Adults making or receiving digital payments
Source: Global Fintex database, 2021

According to Klapper et al. (2019), adults using digital payments aggressively doubled in Ghana; its digital money ownership increased from 13 percent in 2014 to 39 percent in 2017. However, the share is much lower elsewhere, as, in Madagascar and Ethiopia, about 1 in 7 adults use digital payments. These studies provided that the customers' readiness to carry a cheque card or debit card is still low in Sub-Saharan Africa, reported by only 7 percent of adults. However, the usage is significantly higher in economies such as Mauritius (48 percent), Namibia (37 percent), South Africa (25 percent), and Botswana (17 percent). Klapper et al. (2019) said that about 1 in 10 adults make digital payments for utilities such as water and electricity in Sub-Saharan Africa.

2.6.1. Digital banking in South Africa

South African digital banking market size was valued at $803.8 billion in 2019 and is projected to reach $1610 billion by 2027. The retail banks' segment commands the largest share in the digital banking market, valued at $574.4 billion[1] in 2019 and projected to reach $1320 billion[2] in 2027. According to Statista (2022), the market's largest segment is digital payments with a total transaction value of $14 million[3] in 2022. The average transaction value per user in the alternative financing segment is projected to amount to $83 thousand in 2022.

[1] R10,453.3 billion (OANDA, 2022)
[2] R24,033.8 billion (OANDA, 2022)
[3] R254.904 million (OANDA,2022)

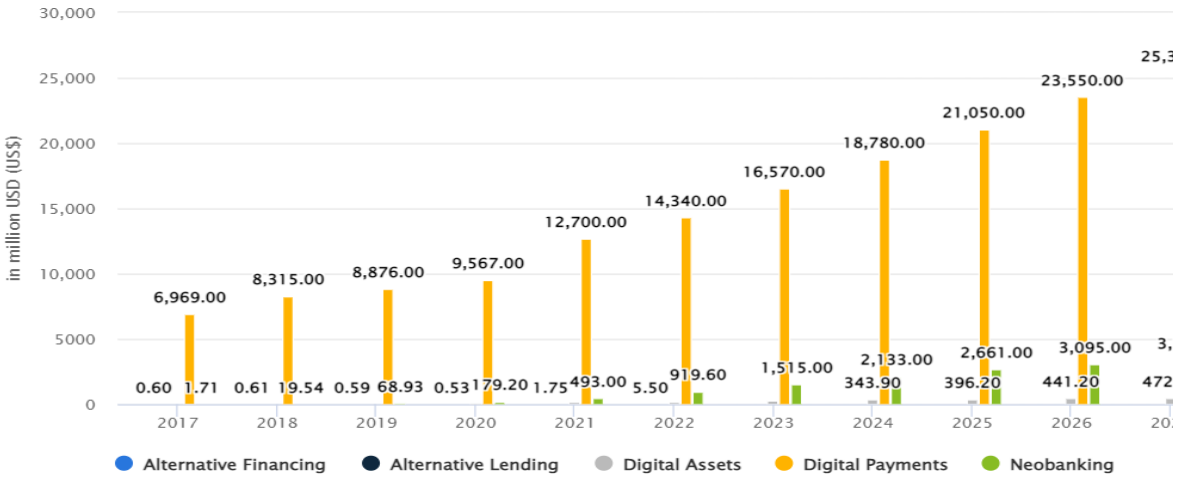


Figure 2.6: Digital transactions South Africa

Source: Statista, 2022

According to the FACSA (2021), the South African digital-banking platform in South Africa is growing. Digital banking provides easy access to banking services. Table 2.2 illustrate the types of digital banks offered in SA.

Table 2.2: Types of digital banks in South Africa

Digitised Incumbents	FNB	These banks are pursuing total digital transformation. These banks compete with digital challengers by acquiring their capabilities.
Neo Banks	Bettr	Neo banks do not have a banking licence but partner with institutions to offer bank-licensed services. Bettr is a neobank based in South Africa offering personal accounts including a debit card, with all transactions being managed from an iPhone or Android application
Beta Banks	Hellobank! AVO	Beta banks are joint ventures or subsidiaries of existing banks that offer financial services through the parent company's license.
Nonbanks	monese CURVE	Nonbanks have no connections to traditional banking licenses. Instead, they provide financial services by other means.
Challenger bank	TymeBank Bank Zero	New/Challenger banks have full banking licenses and are direct competitors of traditional banks offering. The same services as traditional banks.

Source: Mothibi & Rahulani (2021)

2.6.2. Digital banking: The need for further research

COVID-19 has changed consumers' banking behaviours. There is no dispute, however, that to remain relevant, banks need to understand and embrace how customers are feeling and acting. Research has found that adopters of mobile technologies appreciate access, convenience, and ease of use (Kim et al., 2010; Muzurura & Chigora, 2019). Banking has been evolving in response to the mass demand for cell phone access (Matlala, 2016), or as widely known, mobile banking. According to Bagus, Hall, Jeenah and Sari (2020), shows that 42 percent of banking customers expect to make greater use of mobile and online channels as illustrated in Figure 2.6:

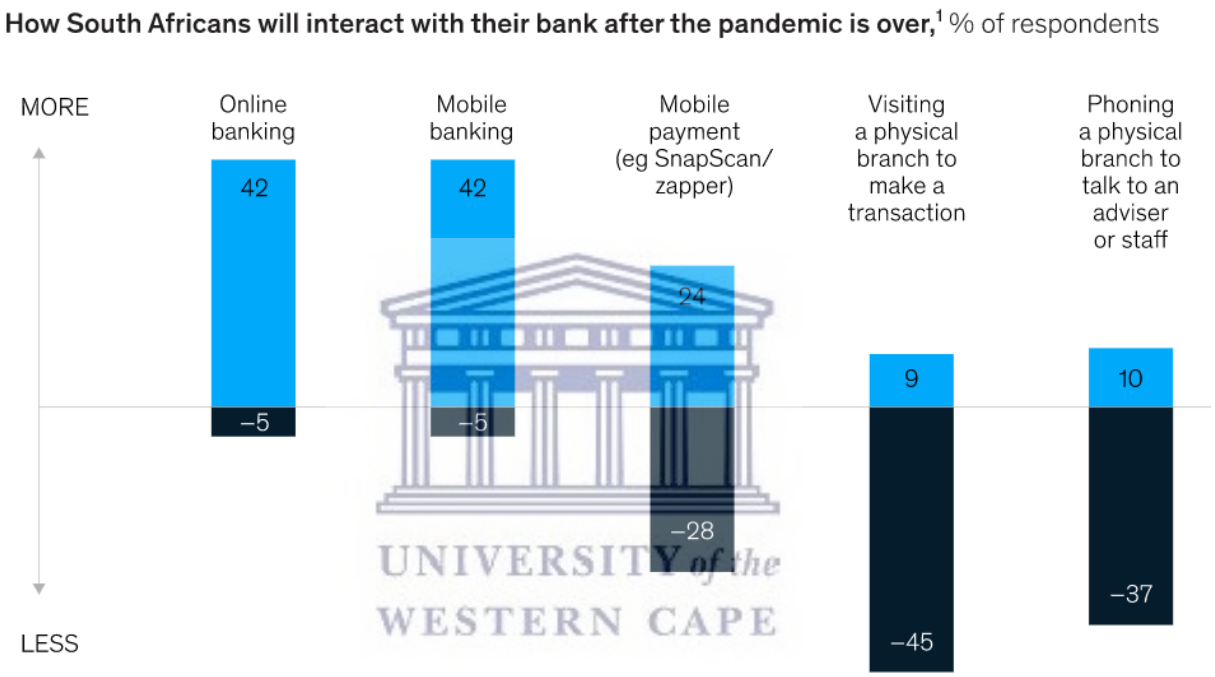


Figure 2.6: Digital banking shift
Source: McKinsey (2020)

Several studies have documented the factors affecting customers' attitudes toward adopting financial services channels and the acceptance of innovative technology related to the financial services mode of delivery (Ramavhuna & Mokwena, 2016; Maduku, 2014; Shambare, 2011; Lee & Kim, 2020a; Merhi et al., 2020). According to Swanson (1988), understanding individuals' behaviour towards accepting or rejecting mobile phones has proven to be one of the most challenging issues in information systems research. This thesis line of research has focused its attention on the customer's readiness and attitude toward the adoption of digital banking.

To facilitate studying consumer behaviour in the context of the financial services industry. A literature review reveals that several models have been widely used to study individuals' acceptance and usage of innovative technology. There are detailed theories widely used to study consumers' acceptance and usage behaviour of innovative technology, which are undoubtedly valuable for this thesis, which become the point of departure of the second half of the literature review, in Chapter 3.

2.7 Conclusion

This literature review highlights salient features examined by earlier researchers in digital banking. It also provides a view of the most significant attributes uncovered in several studies, which examined the impact of digital banking on customer behaviour. This study identifies the changing banking landscape and constant change in utilisation of banking services, as customers are becoming more sophisticated and demanding due to the emergence of technology and its impact on online banking service use. Furthermore, focusing the investigation on online banking service attributes can allow banks to identify customer expectations, enabling them to provide more improved and tailored service to their customers. The changing role of traditional retail banks and growing digital banking usage in South Africa were identified in this literature review.

CHAPTER 3
CONCEPTUAL FRAME DEVELOPMENT

3.1. Chapter Overview

This chapter presents a consumer behaviour theoretical discussion of digital banking. Special emphasis is placed on factors identified in the literature as major influencers of digital readiness and adoption behaviour related to banking technological innovations. Subsequently, the research underpinning theory selection is presented, culminating in the proposed conceptual framework, which guided the study. Figure 3.1 below outlines the sequence of the rest of the chapter.

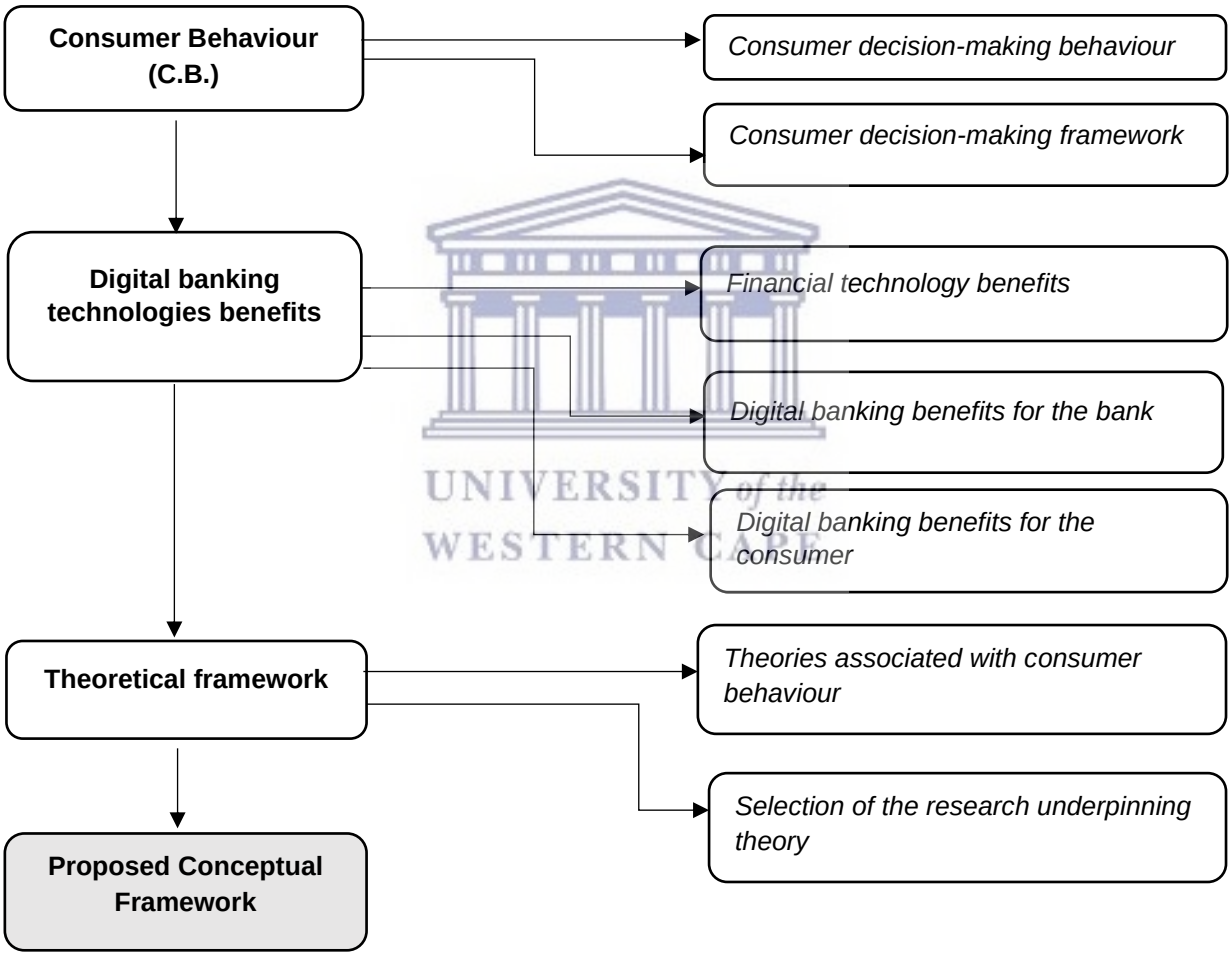


Figure 3.1: Literature review process
Source: Developed for this research

3.2. Literature review process

Chapter 2 provided both global and South African overviews of the retail banking environments. This chapter entails the literature, and theoretical considerations relating to the conceptual model for the research. Such an approach appears to be in line with advice from Perry (1998. 2002; Shambare, 2012; Vale, 2017; Mukhari, 2016; Donga, 2020), who recommend that the literature review process of theses in the marketing discipline, ideally should begin with a thorough discussion of the parent discipline, which in this case is consumer decision behaviour, and progressively narrow its focus to research problem area down to the research question. Figure 3.2 below illustrates the continuous process through which existing literature is systematically analysed in this thesis, from the broad to the specific.

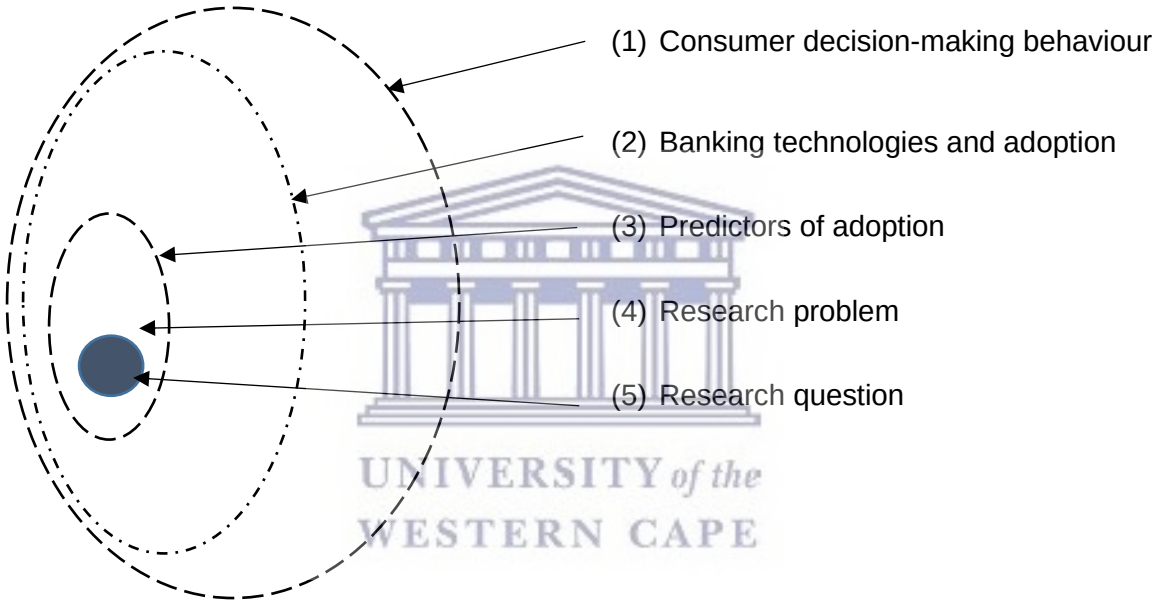


Figure 3.2: Culmination of theory and literature review in research problem and question
Source: Adapted from Shambare (2012)

3.3. Consumer behaviour

According to Erasmus and Mpinganjira (2019) and Kotler and Keller (2011), consumer behaviour refers to the process that inspires or causes of consumers decision on what, when, where, and how to procure goods and services. For example, consumer behaviour has been defined as 'the processes involved when individuals or groups select, purchase, use or dispose of products, services, ideas, or personalities to satisfy needs and desires (Dholakia, 2012). Schiffman, Kanuk and Wisenblit (2010) gave a similar definition as the behaviour consumers display in searching for, purchasing, using, evaluating, and disposing of products

and services that they expect will satisfy their needs. According to Andersone and Gaile-Sarkane (2008), these definitions describe responses to products in terms of mental, emotional, or physical processes, actions and thoughts, feelings, and personalities involved in the buying and consuming process and explain these as psycho-emotional processes.

3.3.1. Consumer decision-making behaviour

The consumers' decision-making process entails the steps consumers go through to make decisions between marketplace alternatives (product choice, brand choice, store choice, paying choice) and whether to purchase all (Lantos, 2015). The decision process has five stages (problem recognition search, alternative evaluation, purchase, and outcomes affected by external factors (Engel, Blackwell & Miniard, 1986). Darley, Blankson and Luethge (2010) included individual characteristics, social influences, situational and economic factors, and online environments (website quality, website interface, website satisfaction, and website personality) into external factors of the online consumer decision process.

To understand consumer decision making behaviour, the study adopted decision making behaviour matrix developed by Beckett, Hewer, and Howcroft (2000) in order to better comprehend customer behaviour in the context of the banking services industry. Furthermore, Beckett et al. (2000) identified involvement and uncertainty as the two primary factors that inspire and affect individual contracting decisions. From a consumer behaviour perspective involvement and uncertainty is defined as:

Involvement is defined as a motivation state of mind (arousal) or interest towards a specific activity that is goal directed (cognitive, emotions, and behaviours) as they make purchasing decisions (Steinhardt, Dolva, Jahnsen & Ullenhag, 2022; Roberts-Lombard & Parumasur, 2017).

Uncertainty is defined as a person's perception of risk, which is influenced by the product's complexity and the outcome of the product in the form of gains (Gautam & Matta, 2013).

This indicates that there is a correlation between an individual's level of motivation toward a specific goal and individual levels of involvement with that objective (Aldlaigan & Buttle, 2001; Bernritter, Müller & van Ooijen, 2017). Beckett et al. (2000) claim that purchase intention in the buyer-seller exchange includes various subsets such as customer control, customer participation, and level of contact (Chan, Barnes & Fukukawa, 2016; de Coster & Mcewen, 2013; Yang & He, 2018). According to Figure 3.3 shows the consumer behaviour matrix:

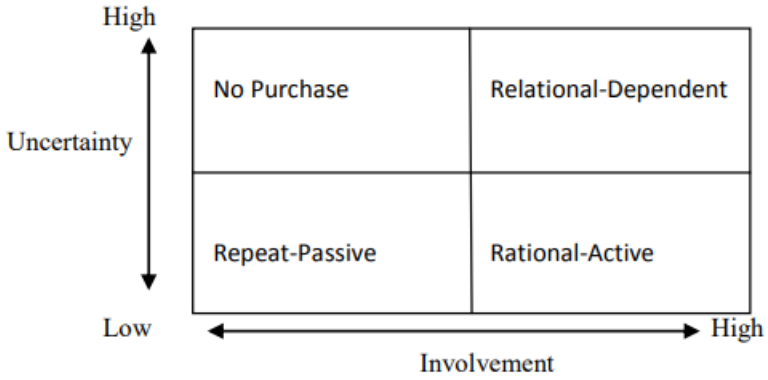


Figure 3.3: Consumer behaviour matrix
Source: Beckett et al. (2000)

1. ***Repeat-Passive:*** customers in this quadrant have low levels of involvement and limited perception of uncertainty with a financial service because they are fully aware of the service's salient features. These customers are described as 'passive' because they will make repeated interactions without looking for alternatives.

2. ***Rational-Active:*** in this quadrant, customers' involvement in the process dimensions of control, participants, and contact, and their confidence concerning financial services complexity and certainty of outcome are all high. These customers on the ability and inclination to make carefully considered decisions across all financial services choices. They tend towards discrete, rational contracting to structure their behaviour regarding financial services whenever possible.

3. ***No-Purchase:*** customers do not purchase in this quadrant because their involvement and confidence with the financial services are low. A significant amount of marketing activity is directed at these customers to increase their awareness of alternative products or services and convince them of their relative advantages.

4. ***Relational-Dependent:*** customers in this quadrant have prominent levels of involvement. However, they are not in control because of the complexity of the financial services or products and the uncertainty of the eventual outcome. Therefore, this reduces customers' confidence. Customers will look for advice and help from banks or third parties to make choices. These customers are described as ‘dependent customers’ who make relationships to reduce uncertainty and structure their pattern of purchases.

3.3.2. The consumer decision making framework

Marketers need to understand the dynamics of the consumer decision making process. While the process and the internal and external factors affecting consumer decision making would vary from individual to situational levels. The study of consumer behaviour attempts to draw certain generalisations. The major decisions taken by a consumer relate to what they purchase (products and services), how much they purchase (quantity), where they purchase (place), when and how they purchase (time), and purchase (payment terms). A decision is defined as choosing an option out of the few or many available. Decision-making is selecting an alternative out of the few or many available choices.

Bestowing Gilbert (1991), suggested a model for consumer decision-making, shown in Figure 3:4. This model suggests that there are two levels of factors that influence consumer decision making. The first level of influence is close to the person and includes psychological influence such as motivation, perception, personality, and learning. The second level of influences includes those, which have been developed during the socialisation process and include socioeconomic, cultural, reference groups, and family influences.

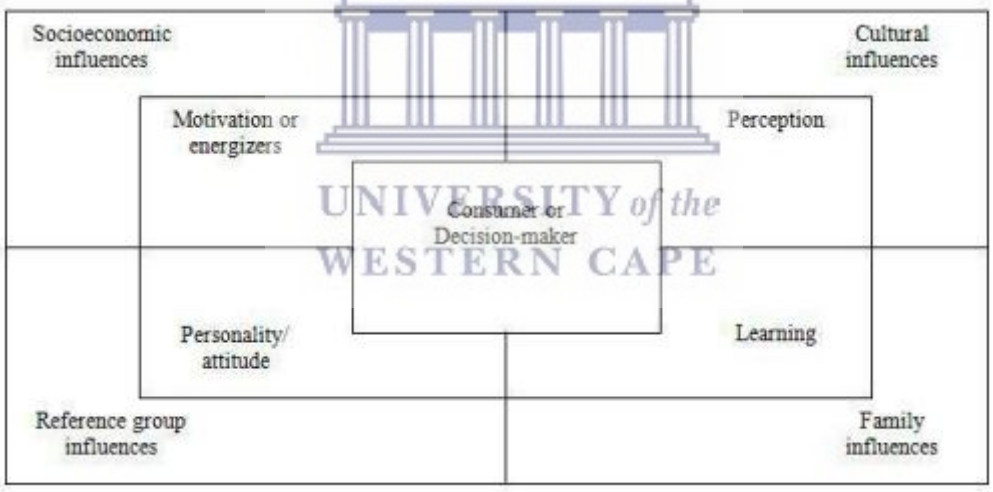


Figure 3.4: Consumer decision-making framework
Source: Gilbert (1991)

3.3.2.1 Physiological factors that influence online consumer behaviour

Psychological factors play a significant role in assisting online consumers who are inexperienced with the service providers or online transactions to overcome their fear of fraud and uncertainty regarding the credibility of the websites (Darke, Brady, Benedicktus & Wilson,

2016; Constantinides, 2004; Cetină, Munthiu & Rădulescu, 2012; Zhang, Zheng & Wang, 2020). The importance of social networks as far as online trust is concerned is unquestionable and continuously increases as they are great and extremely valuable means of communication between customers and organisations. Singh, Kaur and Gupta (2021) argue that building trust is accomplished by using uncertainty reducing elements to ensure the privacy, data safety, and reliability of customers' personal information and transaction data, eliminating fears of fraud, and building trust between online consumers and the often unknown and far away located vendor.

Online perception constitutes the most significant psychological aspect influencing online consumer behaviour (Amin, Matin, Islam, Jahan & Rahman, 2020; Zhang et al. 2020). Perception is the process through which consumers make sense of their environment through interpretation (Moodley, Buthelezi & Cloete, 2021). Many individuals believe that perception is passive, meaning that one sees and hears the world objectively (Constantinides, 2004; Zhang et al. 2020). Nevertheless, individuals actively detect stimuli and things in their contexts, including the online world. Simultaneously, perception approaches reality (Moodley et al., 2021). The brain seeks to interpret the exposure to inputs. Online marketers should be aware of the factors that increase or decrease the trust of potential customers and should attempt to comprehend how trust affects the customers' online view of a particular website (Constantinides, 2004). To inspire consumers to pause, explore, and interact online, websites must also communicate their honesty and credibility.

Personality also affects how people shop online (Hermes & Riedl, 2021; Li, Wang, Kang, Zhang & Chen, 2017). Consumers may behave differently when engaging online than they do in their daily lives, and they may employ alter egos to communicate with one another when participating in virtual learning (Chupra & Gupta, 2020). Like going to the mall and trying on several garments at a department or specialty store. Zarov, Steklova, Abrosimova and Epifania (2020), argue that the concept of a virtual personality or virtual self enables people to experiment on multiple personas or identities. Furthermore, Zarov et al. (2020) reiterate that people project their ideal selves onto social networks to maximise their chances of interacting with others. To connect with a customer's inner self and virtual identity in the virtual world, marketers emphasise a product or service's visual and auditory attributes (Ryabikina & Ozhigova, 2020).

The aesthetics of the website are another crucial factor that marketers should think about. Atmospherics, a concept coined by Kotler (1973) to describe the influence of a store's ambiance on customers' inclination to make purchases, is a key component of classic

marketing strategies. Inducing good and powerful motivations for customers not to stop, investigate, and interact with the site is a key part of creating an ambiance that is successful at attracting online clients. Website aesthetics are the equivalent in the virtual world, and they include of factors like the site's layout and presentation, the attractiveness of its individual design elements, and the overall tone and feel it conveys to visitors (Yakunin & Bodrunova, 2021).

3.3.2.2 Social factors that influence online consumer behaviour

Social factors that influence consumer behaviour are reference groups, family, and social roles and statuses. According to Schiffman et al. (2010), consumer reference groups are friendship groups, shopping groups, workgroups, virtual groups or communities, and consumer-action groups. In the online environment, consumer behaviour is influenced by the virtual groups they are part of and, therefore, by word-of-mouth.

According to Statista (2021), third quarter of 2020 some 93 percent of internet users in the country used the messaging app. YouTube and Facebook followed closely, with a penetration rate of 92 percent and 87 percent, respectively (Statista, 2021). The number of WhatsApp users in South Africa is estimated to reach 28.6 million users by 2026. In 2021, WhatsApp counted almost 23 million users in the country (Statista, 2021).

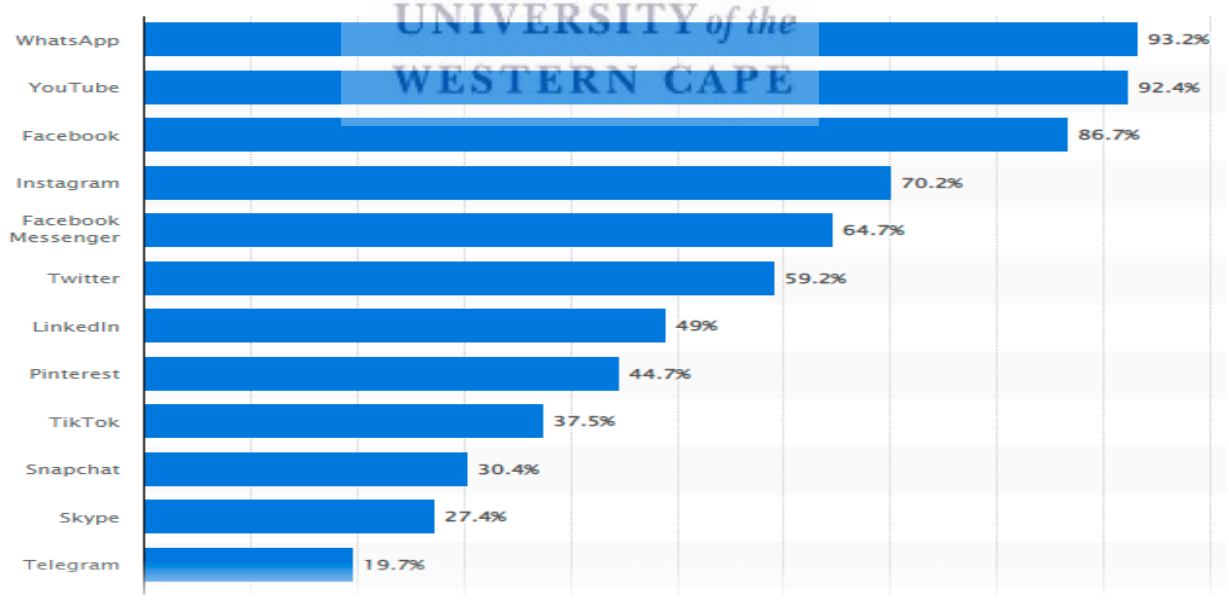


Figure 3. 5: Most used social media platforms in SA as of the 3rd quarter of 2020
Source: Statista (2021)

The importance of social media is continually growing, and marketers must focus on creating powerful social media campaigns tailored to the desires of their customers (Chupra & Gupta, 2020). Actions performed by consumers on the Internet trigger new behavioural dimensions, and customers' possibilities to compare products or services as their new status as online consumers are endless (Prasad & Jha, 2014). It is thus vital for banks to continuously develop their online marketing activity, which, by using interactivity, allows bidirectional communication at any moment and has become indispensable for successful business development. Any organisation should develop its social media component as consumers are part of social networks that influence their online perception and trust in a particular website through word-of-mouth.

3.3.2.3 The Engel-Kollat-Blackwell Model of Consumer Behaviour

The consumer buying decision model is an integrative model that incorporates many aspects of consumer behaviour; it links together the various constructs or variables that may influence the decision-making process and explains the relationship that leads to a purchase decision (Prasad & Jha, 2014). Many researchers (Engel et al., 1978; Nicosia & Meyer, 1976; Schiffman et al., 2010) have proposed various models to understand and explain the consumer buying decision for all kinds of products or services. Engel et al. (1978) developed a model of consumer decision-making. This model is also known as the EKB model. It describes consumers' decision process and how decisions are made when choosing among a list of alternatives available. The model builds on the field of consumer psychology theories and models such as Howard's (1963) theory of buyer behaviour and Nicosia & Meyer (1976), theory of the consumer decision process. However, with the EKB Model, environmental factors are additional variables that influence the formation of consumer decisions. The EKB model is considered one of the most important works in consumer behaviour (Schiffman et al., 2010).

EKB model consists of five sequential steps to process information before consumption decisions are made. The first stage starts with the need for problem recognition. It is followed by searching for alternative solutions, which involves obtaining relevant information from the external environment and internal self (e.g., memory and personality). The third stage involves evaluating alternatives that are subjected to the consumer's criterion in deducing the preference. Once the decision is made, the consumer moves onto the fourth stage, where purchasing the selected alternative occurs. The decisive step involves post-purchase evaluation.

The basic framework of the EKB model begins with the state of unfulfilled needs and wants; it was revised to finally became the Engel, Blackwell, and Miniard Model (2001). The revised model consists of four sections: information input, information processing, decision process, and external variables influencing the decision process. The variables and the working relationship are like the EKB model but have been slightly modified. For instance, consumption and divestment are other variables included in the revised model. According to some researchers, this is one of its primary critical strengths because the added factors embrace contemporary definitions of consumer behaviour, including such stages of consumption in their scope (Solomon 2006; Schiffman et al., 2010).

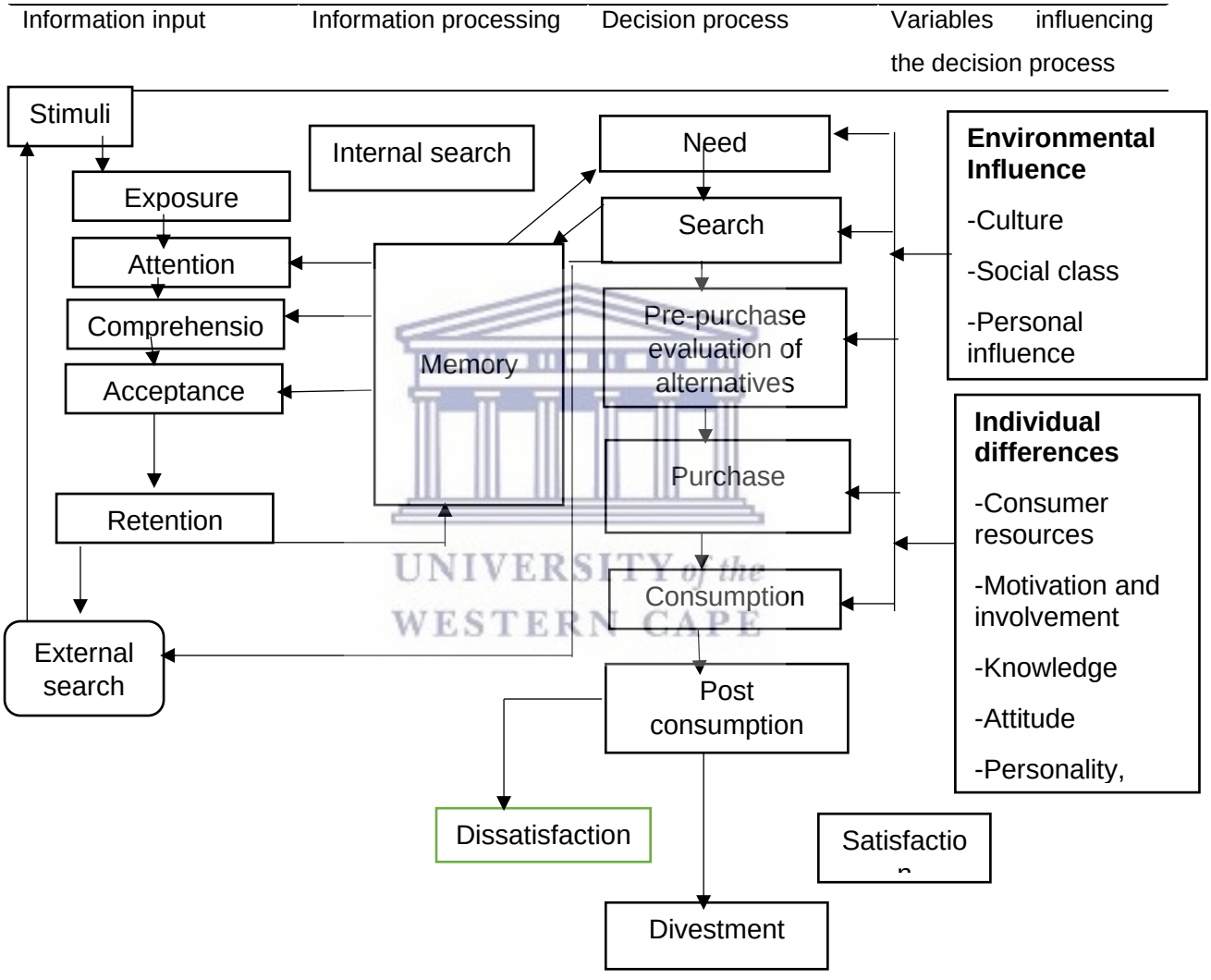


Figure 3.6: The Engel-Kollat-Blackwell Model of Consumer Behaviour
Source: Engel, Blackwell, and Miniard, (1995)

3.3.2.4 Bettman's information processing model

Information processing and consumers' choice (Bettman, (1979); Erasmus, Boshoff and Rousseau, (2001); Prasad & Jha (2014), describe the consumer as possessing a limited capacity for processing information. The model implies that consumers rarely analyse the complex alternatives in decision making and apply a straightforward strategy. In this model, there are seven significant stages.

Stage 1: Processing capacity
The model assumes that the consumer has a limited capacity for processing information and that consumers are not interested in complex computations and extensive information processing.

Stage 2: Motivation
Motivation is located at the centre of the Bettman model, which influences both the direction and the intensity of consumer choice for more information in deciding between the alternatives. Motivation is provided with the hierarchy of goals mechanism that provides a series of different sub-goals to simplify the choice selection.

Stage 3: Attention and perceptual encoding
The component of this step is entirely related to the consumer's goal hierarchy. There are two types of attention: voluntary attention, and a conscious allocation of processing capacity to current goals. The second is involuntary attention, an automatic response to disruptive events (e.g., newly acquired complex information). Both distinct types of attention influence how individuals proceed in reaching goals and making choices.

Stage 4: Information acquisition and evaluation
If consumers feel that the present information is inadequate, they will start looking for more information from external sources. The newly acquired information is evaluated, and its suitability or usefulness is assessed. The consumer continues to acquire additional information until all relevant information has been secured or until he finds that acquiring additional information is costlier in terms of time and money.

Stage 5: Memory
In this component, the consumer keeps all the information collected, and it will be the first place to search when there is a need to make a choice. If this information is not sufficient, consumers will undoubtedly start looking again for external sources.

3.4 Digital banking technologies

Digital banking technologies are regarded as modernised banking. Dubey and Sharmq (2022), argue that shifting to digitisation is a ceaseless cycle that influences both the outside and inside environment by updating inner cycles and existing techniques. Jain, Sharma, Kumar, and Kansal, (2020) shared that there are many reasons that digital transformation happens, for example, refurbishing multiple regions without physical branches and a decrease in working expenses.

3.4.1 Self-service technologies (SST)

Self-service technologies (SST) are 'technological interfaces that enable customers to perform a service independent of direct service employee involvement' (Meuter et al., 2000). In other words, this includes the automation of business systems to allow consumers to perform their activities and transactions using web-based systems without interacting with the banking consultant. Implementing SST has aided businesses to be available for the consumers' convenience and comfort (Meuter et al., 2005). There has been a shift in retail organisations evolving and transforming from employee-customer service to a more digital approach, the focus has shifted from employee-facing systems to intuitive SST (Srivastava, 2007).

Literature on banking self-service technology is well established (Meuter et al., 2000, Brown et al., 2003; Shambare, 2012) and many findings are cited:

Table 3. 1: Previous researcher recommendations

Recommendations	Author
One way to reduce SSTs failures is to include customers in the design phase.	Meuters (2000)
Need for further training.	Shambare (2012)
Providers should consider closely the social context of the innovation, and the subsequent banking needs of the typical user.	Brown et al. (2003)

Source: Developed for this research

While the idea of technology holds great promise for future simplification and automation. For instance, the current generation of international payment systems such as PayPal is based on smart card technology (for use in e.g., bank cards, credit cards, and electronic purses). However, Rogers (1995), argued that getting customers to use technological innovations is

not straight forward process. Prendergast (1993) asked the question, “Should banks be spending any resources at all in trying to encourage new users of banking technologies?” It, therefore, makes a good case for banks to identify factors that influences the adoption of SSTs banking technologies. In other words, a bank will gain competitive power to understand consumer behaviour in transacting using digital banking channels over alternatives (Kumar & Gupta, 2008).

SSTs keep whittling down the number of visits to a brick-and-mortar banking (Coetzee, 2018; Mthombeni, 2022). Consumers get tightly hitched to self-service banking, especially automated teller machine instruments (Mahansaria & Roy 2019). SSTs in the banking sector have been emerging as one of the significant business drivers that facilitate customers in operating their bank accounts with more ease and effectiveness (Saxena, Sinha & Majra, 2016). Indeed, SSTs (e.g., ATMs, Internet banking, mobile banking) have allowed banking customers to carry out their banking transactions in a 24/7 mode based on their requirements and convenience (Manikandan & Chandramohan, 2016). In South Africa, the competitiveness of traditional banks has been exacerbated by the emergence of new entrants in the South African banking sector, including the 100% digital TymeBank, Bank Zero, and Discovery bank, in late 2018.

3.4.2 Benefits of digital banking technologies

The ability of the bank to compete in the current environment rests on its ability to provide innovative products and services that address the evolving needs of customers and explore other ways of maintaining a competitive advantage that differentiates them from its competitors (Coetzee, Van Zyl & Tait, 2013).

1. Benefits of digital bank for the bank

Today bank customers are reluctant to visit brick-and-mortar branches; they are well informed about the products and services offered by digital banking and the demand for convenience (Lunce et al., 2010; Coelho & Easingwood, 2003; Maduku & Mpinganjira, 2012; Luo et al., 2010). The introduction of digital banking has freed valuable branch space and reduced the number of bank employees such as tellers; therefore, redirecting the money spent on the leasing of physical branches and bank employees’ salaries to other initiatives.

A study by Meuter et al. (2005), revealed that the most significant benefits of introducing digital banking have been lowered operating costs, more significant margins, and higher yields of the

invested capital. Similarly, a study conducted by PWC (2019) on financial transactions revealed that it is 95% cheaper to process financial transactions using digital banking channels rather than face-to-face contact with a bank teller. Therefore, banks can save on the personnel and infrastructure costs associated with physical branches by shifting transactions to digital, as illustrated in Figure 3.7:

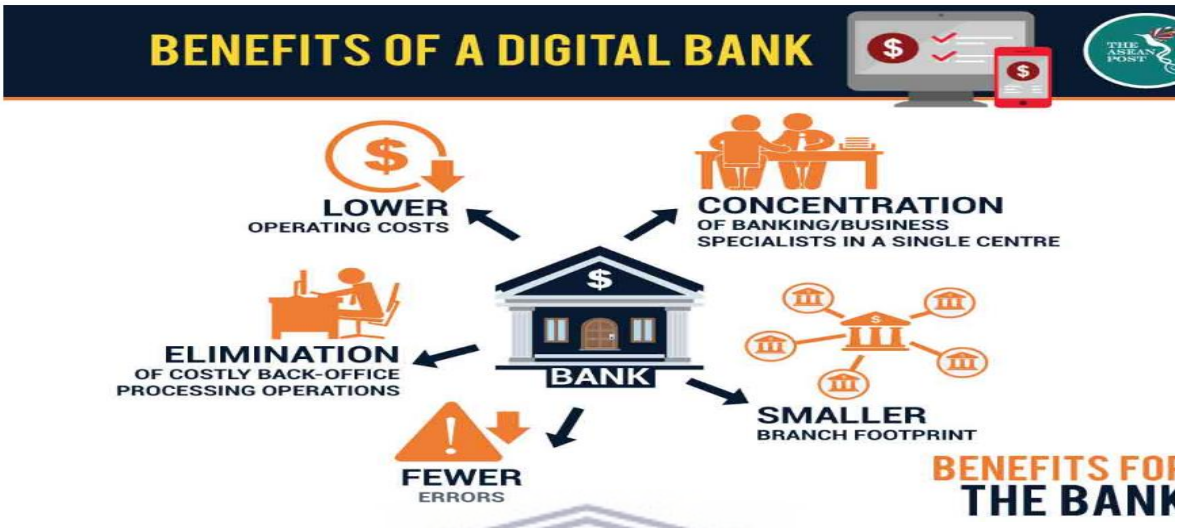


Figure 3.7: Benefits for the bank.

Source: Thomas, 2019

The implementation of digital banking has resulted in banks providing effective and efficient service delivery of financial services to consumers. Dawodu and Osondu (2013) indicated that digital banking use, is far more effective and efficient than traditional face-to-face banking. Furthermore, digital banking allows banks to provide a reliable and efficient service to their consumers. According to Techcentral (2016), the digital banking rollout provided banks with an increased footprint. Suddenly, banks could provide unique banking channels catered to different customers' uniqueness, regardless of their geographic locations. It has not only managed to allow the full range of banking services to consumers but introduced new services that were previously not offered in physical branches. Digital banking has delivered services to remote disadvantaged communities where traditional banks were physically absent (Subia & Martinez, 2014). Now, consumers can open accounts, check their balances, pay their bills, transfer funds, and meet their everyday demands (Poppe et al., 2020).

2. Benefits of a digital bank for the consumers

Digital banking has provided banking consumers with the ability to access finances and perform financial transactions 24 hours a day, without being confined to banking hours or brick-and-mortar banking branches (Gu, Lee & Suh, 2009; Omarini, 2013; Patel & Brown, 2016). Similarly, a study conducted by Idris (2014) highlighted that accessibility and convenience were some of the main attractions or differentiators between the use of the physical branch and ATMs. These benefits positively affected consumers' adoption of digital banking services, as illustrated in Figure 3.8:

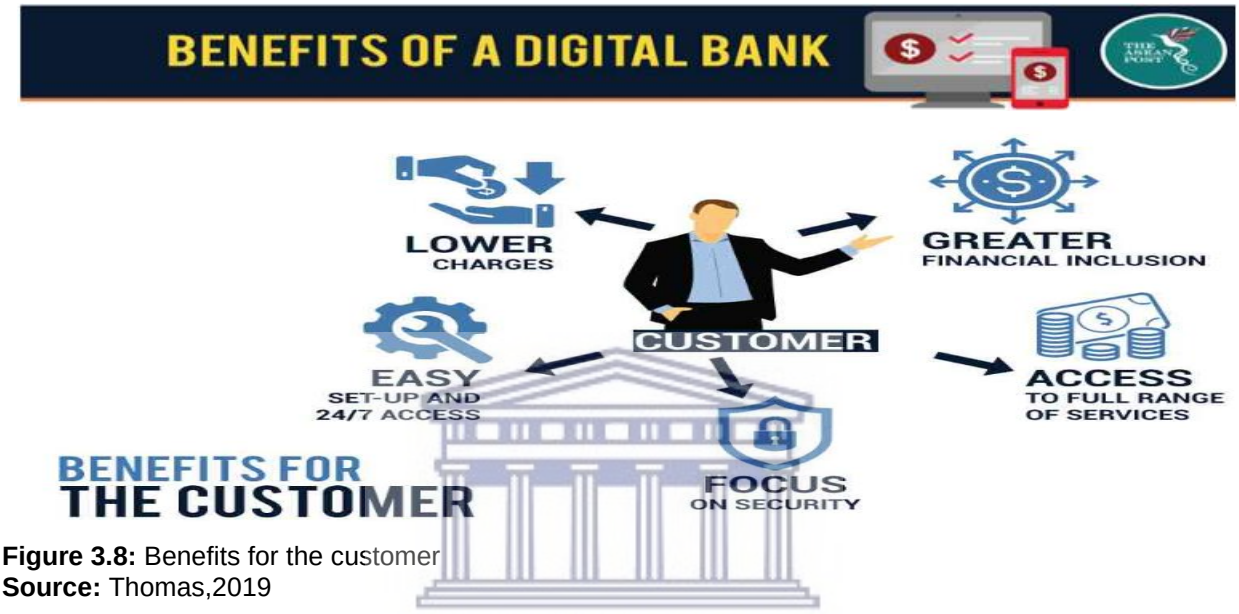


Figure 3.8: Benefits for the customer
Source: Thomas,2019

Consumers could travel abroad and still enjoy favourable exchange rates when using ATMs to dispense cash in foreign currency. Moreover, it became an added value for travellers as they need not carry cash or travellers' cheque. Notwithstanding the benefits mentioned above, some researchers (Diza, Munyanyi & Gumbo, 2017; Jegede, 2014; Sewpersad, 2010; Wan, Luk & Chow, 2005) have cast doubts on the benefits of holistic DBSSTs (Diza, Munyanyi & Gumbo, 2017; Jegede, 2014; Sewpersad, 2010; Wan et al., 2005).

3.5 Theoretical framework

Since the introduction of information technology (IT) into the commercial world, there has been an interest in the rate at which consumers embrace mobile technology (Bhatiasevi, 2015; GSMA, 2022; Meuter et al., 2005; Persaud & Azhar, 2012). Hoenig (1995) and Lai (2017) observed that the rate of commercial system development is determined by a struggle between rapid technology change and natural impediments to the acceptance of new products

and services. Furthermore, scholars and practitioners alike are fascinated by establishing the factors affecting consumers' beliefs, attitudes, and perceptions toward mobile technology adoption (Lee, Kozar & Larsen,2003). As a result, several theories have been proposed to explain consumers' acceptance of innovative technologies and their usage behaviour. Bhatiasevi (2015) posits that for the past two decades, there have been many studies (Gong & Li, 2008; Parasuraman, 2000; Venkatesh et al., 2012) that have contributed to theoretical frameworks and models concerning the adoption of information technology.

The researcher focused on theories associated with consumer behaviour on digital readiness and adoption of self-service banking technologies adoption in this study. The theories help in understanding how consumers think and feel about various products and services. How the consumers' culture, family, and media influence the decision to adopt digital banking. It helps marketers to adapt and improve their marketing campaigns and marketing strategies.

3.5.1 Innovation diffusion theory (IDT)

Multiple researchers Brown et al (2003), Shambare (2012), Matlala (2016) and Donga (2020) considered IDT as one of the most popular theories that have attempted to explore factors that affect an individual to adopt an innovation or a new technology. IDT is a theory that seeks to explain how, why, and at what rate new ideas and technology spread through cultures (Rogers,1995). Rogers (1995) defines diffusion as the adoption of an innovation "over time by the given social system", as consequence diffusion processes result in the acceptance or penetration of a new idea, behaviour, or physical innovation. According to the framework, adoption occurs through five steps, as discussed in Table 3.2.

Table 3.2: Innovation-Decision process

Stage	Implication
Knowledge	The innovation-decision program commences with the stage of acquiring knowledge. In this stage, an individual becomes conscious of an innovation's existence and seeks information about it. The individual strives to determine "what the innovation is and how and why it works" during this phase (Rogers, 2003). The crucial questions in the knowledge phase are "what?" "how?" and "why?"
Persuasion	The persuasion stage in the innovation-decision process follows the stage of knowledge towards. Moreover, according to Rogers (2003), whereas the knowledge stage is more cognitively (or knowing) based, the persuasion stage is more emotionally centered. Consequently, the individual becomes more emotionally invested in the innovation during the persuading stage. Social reinforcement from others (colleagues, peers, friends, and family members) influences an individual's thoughts and beliefs concerning an innovation.
Decision	At this stage of the innovation-decision process, the consumer decides whether to accept the innovation. Rogers (2003) refers to adoption as "the application of an innovation in its entirety as the optimal course of action," whereas rejection denotes "not to adopt an innovation". If an innovation has a partly trial basis, its adopted more quickly since most consumers prefer to first assess it in their circumstances before deciding to embrace it. The vicarious trial can accelerate the innovative decision-making procedure. Nevertheless, rejection is conceivable at every stage of the innovative decision-making process. In a state of passive rejection (or non-adoption), the individual has no interest in embracing the innovation.
Implementation	At this stage, the prospective user utilises the product. Additionally, the individual will consult owners' equipment manuals (OEM) to ensure efficient execution.
Confirmation	In the confirmation phase of the innovation phase, the innovator seeks validation for the choice they have already made. If the consumer gets the exposure to conflicting messages about the invention, as Rogers (2003) claims, they may reconsider their decision. The consumer, however, typically avoids such messages in favour of those that provide affirmation of the chosen course of action. Accordingly, the importance of one's attitude increases during the confirmation phase. Subsequent adoption or discontinuation occurs at this stage, depending on the level of adaptive assistance and the individual's attitude.

Source: Adapted from Rogers (2003)

Respective studies have examined factors influencing the adoption and diffusion of self-service banking technologies and have consistently concluded these attributes, particularly those of relative advantage, ease of use, and compatibility, as the most frequently salient factors for the adoption of technologies (Agarwal & Prasad, 1998; Koenig-Lewis et al., 2010; Meuter et al., 2005; Sahin, 2006). Rogers identified several attributes of an innovation that are key influences on adoption behaviour. According to Rogers, these attributes are relative advantage, complexity, compatibility, trialability, and observability. Following is a summary of Rogers' five attributes and their relationship with innovation adoption.

3.5.1.1 Relative advantage

Relative advantage refers to the degree to which an innovation is perceived as providing more benefits than its predecessor (More & Bombast 1991). Relative advantage results in increased efficiency, economic benefits, and enhanced status (Rogers, 2003). Past research has found that the relative advantage of an innovation is positively related to the rate of adoption (Moore & Benbasat, 1991). Research suggests that when user perceives the relative advantage or usefulness of an innovative technology over an old one, they tend to adopt it McCloskey, 2006; Rogers, 2003). In the context of mobile banking adoption, benefits such as immediacy, convenience, and affordability to customers have been reported (Lin, 2011).

3.5.1.2 Perceived compatibility

According to Hawkins, Best and Coney (2001), the extent to which consumers distinguish themselves and define their lives concerning their environment and personal ambitions defines their self-concept. Likewise, lifestyle is shaped by how they live that identified self-concept. Therefore, the compatibility of innovation is defined by how well-suited a product is to a consumer's lifestyle, values, and needs. Since it facilitates consumers in identifying and projecting their 'perceived self-image', the compatibility construct is related to its adoption rate (Meuter et al., 2005). Consequently, consumers who view mobile marketing services as closely aligned with their sense of self will adopt them.

3.5.1.3 Complexity

Complexity of an innovation denotes the extent to which consumers perceive innovation to be difficult and complicated to use or understand (Joachim, Spieth & Heidenreich, 2018). Because individuals typically resist change and adjust behaviour patterns, the more complicated a product seems, the less likely the product will be adopted. Complexity is related

to the nature of the innovation. For instance, in the case of continuous innovation (improvements to existing products), the degree of complexity is inversely related to the adoption rate since the innovation is used in much the same manner as the products before it.

Innovations that are perceived as dynamically continuous (innovations that often involve the introduction of a new, different, or better technology) has a pronounced effect on consumers' behaviour patterns. If placed on a continuum of the level of ease/difficulty to learn, dynamically continuous innovations, for example, smartphones, fall in the middle of the continuum, possessing low to moderate complexity. A discontinuous innovation (mostly new products), on the other hand, requires consumers to adopt new behavioural patterns and is perceived as more complex, as a result taking longer to be adopted by consumers (Shambare & Donga, 2019). When it was first introduced, the internet was an example of a discontinuous innovation.

3.5.1.3 Trialability

Trialability is how consumers are allowed to try out innovations prior to purchase. For instance, Avast is a famous internet security software firm well-known for its value-for-money online antivirus protection service. By offering a new customer a 30-day free Avast antivirus trial, they hope those who sign up for the trial will be a customer. In their research, Tan and Teo (2000) found that customers allowed to experiment with the innovation prior to purchase are more likely to adopt the product than those who do not. Thus, the adoption of mobile marketing technologies is more likely if the services are first demonstrated to mobile customers.

3.5.1.4 Observability

As highlighted by Rogers (1995), the last characteristic of innovations is observability, defined as "the degree to which the results of an innovation are visible to others". Like relative advantage, compatibility, and trialability, observability is also positively correlated with the adoption rate. The chances of innovation adoption are greater if people can easily observe the functionality of the innovative technology. In fact, after some adoption, observability can improve the diffusion effect, a critical component of technology transfer. Thus, when new products are evident, it drives more people to share them and increases the likelihood of mass adoption (Burkus, 2013).

Although Rogers (1995) identifies five critical predictors of adoption, other studies confirm that only three of these: relative advantage, compatibility, and complexity, consistently prove to be stable predictors of adoption across multiple disciplines (Agarwal & Prasad, 1998; Davis, 1989; Meuter et al., 2005; Rugimbana & Iversen, 1994). Except for complexity, the other four characteristics positively correlate with the adoption rate of innovations. Since these contribute the most variance in adoption, it is not uncommon for recent studies to only utilise these three constructs of the IDT framework for apparent reasons (Meuter et al., 2005). Rogers (1995) emphasised that despite innovation characteristics being important determinants of the adoption of an innovation, the process manifests itself in diverse ways and is highly subject to the type of adopters and innovation-decision process.

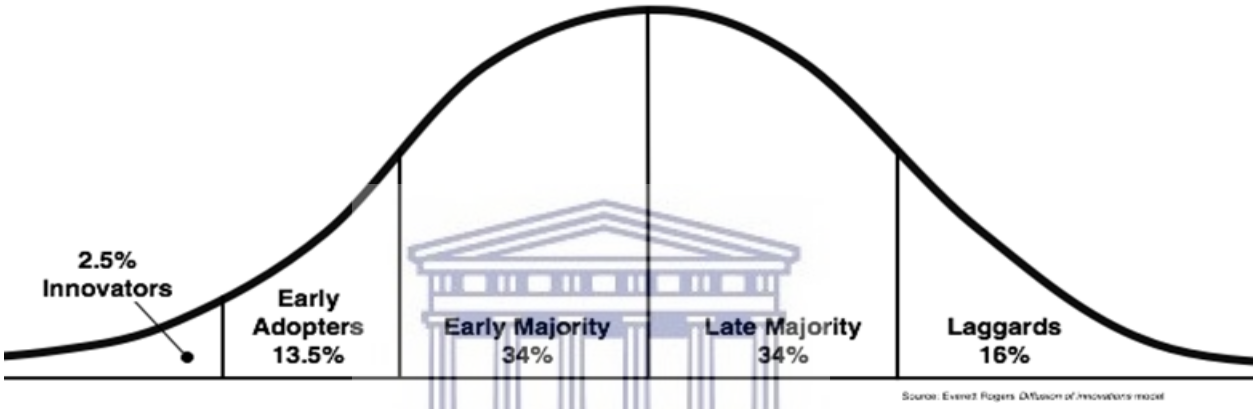


Figure 3.9: Characteristics of adopter categories
Source: Shambare and Donga (2019)

Thus, adoption does not happen simultaneously within society; instead, it is a process whereby some people are more apt to adopt the innovation. Laukkanen and Pasanen (2008) point out that "people who adopt an innovation early have different characteristics than people who adopt an innovation later, and when promoting an innovation to a target population, it is important to understand the characteristics of the target population that will help or hinder adoption of the innovation". To illustrate this notion, the following section discusses the characteristics of five different adopter categories (Rogers, 2003) related to innovation adoption. As mentioned earlier, there are five established adopter categories, summarised in Table 3.2, and while most of the general population tends to fall in the middle categories (Rogers, 2003), it is still necessary to understand the characteristics of the target population.

(1) Innovators

Innovators (2,5%) are adventurous individuals who enjoy trying new things, very first people to adopt an innovation; and have substantial financial resources to support

their cosmopolitan lifestyle (Lund, Omame, Tijani & Agbaji, 2020). Although they are frequently misunderstood by other members of the social system, innovators can accept a high level of uncertainty with invention, hence facilitating the innovation penetration process. These individuals are mostly risk takers or adventurous, typically highly educated, and sociable. Marketers and retailers usually target these consumers first when they introduce innovation, as extraordinarily little, if anything, needs to be done to appeal to this population

(2) Early adopters

When compared to innovators, who are much more integrated into the structures of the social system, early adopters (13.5% of the population) are most likely leaders who are frequently questioned by other members of the social system about innovations and new ideas. This is because early adopters are the most probable people to question about innovations and new ideas. The early adopters get their information from both interpersonal sources (such as friends and co-workers) and mass media (such journals, television, comics, and broadcast). Interpersonal sources include people the early adopters connect with, such as co-workers and friends. When launching an innovation, marketers and merchants need to concentrate their efforts on early adopters by targeting their promotion and communication through marketing channels that early adopters commonly utilise. When early adopters embrace a new technology, it often serves as a model for subsequent users, many of whom either do not have access to the same information as early adopters or would rather learn about an innovation from early adopters than via advertising campaigns.

(3) Early majority

Together with the early adopter, the early majority (34% of the population) is a crucial component of the diffusion chain. When playing the roles of mediators of the uncertainty rate in the process of diffusion in the social system, early majority members frequently play the role of leaders, but their innovation decision-making process takes longer than that of innovators and early adopters.

(4) Late majority

Comprises one-third (34%) of the target market. These clients are frequently cautious when evaluating innovations, taking longer than average to accept them, and are susceptible to peer pressure (Cirus & Simonova, 2020). As a result, these consumers tend to wait until the innovation has achieved "critical mass," i.e., when the product

has established itself and is no longer deemed novel, before they contemplate purchasing it. At this step, customers will have access to a wealth of product-related information and comments from other consumers.

(5) Laggards

Laggard (16%) solutions and ideals are defined as traditionalist; if they gain an innovation, it usually occurs through the gradual replacement of older concepts (Cirus & Simonova, 2020; Lund et al., 2020).

Rogers (2003) states that distinguishing between innovators and non-innovators is vital in successfully adopting ICT innovations. Relating to the adoption of mobile technologies, university students typically fall well into either the innovator or early adopter categories depending on an individual's innovativeness. According to Lee (2014), the higher smartphone adoption rate among college students than among people in other age groups indicates that many early mobile technology users are college students.

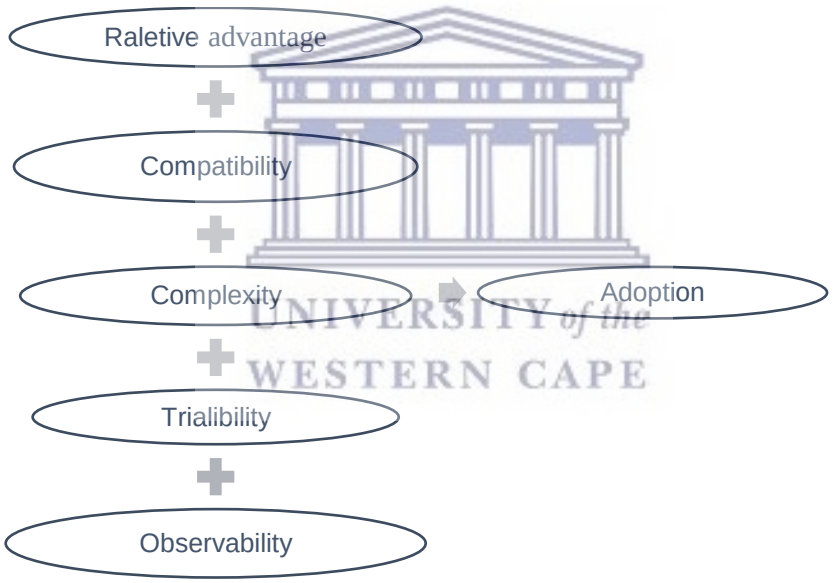


Figure 3.10: Innovation diffusion theory
Source: Rogers (1995)

3.5.2 Technology Acceptance Model (TAM)

Fred Davis invented the technology acceptance model, generally referred to as TAM, in 1986. This is a hugely influential hypothesis about the adoption of breakthrough technologies (Shambare & Shambare, 2016). TAM is based on Fishbein and Ajzen's theory of reasoned

action (TRA) (1985). As an extension and modification of the TRA, the TAM postulates that individuals' ideas and perceptions of an innovation influence their attitudes toward it, hence influencing their adoption intentions (Agarwal & Prasad, 1998).

The model presupposes those two determinant variables associated with innovation: PU and PEOU, are drivers of its adoption (Davis, 1989). In TAM, the attributes of ease of use and usefulness are the fundamental determinants of adoption.

i. Perceived ease of use is “the degree to which a person belief that using a particular system would be free of effort” (Davis, 1989).
ii. Perceived usefulness is “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989).

Perceived ease of use explains users' perceptions of the effort required to utilise the system or how users believe using a particular technology will be effortless and relatively easy (Kang & Hwang, 2022). On the other hand, Perceived usefulness is the prospective adopter's subjective probability that applying the new technology will benefit his personal and work life (Thong, Hong & Tam, 2006). Although both variables are important in determining adoption behaviour, more recent studies such as that by Abdullah, Ward, and Ahmed (2016) propose that PEOU affects technology acceptance indirectly through PU. In other words, PU mediates the relationship between PEOU, and adoption as shown in Figure 3.8. The fact that regardless of how a technology might be useful and beneficial, its complexity will outweigh its benefits if it is not easy to use. As such, consumers will be less likely to adopt the product.

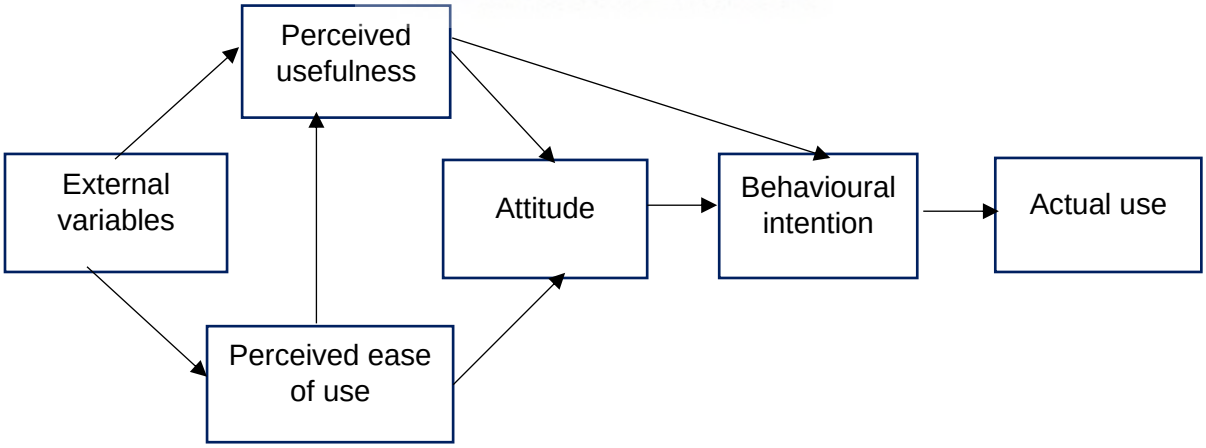


Figure 3.11: Technology acceptance model
Source: Davis (1989)

TAM has proven to be a more appropriate model for the study of communication and computing information technologies (Rafikasari & Iriawan, 2021). Consequently, the concept has garnered widespread support in empirical investigations of consumer decision making for ICT-related goods (Walczuch et al., 2007). Similarities are formed between the IDT and TAM frameworks while applying the TAM. Taylor and Todd (1995) identify similarities between relative advantage and the concept of perceived usefulness (Table 3.2), which is a user's subjective evaluation of the extent to which employing an invention will improve her job performance. In addition, perceived ease of use is analogous to the IDT framework's concept of complexity (Davis, 1989). This also supports the literature's argument that three features of innovations, namely relative benefit, complexity, and compatibility, have been shown to be consistently connected to adoption behaviour (Agarwal & Prasad, 1998; Meuter et al., 2005).

3.5.3 Theory of Reasoned Action

Theory of Reasoned Action (Fishbein & Ajzen, 1985) is a tool used to achieve more profound insights into how attitudes and beliefs relate to individual intentions to perform. TRA is a refinement of Fishbein's multi-attribute model that clarifies the relationship between attitudes and behaviour. The TRA model (See Figure 3.10) represents a comprehensive integration of attitude components into a model that leads to better explanations and better behaviour predictions. In accordance with this expanded model, to understand consumers' intention to adopt a particular innovation, it is essential to measure the subjective norms that influence an individual's intention to adopt (Schiffman et al., 2010).

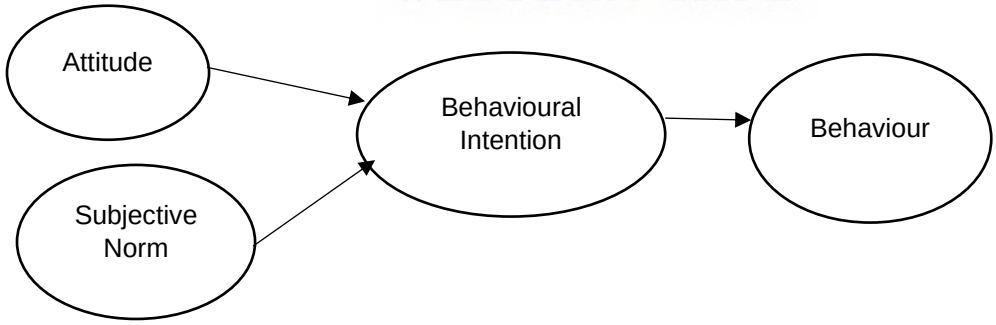


Figure 3.12: Theory of reasoned action
Source: Ajzen & Fishbein (1988)

Subjective norm refers to an individual's perspective of what others believe about the behaviour in question. As an independent variable, subjective norm reflects an individual's perception of the social pressure to either perform or refrain from performing the intended

behaviour (Ajzen and Fishbein, 1980; Fishbein & Ajzen, 1975). It typically includes perceptions about what family, friends, co-workers, the head of department, and professional organisations believe about the outcome of the behaviour (normative belief) and the extent to which this influences the behaviour or incentive to comply (Pedersen, 2005). Fishbein and Ajzen (1975) stressed that the influence of subjective norm is necessary for the accomplishment of a certain behaviour. The components of TRA are three general constructs: behavioural intention, attitude, and subjective norm. TRA proposes that the most significant determinant of a consumer's actual behaviour is the intention to perform a behaviour which is a function of attitude towards behaviour and subjective norms (Chakraborty & Mitra, 2018).

3.5.4 Theory of Planned Behaviour

The theory of planned behaviour (TPB) was suggested as an extension of the theory of reasoned action (Fishbein & Ajzen, 1975) and includes an additional construct perceived behavioural control, which is a consumer's perception of whether the behaviour is or is not within consumer's control (see Figure 3.11). Perceived behavioural control plays an integral part in the theory of planned behaviour. Perceived behavioural control indicates that the more the individual's resources and possibilities and the less the anticipated obstacles, the greater the purpose to create a particular behaviour (Liao et al., 2022). Ajzen (1991) defines perceived behavioural control as the ease or difficulty of performing the behaviour. In system usage, perceived behavioural control relates to how an individual believes that the consumer has control over personal or external factors that may facilitate or constrain system use (Chakraborty & Mitra, 2018).

Ajzen (1991) shows that perceived behavioural control, attitudes, and subjective norms are all positively related to the intentions about the behaviour, which predicts the actual behaviour. For mobile services, attitude towards behaviour can then be described as an individual's favourable or unfavourable evaluation of using a specific service, while subjective norm can be seen as the perceived social pressure to use or not to use a pointed service. According to Chakraborty and Mitra (2018), The TPB model has not been tested sufficiently in empirical studies because of some limitations, such as the ambiguity that surrounds the definition of perceived behavioural control and lack of consideration of unconscious motives as TPB is grounded on the belief that people think rationally and make logical decisions.

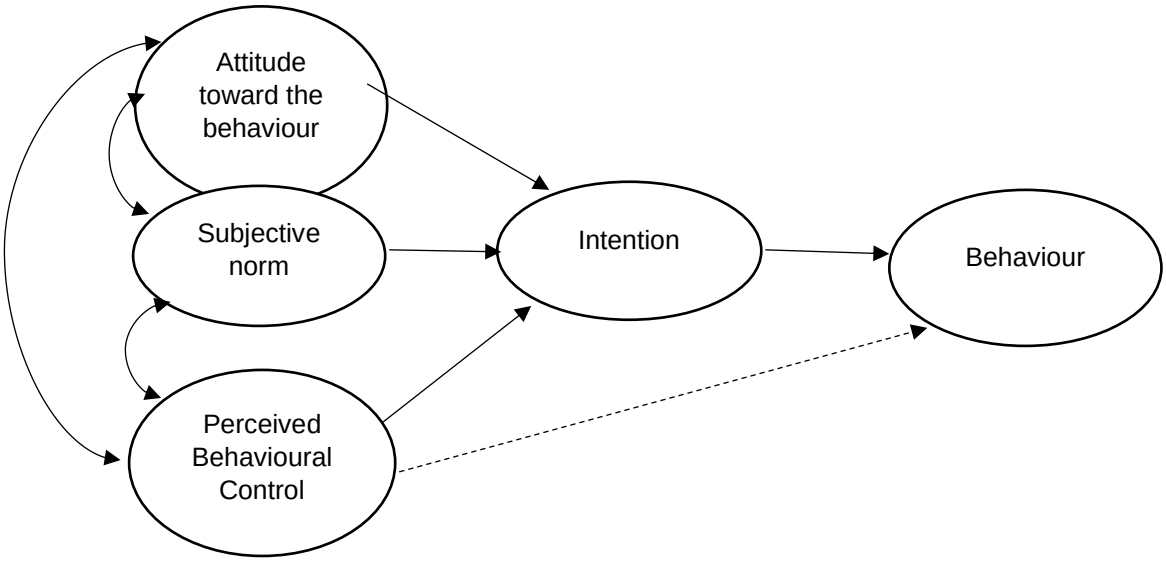


Figure 3.13: Theory of planned behaviour
Source: Ajzen (1991)

3.5.5 Unified Theory of Acceptance and Use of Technology

Aimed at harmonising the literature associated with acceptance of innovative technology, Venkatesh, Morris, Davis, and Davis (2003) developed a unified model that brings together alternative views on user and innovation acceptance – The unified theory of acceptance and use of technology (UTAUT). The UTAUT (See Figure 3.7) suggests that four core constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) are direct determinants of behavioural intention and behaviour and that these constructs are in turn moderated by gender, age, personality, and voluntariness of use (Venkatesh et al., 2012). It is argued that by examining the presence of each of these constructs in a real-world environment, researchers and practitioners will be able to assess an individual's intention to use a specific system, thus allowing for the identification of the key influences on acceptance in any given context. The four core constructs of the UTAUT, as espoused by Venkatesh et al. (2003), are discussed next.

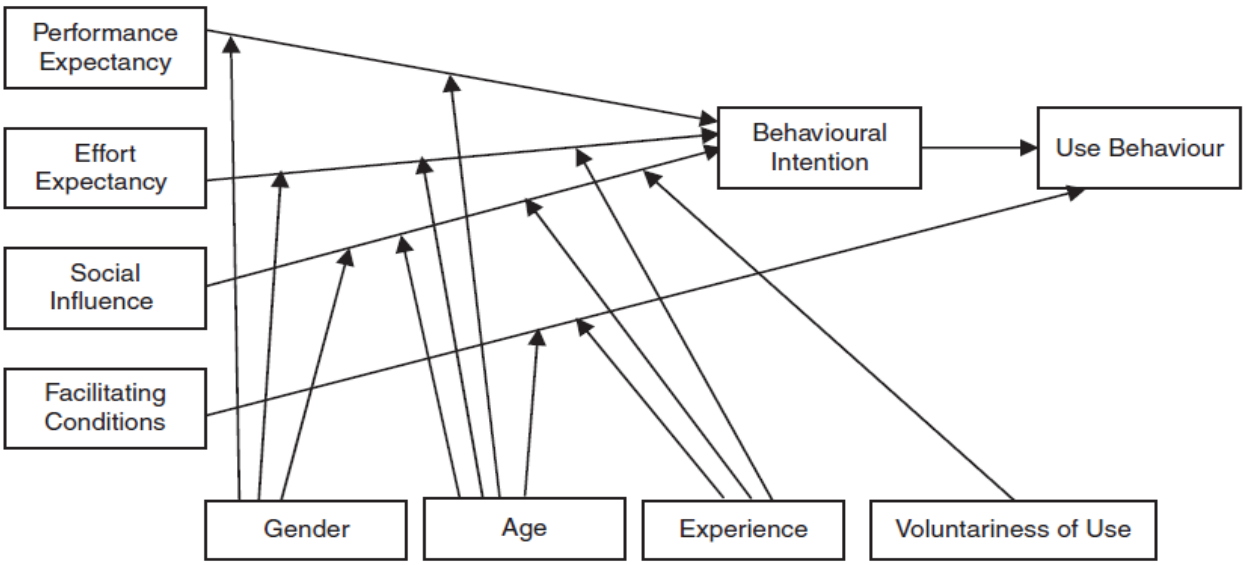


Figure 3.14: Unified Theory of Acceptance and Use of Technology
Source: Venkatesh et al. (2003)

3.5.5.1 Performance expectancy

According to Venkatesh et al. (2012) defined performance as how an individual believes that using technology will help better attain significant rewards. Thus, users' expectation on technology performance influences their intention to adopt the technology. Past research shows evidence of the influence of perceived performance on behavioural intention to adopt mobile marketing (Alsheikh & Bojei, 2014; Yang, Liu, Li & Yu, 2015; Yu, 2012). In their work, Venkatesh et al. (2003) provided evidence that customers' intention to adopt technology depends on how they perceive the usefulness of the technology. Like perceived usefulness in TAM, consumers will be less likely to adopt an innovation if it does not meet their perceived expectations.

3.5.5.2 Effort Expectancy

Effort expectancy refers to the degree of ease associated with the use of a technology (Venkatesh et al., 2012). Experts in technology adoption models (Davis, 1989; Dillon, 2001; Morris & Dillon,1997) emphasised that a user's perception of ease of use determines the acceptance of innovative technology. When a technology calls for less cognitive effort to use and apply, adopters will take it on with ease, less effort is required to learn, apply, and use it. However, if a lot of effort must be devoted to learning, using, or implementing such technology, the level of resistance is likely to be high in mobile marketing; for instance, according to

Lichtenstein and Williamson (2006), less effort is required to execute a transaction was one of the critical reasons established to influence consumers' adoption of the technology.

3.5.5.3 Social Influence

Venkatesh et al. (2012) defines social influence as the degree to which an individual perceives that significant other believes he or she should use innovative technology. Social influence, for instance, from friends and colleagues highly eases intention and the process of technology adoption. Furthermore, social influence gives confidence to inexperienced users of the technology of its usefulness and value; thus, inexperienced users will easily buy in to adopt it. Vannoy and Palvia (2010) present confirmatory findings intending to accept high-tech innovations positively affected by social influence.

3.5.5.4 Facilitating Conditions

Facilitating conditions are defined as the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of technology (Abdulwahab & Dahalin, 2010). In the mobile marketing context, facilitating conditions can be seen as the extent to which consumers believe that adequate technical infrastructure exists to enhance the execution of mobile marketing transactions. Facilitating conditions, for instance, the introduction of fourth generation (4G) network infrastructure has radically improved mobile commerce through greater internet connectivity, giving impetus to the time needed to execute online transactions.

Although the conceptual frames discussed above contribute immensely to the study of I.T. adoption, they pose some limitations which need to be considered. As shown in Table 3.3, they are four significant factors that can be deduced from the conceptual frames of a particular technology: (1) user friendliness of the technology, (2) potential benefits of the technology, (3) influence of others towards the use of the technology and (4) influence of the technology on perceived self-image. According to Bhatiasevi (2015) even though the theories use different terminologies, they explain related and similar concepts, which poses some challenges when contrasting them. Furthermore, the author posits that all the theories assume an attitude-intention behaviour relationship, that is, cognitive and normative or affective beliefs form attitude, which in turn influences behavioural intention and actual usage behaviour.

Table 3.3: Commonly Used Innovation Theories and their Distinctive Similarities

		Factor		
Factors in various Conceptual frameworks	**Technology Theories**	**Assessing Conceptual consumer friendliness for technology adoption**	**Benefits of the Technology**	**Influence on other consumers to adoption technology**
	IDT	Complexity	Relative advantage	
	TAM	Perceived ease of use	Perceived usefulness	
	TRA		Attitude	Subjective norm
	TBP		Attitude	Subjective norm
	UTAUT	Expectancy effort	Performance expectancy	Social influence
	TRI	Insecurity	Optimism	Innovativeness

Source: Developed for this research

3.5.6 Technology readiness (TRI)

TRI is defined by Parasuraman (2000) as 'people's propensity to embrace and use new technologies for accomplishing goals in home life and at work'. Parasuraman (2000) based the components of TRI on the notion that people harbor positive and negative feelings towards technology, as identified by Mick & Fournier, 1998). In addition, Mick, and Fournier (1998) listed eight technology paradoxes with which consumers must cope control or chaos; freedom or enslavement, new or obsolete, competence or incompetence, efficiency, or inefficiency, fulfils or creates needs, assimilation, or isolation, and engaging or disengaging.

Further, (Parasuraman, 2000) identified four groups of beliefs that affect the technological readiness of individuals. The study contends that optimism and innovativeness are contributors to TRI whilst discomfort and insecurity are inhibitors to TRI. Parasuraman (2000) points to the need to investigate the antecedents and consequences of TR in a model where TR is the core construct. Lin and Hsieh (2006) who empirically tested how TR influenced satisfaction and behavioural intentions followed this research avenue. Their research found that TR influenced how consumers perceived the quality of SST interactions and determined

their intentions to use them. Furthermore, another study by Zhu, Nakata, Sivakumar, and Grewal (2007) empirically tested the influence of TRI on the effectiveness of technology interfaces and found that the level of TRI influenced the cognitive processing of interface design features.

Therefore, TRI is a critical factor as it is related to perceptions of service quality (Zeithaml, Parasuraman and Malhotra, 2002). Chiu, Fang, and Tseng (2010), and Liljander, Gillberg, Gummerus and Riel (2006) challenge the importance of TR in explaining SST adoption behaviour. In their study, Liljander et al. (2006) suggested that the TR of adopters and non-adopters of self-service check-in did not differ significantly while other factors such as the efficiency of service, control, perceived benefits, preference for personal contact, and convenience emerged as stronger predictors. Liljander et al. (2006) research did not confirm the vital role of TR as an adoption factor, which contrasts with the findings of Lin and Hsieh (2006), and Parasuraman (2000). This difference in findings was attributed to the TR measurements that may need to be adapted for the specific research contexts (Chiu et al., 2010; Liljander et al., 2006).

Other researchers look at consumer characteristics specifically related to technology, such as technology readiness (TRI). Technology readiness refers to one's willingness to leverage innovative technologies in performing tasks (Parasuraman, 2000). TR expresses the "people's propensity to embrace and use new technologies for accomplishing goals in home life and at work" and comprises two drivers (innovativeness, optimism) and two inhibitors (discomfort, insecurity). Developed by Parasuraman (2000), TR expresses the "people's propensity to embrace and use new technologies for accomplishing goals in home life and at work" and comprises two drivers (innovativeness, optimism) and two inhibitors (discomfort, insecurity).

The drivers refer to positive feelings toward technology providing benefits such as efficiency and the personal propensity to be a technology pioneer. The inhibitors express the opposite, namely distrust, scepticism, and uneasiness. The latter are perceived quality, satisfaction, and loyalty. Liljander et al. (2006) argue that perceived risk is like the TRI dimension insecurity, which is defined as "the result of lack of trust in technology and its ability to work properly". In their study, TRI is examined in the context of self-check-in options of digital banking, particularly about the consumers' attitude toward, adoption of, and responses to those SST options.

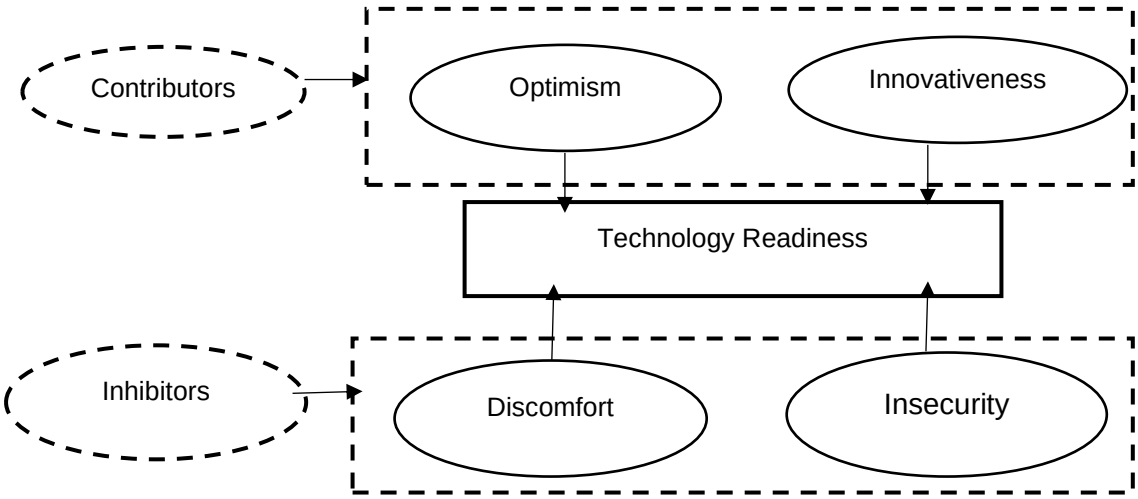


Figure 3.15: Technology readiness model
Source: Parasuraman, 2000

3.5.6.1 Optimistic

Optimistic people generally expect that “good rather than bad things will happen to them” (Scheier & Carver, 1985). How they approach the world will impact their attitude toward risk perception and acceptance of technology (Costa-Font, Mossialos, & Rudisill, 2009). Parasuraman argued that optimism relates to "a positive view towards technology and trust that it will offer people more efficiency, flexibility and control" (2000, p. 311). Also, he concludes that this positively impacts TRI According to Lin, Shih & Sher (2007), PU and PEOU have reconciling effects between TRI and the use intentions. Based on these insights, Hallikainen and Laukkanen (2016) argued that optimism positively influences both the PEOU and the PU of digital services.

3.5.6.2 Innovativeness

Garcia and Calantone (2002) state that 'innovativeness 'is used to assess the 'newness' of an innovation, where innovative products are labelled with a high degree of newness. Users characterised as 'innovative' adopt innovative ideas earlier than others (Rogers, 2003). Parasuraman introduces the technological dimension and refers to “a propensity of being a technology pioneer and influencer” (2000, p. 311). Venkatesh and Bala (2012) identify a direct positive link between technology readiness and the adoption of business process standards.

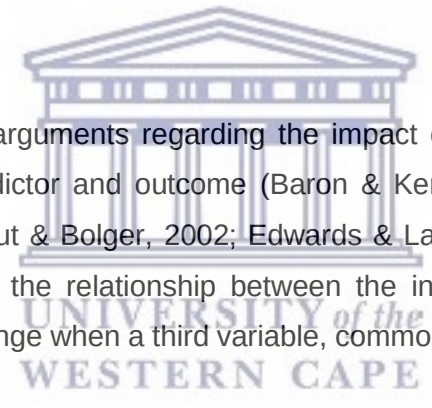
3.5.6.3 Discomfort

Discomfort attributes are defined as "a perceived lack of control regarding technology and the sense of being overwhelmed by it" (Parasuraman, 2000, p. 311). Mukherjee and Hoyer (2001) argue that the high-complexity features of technology products negatively influence product evaluation because of the user's learning cost. Even though both studies have hinted at a negative impact on the PEOU and PU, some recent studies have not been able to find a correlation (Godoe & Johansen, 2012; Walczuch et al., 2007).

3.5.6.4 Insecurity

Insecurity "implicates a distrust of technology and the disbelief about its ability to work properly" (Parasuraman, 2000, p. 311). Even though TRAM suggests a negative impact on the PEOU and PU., some recent studies have not been able to find a correlation (Godoe & Johansen, 2012; Walczuch et al., 2007).

3.5.7 Mediation



There have been numerous arguments regarding the impact of mediator variables on the relationship between the predictor and outcome (Baron & Kenny, 1986; Holmbeck, 1997; MacKinnon et al., 2002; Shrout & Bolger, 2002; Edwards & Lambert, 2007). These studies sought to determine whether the relationship between the independent variable and the dependent variable would change when a third variable, commonly known as the intervenors, was introduced.

A mediating variable is relevant whenever a researcher wants to understand the process by which two variables are related, such that one variable causes a mediating variable which then causes a dependent variable. A mediating variable explains and identifies the causal process underlying the relationship between two other variables. A mediating variable (*M*) is intermediate in the causal sequence relating the predictor (*X*) to the outcome(*Y*) such that the predictor variable causes the mediating variable, which in turn causes the outcome variable. Intermediate variables come between the predictor and the outcome variable as illustrated in Figure 3.16 and 3.17.

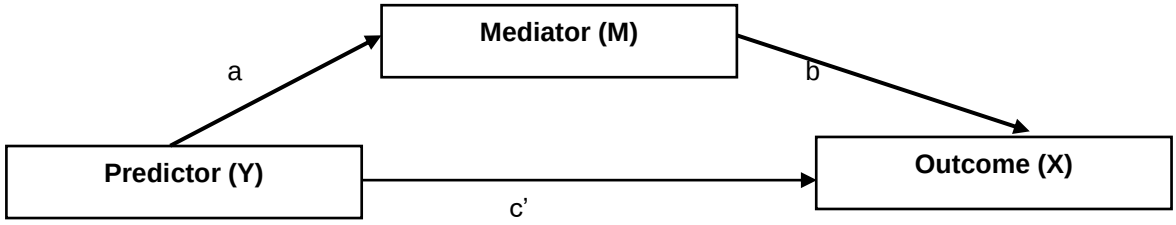


Figure 3. 16: Simple mediation.
Source: Developed for this research.

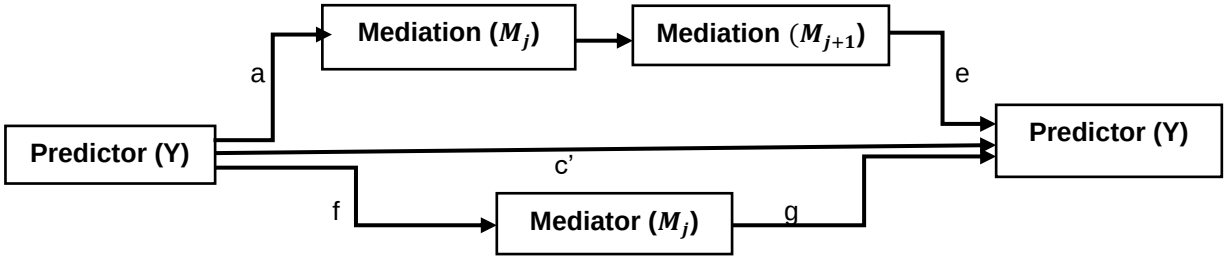


Figure 3.17: Serialisation/parallel mediation
Source: Developed for this research.

Important aspects of mediating variables are their close link with theory and the potential that the mediating variables identified in one context may operate in various contexts.

- ***Perceived Usefulness (PU)-*** serves as a mediator between the independent variable (perception and personality) and behavioural intention to adopt digital banking. Recently, a study conducted by Kirana and Havidz (2020) also suggests that advanced financial literacy and repeated use of mobile phones help increase digital banking commitment. Liébana-Cabanillas et al. (2020) found that perceived usefulness influences the intention to use digital banking channels. In another study Shin, Jian, Driscoll, and Bar (2018) proposed an extended TAM model and concluded that perceived usefulness impacts the intention of individuals directly and through attitude. Earlier studies also revealed that perceived usefulness is positively associated with attitude and usage intention (Davis, 1993; Hsu & Chiu, 2004; Liu et al., 2009; Liébana-Cabanillas et al., 2020).

- ***Perceived ease of use (PEOU)-*** serves as a mediator between external variables and the adoption intention of digital banking. PEOU is one of the TAM factors responsible for the individual user motivation towards using a particular system (Taherdoost, 2018). Previous studies have reported the direct relationship between perception and

personality concerning its ease of use. Other studies also reported the substantial influence of PEOU on the adoption intention of mobile-related services (Keramati, Taeb, Larijani & Mojir, 2012; Leong et al., 2013; Jaradat & Faqih, 2014). Earlier studies have established the association between PEOU, attitude, and usage intention (Schepers & Wetzels, 2007). Davis et al. (1989) found that perceived ease to use leads to the behavioral intention to adopt and use the technology. This has also been empirically proved by some of the studies (Alkhaldi, (2017), Alshare & Mousa, (2014), Musa et al., (2015), and Soomro, (2019) in the context of digital banking.

- ***Perceived credibility (PCR)-*** PCR is linked to TAM-based research efforts investigating the adoption of digital banking in various forms. Ganesan (1994) defines PCR as "the extent to which one partner believes that the other partner has the required expertise to perform the job effectively and reliably" and includes the concepts of privacy and security. Therefore, it is likely that PCR plays a significant role in determining the adoption of digital banking, a transactions channel connected with profound uncertainty regarding the privacy and security provisions it ensures to its users. This issue can emerge more emphatically in populations whose members are not familiar with performing any kind of transaction over the internet.

3.5.8 Moderator variables

Moderating variables is essential whenever a researcher wants to assess whether two variables have the same relation across groups. Moderator modifies the form or strength of the relationship between an independent and a dependent variable. The examination of moderator effects has a long and vital history in various research areas (Aguinis, 2004; Aiken & West, 1991). Moderator effects are considered the interactions because the third variable interacts with the relation between two other variables. Moderators such as age, gender, and race are often routinely included in studies (MacKinnon, 2011; Park et al., 2021; Witts & Kessy, 2021). Demographic characteristics actively measured include family income, marital status, and education.

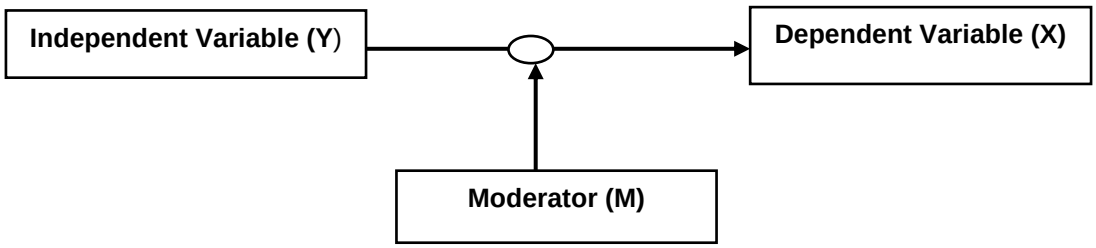


Figure 3.18: Moderation analysis
Source: Developed for this research

- ***Age as a moderator***

Similarly, studies on technology adoption demonstrated that younger users behave differently as compared to their counterparts. Older individuals due to their limited exposure to computers, mobile handsets, and the internet, have lower perceptions of self-efficacy in learning the internet (Porter & Donthu, 2006). Older users tend to be calm in terms of using technology for conducting transactions as they are skeptical about the technology and rely more on face-to-face transactions. Older people tend to have greater technology anxiety; are less technologically innovative, compared to young consumers.

That is, younger people are early adopters of innovative ideas, services, and products (Lee, Park, Yoon & Park, 2010). Age has been identified to have a moderating effect between technology use and perceptions (Chawla & Joshi, 2018). Technology anxiety influences the degree of adoption differently among varying age groups with older consumers having more technology anxieties (Morris et al., 2000; Porter & Donthu, 2006; Demirci & Ersoy, 2008; Lee et al., 2010). Age strengthens perceived usefulness, perceived cost, and perceived system quality and in turn moderates' attitudes toward the intention to adopt mobile banking (Riquelme & Rios, 2010).

- **Education as a moderator**

Education refers to a title, knowledge, and skill gained through the process of formal education which is recognised in the industry and makes someone eligible for a position or job. The decision to adopt modern technology is governed by the degree of knowledge or information one has on how to use it appropriately. Liebermann and Stashevsky (2002) found that users with low education levels will perceive high barriers to Internet and e-commerce usage as compared to users with high education levels. A higher educational level may give rise to a greater level of knowledge of modern technologies, thereby accelerating the early adoption of innovative technology. This is evident from a study by Rhee and Kim (2004) who found that people educated to a higher level were found to be

more likely to use the Internet. According to Porter and Donthu (2006), early adopters of modern technologies tend to have higher educational levels while less educated individuals feel more technology anxiety which impedes their ability to learn newer technologies. Weijters, Rangarajan, Falk and Schillewaert (2007) suggest that people exposed to higher levels of education are likely to have had more exposure to technology, not only at their workplace, but also in their day today activities.

- **Income as a moderator**

Income is defined as the money earned by individuals or businesses in exchange for providing products or services. Income levels influence user attitude and behaviour. Past research studies have examined how income may encourage or discourage the user from technology adoption. Porter and Donthu (2006) study showed that lower income consumers are the consumers who are most concerned about cost and their perception is that the cost is high relative (device, access fee) to perceived usefulness. On the contrary, high-income consumers can afford high quality latest technology and internet connection. This differential access to technology results in varying levels of anxiety among users, with low-income users having high anxiety. Thus, income level influences the timing and the extent of technology adoption.

According to Hernández, Jiménez and Martín (2011). high income causes users to perceive lower risks while making online purchases whereas low income discourages online transactions. It is logical to believe that with rising incomes, perceptions related to ease of use, efficiency, convenience, and trust with technology adoption moderate user behaviour and intention. This is evident from the findings of a study by Lee et al., (2010) who found that technology anxiety decreases as income level increases.

- ***Awareness as a moderator***

Earlier research studies have cited awareness as the amount of time the individual has been using a particular technology be it internet banking, online commerce, and digital banking. The concept of awareness in previous studies refers to the same implied meaning: more familiar with and more knowledgeable about the technology of interest (Sun & Zhang, 2006). In our study, awareness is defined as a condition of being conscious of something. Awareness in previous studies refers to the degree of familiarity and knowledge about the technology of interest (Sun & Zhang, 2006). Taylor and Todd (1995) confirmed that technology adoption is more significant for consumers that are aware than those that are not aware.

3.6 Determining the relative importance of consumer decision to adopt digital banking and consumer-related factors

While there are numerous theories for adopting technology, these include, but are not restricted to, the Technology Acceptance Model (TAM) (Davis, 1989), Innovation Diffusion Theory (IDT) (Rogers, 1995), Theory of Reasoned Action (TRA) (Fishbein, 1979), Theory of Planned Behaviour (TPB) (Ajzen, 1985) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). Hsu, Ju, Yen, and Chang (2007), and Lee, Cheng, Yeung and Lai (2011) alluded that TAM and IDT are the most common theories describing consumers' adoption of information systems. This study will focus on those commonly utilised in studying the adoption of digital readiness and the adoption of self-service banking technologies. The standard innovation adoption theories are discussed thoroughly in the preceding sections.

3.6.1. Proposed conceptual model

The researcher's primary approach is to investigate factors influencing the adoption of technologies focusing on IDT (Rogers,1995); TAM (Davis, 1989), and TRI (Parasuraman, 2000) models; this study develops an integrated model to provide a fuller understanding of factors facilitating or impeding the adoption of digital banking, focusing on banking consumers in South Africa. According to the literature, perception and personality are considered two independent antecedent variables of the vital concepts in consumer readiness and adoption (Castaneda et al., 2009; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975).

An attribute gap discrepancy is addressed by integrating IDT and TRI as the independent variables. Besides maintaining two IDT and four TRI variables, one construct was added, namely structural assurance. Second, the study propose a direct effect of IDT and TRI on technology adoption. The hypotheses suggest that more technology-ready customers are more likely to use a specific technology, as most studies have proposed a positive relationship between the two independent variables and technology adoption.

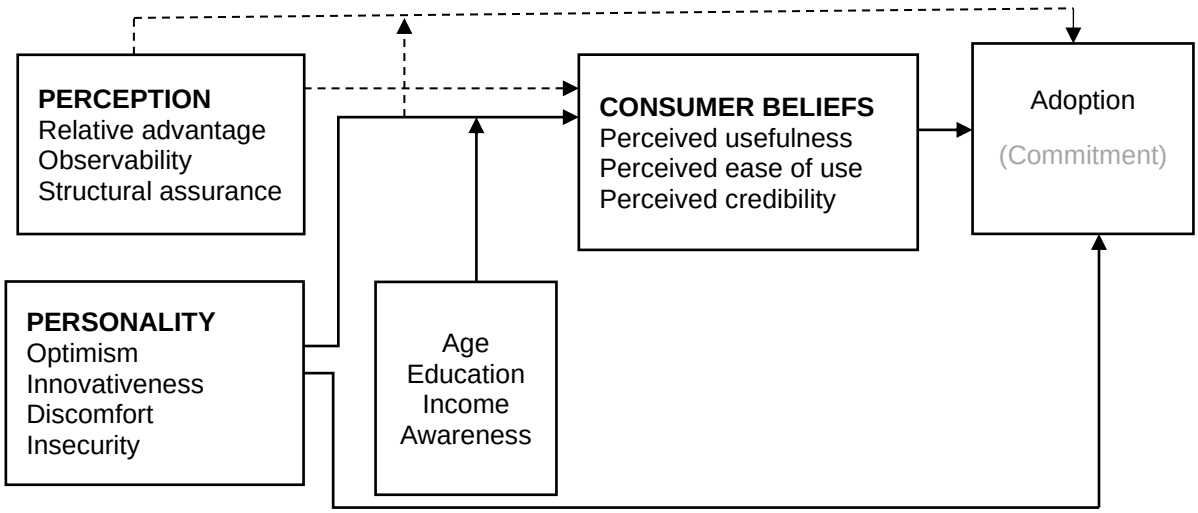


Figure 3.19: Proposed model for the study
Source: Developed for the research

Thirdly, the researcher incorporates mediators for IDT and TRI effects theoretically grounded in the TAM literature. TAM explains technology acceptance from the customer's point of view and seems fit for the theoretical basis of this study's conceptual model. Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Perceived Creditability (PCR) were proposed as the mediators affecting indirectly the behavioural intention to adopt digital banking. The mediator variables refer to an individual's beliefs about specific technology and willingness to adopt it. Fourth, drawing on trait-formation theory, the framework includes perception as antecedents of IDT and personality as antecedents of TRI. Finally, it focuses on contextual moderators characterising the age, income, education, and awareness.

3.6.2. Research question and hypotheses

This research aims to contribute to the body of knowledge a stream of literature on technology readiness, behavioural intention, and adoption of digital banking. Further to assist bank marketers in establishing a better understanding of consumer behaviour to adopt digital banking across South Africa. Given this context, the research questions and hypotheses were developed.

1. Research question

To resolve the problem for this study, the research question was formulated as follows:

Which variable between perceptions and personality has the greatest predictive power in influencing the adoption of digital banking in South Africa?

2. Hypotheses

Hypotheses are unproven statements or propositions about a factor or phenomenon of interest to the researcher. They go beyond research questions because they are statements of relationships or propositions rather than merely open-ended questions.

To support the investigation of the stated research questions, the following hypotheses were formulated:

H1: Perception attributes have effect on consumer's belief in digital banking:

H1a: Relative advantage has effect on consumer's perceived ease of use.

H1b: Relative advantage has effect on consumer's perceived usefulness.

H1c: Relative advantage has effect on consumer's perceived credibility.

H1d Relative advantage has effect on consumer's behavioral intention to adopt.

H1d: Observability has effect on consumer's perceived ease of use.

H1e: Observability has effect on consumer's perceived usefulness.

H1f: Observability has effect on consumer's perceived credibility.

H1g: Observability has effect on consumer's behavioral intention to adopt.

H1h: Structural assurance has effect on consumer's perceived ease of use.

H1i: Structural assurance has effect on consumer's perceived usefulness.

H1j: Structural assurance has effect on consumer's perceived credibility.

H1k: Structural assurance has effect on consumer's behavioural intention.

H1l: Perceived usefulness has effect on consumer's behavioral intention to adopt.

H1n: Perceived ease of use has effect on consumer's behavioral intention to adopt.

H1m: Perceived credibility has effect on consumer's behavioral intention to adopt.

H1o: Perceived ease of use has effect on perceived usefulness.

H1p: Perceived ease of use has effect on perceived credibility.

H2: Personality attributes have effect on consumer's belief in digital banking:

H2a: Insecurity has effect on consumer's perceived ease of use.

H2b: Innovativeness has effect on consumer's perceived ease of use.

H2c: Optimism has effect on consumer's perceived ease of use.

H2d: Insecurity has effect on consumer's perceived credibility.

H2e: Optimism has effect on consumer's perceived credibility.

H2f: Perceived ease of use has effect on consumer's perceived credibility.

H2g: Insecurity has effect on consumer's behavioural intention.

H2h: Innovativeness has effect on consumer's behavioural intention.

H2i: Optimism has effect on consumer's behavioural intention.

H2j: Perceived credibility has effect on consumer's behavioural intention.

H2k: Perceived usefulness has effect on consumer's behavioral intention.

H2l Perceived ease of use has effect on consumer's perceived usefulness.

H2n: Discomfort has effect on consumer's behavioral intention.

H2m Discomfort has effect on consumer's perceived credibility.

H2o: Discomfort has effect on consumer's usefulness.

H2p: Discomfort has effect on consumer's perceived ease of use.

H2q: Optimism has effect on consumer's usefulness.

H2r: Innovativeness has effect on consumer's usefulness.

H2s: Innovativeness has effect on consumer's perceived credibility.

H2t: Insecurity has effect on consumer's usefulness

In addition to the above hypotheses, the following hypotheses were developed in line with the proposed conceptual framework:

H3: Consumer's belief variables mediate the relationship between perception and adoption:

H3a: Relative advantage and adoption through perceived ease of use and perceived usefulness.

H3b: Relative advantage and adoption through perceived ease of use and perceived credibility.

H3c: Relative advantage and adoption through perceived credibility.

H3d: Observability and adoption through perceived ease of use and perceived usefulness.

H3e: Observability and adoption through perceived ease of use and perceived credibility.

H3f: Observability and adoption through perceived credibility.

H3g: Structural assurance and adoption through perceived ease of use and perceived usefulness.

H3h: Structural assurance and adoption through perceived ease of use and perceived credibility.

H3i: Structural assurance and adoption through perceived credibility.

H4: Consumer's belief variables mediate the relationship between personality and adoption:

H4a: Insecurity and adoption through perceived ease of use and perceived usefulness.

H4b: Insecurity and adoption through perceived ease of use and perceived credibility.

H4c: Insecurity and adoption through perceived credibility.

H4d: Innovativeness and adoption through perceived ease of use and perceived

H4e: Innovativeness and adoption through perceived ease of use and perceived credibility.

H4f: Optimism and adoption through perceived ease of use and perceived usefulness.

H4g: Optimism and adoption through perceived ease of use and perceived credibility.

H4h: Optimism and adoption through perceived credibility

H4i: Discomfort and adoption through perceived ease of use and perceived usefulness.

H4j: Discomfort and adoption through perceived ease of use and perceived credibility.

H4k: Discomfort and adoption through perceived credibility.

H4i: Innovativeness and adoption through perceived credibility

H5: Age moderates the relationship between personality and consumer beliefs.

H6: Age moderates the relationship between perception and consumer beliefs.

H7: Income moderates the relationship between personality and consumer beliefs.

H8: Income moderates the relationship between perception and consumer beliefs.

H9: Education moderates the relationship between personality and consumer beliefs.

H10: Education moderates the relationship between perception and consumer beliefs,

H11: Technology awareness moderates the relationship between personality and consumer beliefs.

H12: Technology awareness moderates the relationship between perception and consumer beliefs.

3.6.3 Research objectives

To identify the extent of technology adoption frameworks usage in predicting consumers' behavioural intention.

This paper investigates the following research objectives:

RO1: To determine which variable between perception and personality has the greatest predictive power in influencing the adoption of digital banking in South Africa.

RO2: To assess the role of demographics and technological awareness in moderating the relationship between two independent variables (perception as antecedents of IDT and personality as antecedents of TRI) and consumer beliefs.

RO3: To assess the role of consumer beliefs in mediating the relationship between two independent variables (perception as antecedents of IDT and personality as antecedents of TRI) and adoption.

3.7 Conclusion

This chapter reviews consumers' technology readiness and behaviour to adopt digital banking from the South African perspective. The theories relating to consumer behaviour selection and adoption patterns were also discussed. Finally, the proposed conceptual frame was also presented, accompanied by a discussion of the research variables. The methodological approaches applied to address the research objectives and test the hypotheses will be explored in Chapter 4.

CHAPTER 4
RESEARCH METHODOLOGY

4.1. Chapter overview

This chapter explains the research methods applied to answer the research question. This study's research methodology construction is based on the theoretical concept of “research onion” (Figure 4.1), proposed by Saunders et al. (2019). The research onion provides an exhausting description of the main layers or stages which are to be accomplished to formulate an effective methodology (Raithatha, 2017). The research onion is structured into six sections: philosophies; approach to theory development; methodological choice; strategies; time horizon; techniques and procedures. While the second section, deals with the ethical considerations and the third concludes the chapter.

4.2. Introduction

The purpose of this methodology is to resolve the research problem. The research intends to demonstrate a quantitative method to identify the impact of digital banking on consumers 'behaviour from the South African perspective. The methodological framework for the research project consists of every aspect related to how the study was conducted (Quinlan, 2011).

4.3. Research framework

The methodological framework deals with distinct aspects of the research procedure, from philosophical assumptions to data analysis (Lisle, 2011). Creswell (2009) defined research methodology as, “the plan or proposal to conduct research, involves the intersection of philosophy, strategies of inquiry and specific methods.”

Methodologist researchers debated on classifying research methodology into sequential stages (Saunders et al., 2019; Bryman & Bell, 2017; Cooper & Schindler, 2018; Creswell, 2014; Denzin & Lincoln, 2011; Crotty, 2020). This study acknowledges that there is multiple research methodological framework applied, nonetheless, to rationalise the framework of this study, selected three research methodologies.

The first model**,** proposed by Crotty (2020) separated epistemology and theoretical perspectives by identifying four chronological stages. These stages are epistemology,

theoretical perspective, methodology, and methods. Furthermore, Crotty (2020) argues that the choice of epistemology leads the researcher to choose the appropriate theoretical perspective, which will, in turn, inform the methodology and finally the related set of methods, which include both data collection and data analysis.

The second **model**, proposed by Creswell, (2014) suggested a three-component framework for designing any research. Creswell's framework considers the interconnection of worldviews or philosophies (e.g., constructionism), strategies or methodologies of inquiry (mixed methods strategies, use sequential), and research methods (data collection, use questionnaire).

Finally, Saunders et al. (2019) argued that research design involves six layers of the research onion. The layers of the research onion are philosophies, approaches, strategies, choices, time horizons, techniques, and procedures.

There is a substantial overlap between all three research methodologies discussed. This study adapts Saunders et al. (2019), as its general framework design. Research Onion illustrates the stages involved in the development of research work as a step-by-step process for almost any type of research methodology and in a variety of contexts (Saunders et al., 2019). As shown in Figure 4.1, applying the research onion is to infer a valid, relevant, and effective methodology to attain the research objective and provide appropriate answers to research questions.

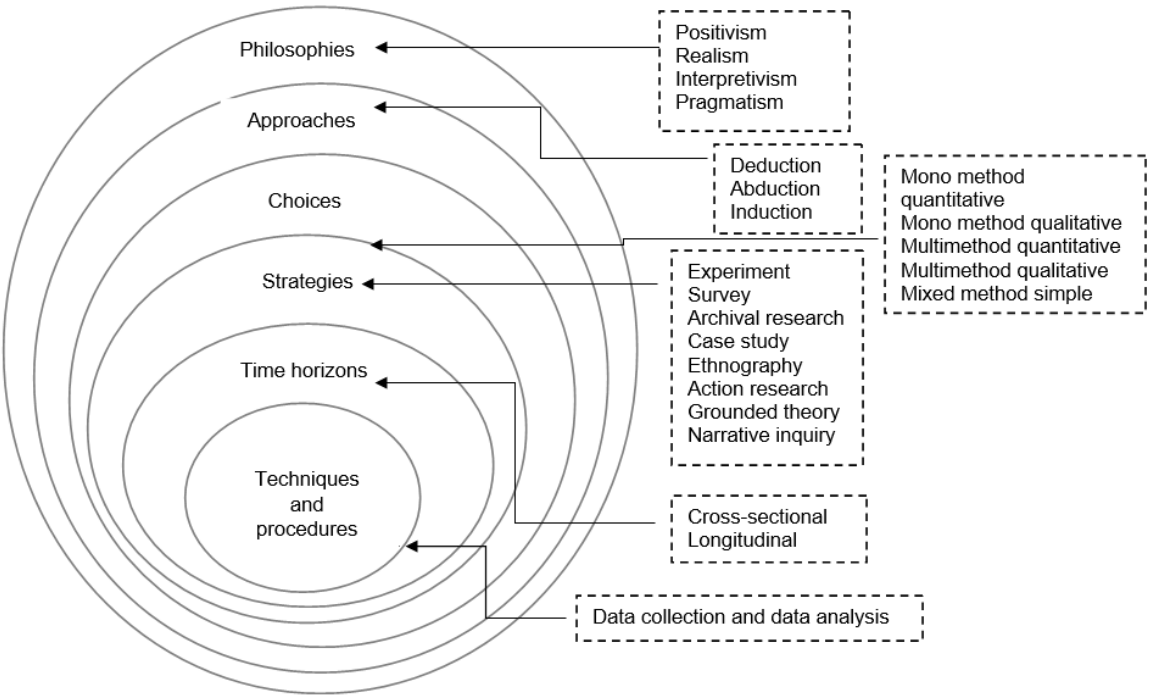


Figure 4.1: Research onion diagram.

Source: Saunders et al. (2019)

4.3.1. Research philosophies

To address the matter of the first layer of the research onion, it is important to highlight the basic techniques of the research philosophies.

1. *Positivism:* reflects the philosophical stance of a natural scientist. Ontology is based on objectivist assumptions that entities are observed, atomistic events, existing external to social actors (Crotty, 2020; Lucena-Molina, 2016; Chilisa, 2019), therefore, only observation and verifiable empirical data may be referred to as credible. Melnikovas (2018) emphasize that observation and the identification of event regularities are based on causal and function relation.

2. *Interpretivism:* an approach based on subjectivist ontological assumptions in that researchers tend to gain a deeper understanding of the phenomenon and its complexity in this context as opposed to attempting to generalise the understanding based on the entire population (Uduma & Sylva, 2015; Creswell, 2014).

3. *Pragmatism also known as* mixed method is based on assumption that within the research it is possible to adapt both positivist and interpretivist positions whichever works best for the research question (Uduma & Sylva, 2015).

4. *Critical realism* is based on two ontological assumptions: 1) the world consists of real entities; 2) we perceive the sensations and images of real entities, not the real entities themselves (Saunders et al., 2019). Knowledge is obtained by discovering generative mechanisms.

The philosophy of positivism was selected for this study. The positivist position regards the social world as having a fixed nature, characterised by patterns of cause and effect that can be described and predicted (Burrell & Morgan, 1979; Chilisa, 2019). Another vital component of the positivist perspective is that physical and social reality is independent of those who observe it. Thus, positivist researchers may use a highly structured methodology to control bias using standardised instruments (Park et al., 2020). The emphasis here is that the objective reality exists beyond the human mind; research methods are statistics and content analysis; validity-data truly measures reality; reliability-research results can be reproduced; research object has inherent qualities that exist independently of the researchers (Uduma & Sylva, 2015).

4.3.2. Research approaches

Researchers explored research approaches in multiple ways depending on different philosophical attitudes. Therefore, every hypothesis grants a declaration about the link between two or more variables as being the building blocks of theories (Bhattacherjee, 2012; Gill, Johnson & Clark, 2010; Pathirage et al., 2008). Saunders et al. (2019) distinguish three main approaches to theory development which are deductive, inductive, and abductive.

1. Deductive is based on scientific principles. This approach moves from theory to research (*theory-testing research*). The researchers' goal is to test concepts and patterns known from theory using new empirical data; explain and find the causal relationship between variables (Bhattacherjee, 2012).

2. Inductive is based on understanding the meanings humans attach to events (*theory-building* research). The researchers' goal is to infer theoretical concepts and patterns from observed data and should have a detailed and complete understanding and

knowledge of the research context (Hyde, 2000; Bhattacherjee, 2012; Azungah, 2018).

3. Abduction is an alternative to scientific implication judgment and process that create a descriptive proposal with a new idea (Tan et al., 2018; Reid, 2018; Brandt & Timmermans, 2021).

Therefore, Table 4.1 illustrate the difference between inductive and deductive approaches.

Table 4.1: Difference between Inductive and deductive

Inductive approach	**Deductive approach**
Based on understanding the meanings humans attach to events	It is based on scientific principles.
The researcher should have a detailed and complete understanding and knowledge of the research context.	The approach moves from theory to research.
It involves collecting qualitative data.	The researcher explains and finds casual relationships between variables.
It adopts a flexible structure that allows for changes or variations in research emphasis along with the progress of the research.	It involves collecting quantitative data.
The researcher has an evident realization that they are part of the process.	The researcher introduces and applies controls to ensure and protect the validity of the data. To ensure clarity of data, the concepts are operationalized. It is a very structured approach
The researcher is less concerned about generalization.	. There is a need to have a large enough sample size to make conclusions.

Source: Adapted from Alturki (2021)

Accordingly, Alturki (2021), Al-Zefeiti & Mohamad (2015), Safi et al. (2021) and Melnikovas (2018**)** the research starts with an existing theory, then rising a question or hypothesis and data collection to confirm or reject the hypothesis. It is also a popular and common strategy in business and management research and is most frequently used to answer who, what, where how much, and how many (Saunder et al., 2019). In other words, it goes ahead from theory to data. Hence this study adopted the use of the deductive approach as involves conceptual

or theoretical structure development by applying practical observation (Ali & Birley, 1999; Al-Zefeiti & Mohamad, 2015; Alturki, 2021) as illustrated in Figure 4.2.

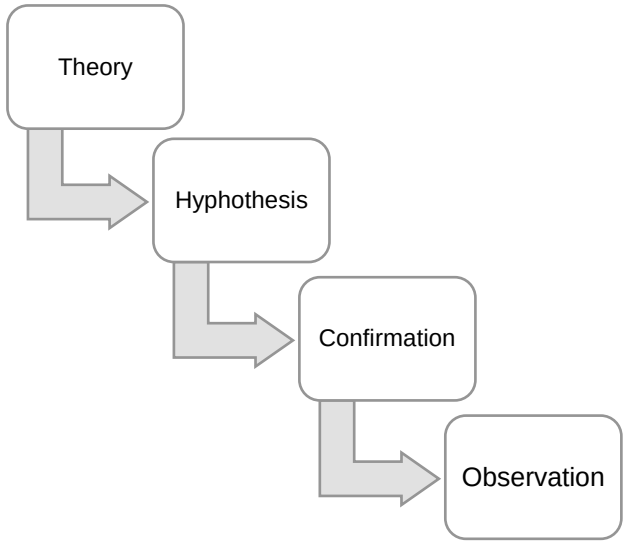


Figure 4.2: Deductive research approach
Source: Developed for this research

4.3.3 Methodological choice

Despite the existence of multiple research method classifications qualitative (non-numerical and quantitative(numeral) methods are the most dominating methods (Rahi, 2017; Wimalaratne & Kulatunga, 2022; Alturki, 2021; Mohajan, 2020; Saunders et al., 2019). Qualitative research origins start from social and cultural anthropology, history, psychology, philosophy, and sociology (Haradhan, 2018). Qualitative studies use words and adopt methods for collecting data that are nonquantifiable (such as videos and interviews) and the results generated by data analysis procedures (like content analysis) are nonnumerical (Wimalaratne & Kulatunga, 2022; Alturki, 2021). Quantitative research explains a phenomenon issue by data gathering in numerical form and analysing with mathematical systems, particularly statistics (Alturki, 2021; Wimalaratne & Kulatunga, 2022; Mohajan, 2020). Saunders et al. (2019) delimit research selections to the quantitative and qualitative research methods, in addition to the simple or complex mix of both or mono methods use (Melnikovas, 2018).

The Mono method is chosen when the research is dedicated to qualitative or quantitative data gathering (Melnikovas, 2018); while mixed methods have been crossbred, and combined (Bowen et al., 2017). As mixed methods are chosen when quantitative and qualitative methods

are used in the same research to attain different aims and offset the mono method limitations. It can be either mixed-method design or mixed model design (Jorgenson & Vesaas, 1962; Mik-meyer, 2020). While multi-method choice requires the usage of qualitative or quantitative methods, although the research is focused on one of them (Saunders et al., 2019; Melnikovas, 2018).

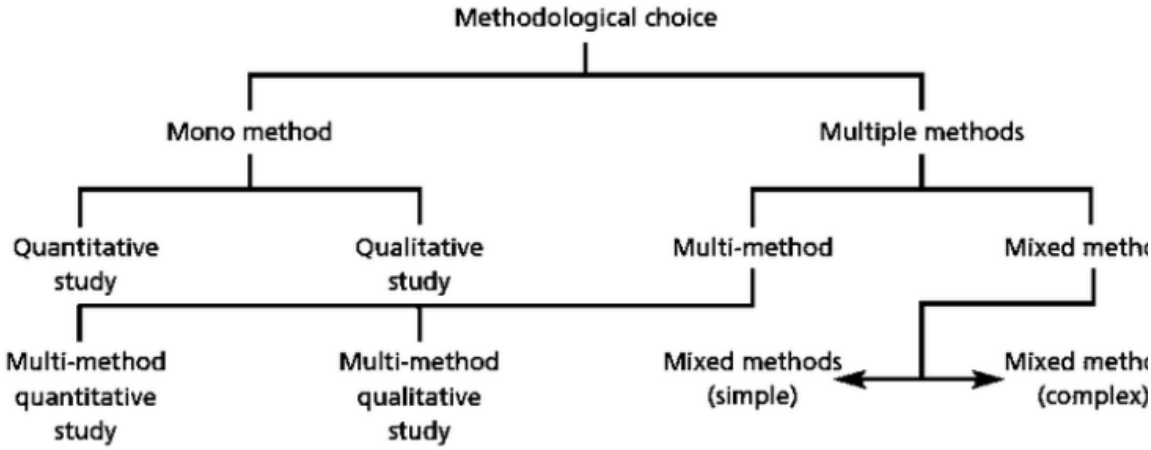


Figure 4.3: Methodological choice
Source: Saunders et al. (2019)

This study adopted the quantitative method as it examined the relationship between dependent and independent variables, which incorporates numerous statistical techniques. The advantage of a quantitative approach is that it places significant importance on objectives and the reliability of findings, encouraging replication (Saunders et al., 2019). The purpose of quantitative research was to obtain an in-depth understanding of the perspectives and personalities of participants. Quantitative research methods were developed in the social sciences to study socioeconomic and behaviour phenomena (Mohajan, 2020). These methods enable researchers to understand people and the social and cultural contexts in which they live. Quantitative research was used in this study to explore the participants' digital banking readiness and digital competencies.

By contrast, quantitative research is a research strategy that focuses on quantification in collecting and analysing data (Bryman & Bell, 2017). It is a type of planned collection of data to describe or predict a social phenomenon as a guide to action or to analyse the relationship between the variables (Oppenheim, 1992). Researchers have characterised this strategy as 'thin' but 'hard and 'generalisable' (McClintock et al., 1979). Previous research (Nettleton & Taylor, 1990; Walker, 2005; Choy, 2014; van Nes & Yamu, 2020) reiterates that quantitative research aims to explain social phenomena in terms of a cause-and-effect relationship and measure events by objective criteria. Researchers who use this strategy should rely on

standardised data collection instruments, such as questionnaire surveys or structured interviews, to use statistical techniques to help interpret data (Mohajan, 2020).

4.3.4 Research strategies

Research strategies are collecting data systems of the research projects or, either practical or hypothetical research (Hernández et al., 2016). Each one can be used for investigative, explanatory, and descriptive research. It may also be used for either the deductive approach or the inductive approach (Yin, 2003). Methods and techniques adopted are according to the problem, and objectives of the research (Kapur, 2018). According to Saunders et al. (2019), there are various strategies as illustrated in Table: 4.2.

The survey method became particularly useful in this study for several reasons. Firstly, it ensured quality in validity and reliability, as this was the methodology applied in past research (Healy & Perry, 2000; Hubbard & Armstrong, 1994; McKinnon, 1988). Secondly, a large sample across an expanded geographic coverage could easily be accessed and enhance representativeness (Blumberg et al., 2014; Mohajan, 2020; Bhattacherjee, 2012). Thirdly, the data are usually collected using structured research modern instruments, such as questionnaires or computer software are used to collect numerical data and use a minimal research team usually in line with budget constraints imposed on doctoral theses (Perry, 1998; Mohajan, 2020). Fourthly, the research objectives, including hypotheses, necessitated the collection and analysis of quantitative data (Field, 2009).

Table 4.2: Research strategies

Definition	Application	References
An experiment is an examination where a hypothesis is tested methodically. It is when scientists actively influence something to observe consequences.	Experiments are usually used in exploratory and explanatory research to get the answer to 'how' and 'why' questions.	Buchanan (1981); McDonough (2017); Alturki (2021); Vizcarguenaga-Aguirre and López-Robles (2020).
A survey is a systematic method of gathering data from a population by sampling a portion of that population and subsequently generalising the attributes of the population from this sample.	Surveys are usually used in quantitative research by using numerically rated items questionnaires or in qualitative research by using open-ended questions, or both strategies by using mixed methods.	Roberts (1999); Ponto (2015); Kapur (2018); Vizcarguenaga-Aguirre and López-Robles (2020).
Archival data strategy is concerned with data gathering and storing for later planned use.	An archival data strategy permits answering research questions that are concerned with the past and fluctuations over time.	Gilliland & McKemmis (2004); Hodder (2017); Das et al. (2018); Subotić, (2021). Robertson (2020); Vizcarguenaga-Aguirre and López-Robles (2020).
The case study is an in-depth analysis of a single event, social situation, individual, community, or process.	It is used to explore practical phenomena in real-life situations.	Yin (1994); Starman (2013); Hernández et al. (2016); Robertson (2020); Vizcarguenaga-Aguirre & López-Robles (2020).
Anthropology strategy describes and explains the social world over the first field study, and it presents social life narratives that are complex and based on a static variable and another socially constructed one.	The anthropologist exists with the local community and gathers life detailed accounts of the traditions and local people's behaviours. It is ingrained in the inductive approach.	Wacquant (2002); Tavory & Timmermans (2009).
Action research strategy is concerned with the resolution study of significant social or	It is used to move social analysis from a linear reason and result framework to a participating	Bowes (1996); Arrowsmith (2 Vizcarguenaga-Aguirre and López-Robles (2020).

administrative subjects together with those who practice these subjects directly.	outline that is inserted in the empirical complications of the research difficulties.	006); Grogan et al. (2007).
Grounded theory is concerned with gathering a logically reliable set of data and investigating actions to discover a theory or develop it.	It is used to answer the "What was going on" question by making substantive or formal theory.	Biles & Biles (2010); Dunne (2011); Reiter et al. (2011); Vizcarguenaga-Aguirre & López-Robles (2020).
Narrative inquiry is considered a philosophical and theoretical approach that turns the researcher to live stories, and as a practical strategy that emphasizes the stories to gather data.	It is suitable for positions when researchers' target is to understand combined and temporally intelligible methods, complex social practices, and life as it exists.	Savin-Baden & Van Niekerk (2007); Coulter et al. (2007); McMullen & Braithwaite (2013).

Source: Saunders et al. (2019)

4.3.3. Time horizon

Methodological choices and related strategies will also influence the selection of appropriate time horizons. Saunders et al. (2019) distinguish two basic time horizons:

1. Cross-sectional
   Cross-sectional research is conducted to investigate variables in various contexts simultaneously (Collis & Hussey, 2014).
2. Longitudinal research

Longitudinal research investigates variables over a longer time (Hernández et al., 2016).

The survey was conducted over eight weeks (from 01 December 2021 to 31 January 2022). Hence, the cross-sectional was employed for this study. Furthermore, the thesis must be completed within a specific timeline, representing a time limit.

4.3.4. Techniques and procedures

Technique and procedures contain the data collection and analysis, data either primary or secondary, samples, designing a questionnaire, and interviews making.

In this study, three primary inquiries were discussed:

- The sampling designs.
- The methods used to collect data.
- The tools used to analyse the obtained data.

4.3.4.1 Sampling design

According to Sekaran and Bougie (2013) state that sampling refers to choosing an appropriate number of elements from the population to certify that a sample study and its properties or characteristics make it possible to generalise such properties to the population elements. Figure 4.4 illustrates the stages that this study went through when conducting sampling.

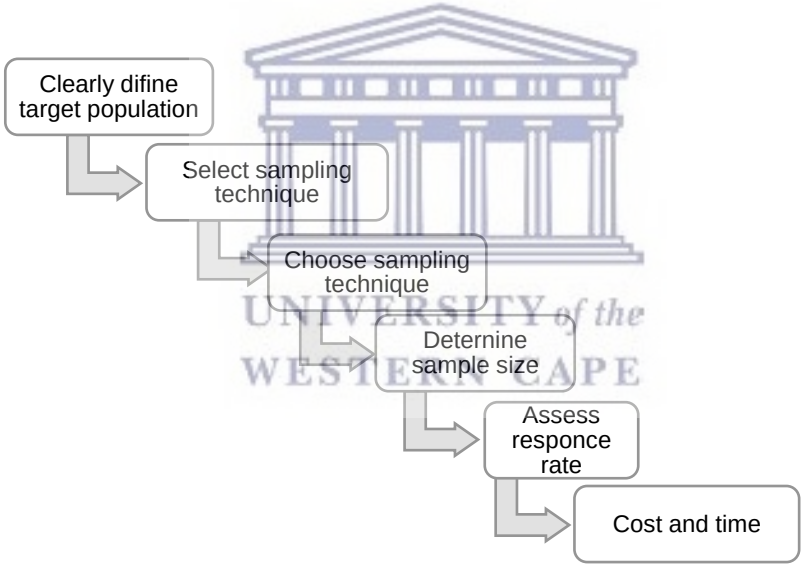


Figure 4.5: Sampling process steps
Source: Adapted from Sekaran & Bougie (2013)

I. Population

Population is the total number of units (individuals, organizations, events, objects, or items) from which samples gets for measurement (Cooper & Schindler, 2018). Further, Saunders et al. (2019) defined population as the full set of a sample collected. Table 4.3 illustrate the population and targeted sample to collect data.

Table 4.3: Population definitions

Criteria	Explanation
Element	The element from which the information is sought. They were South African citizens.
Sampling unit	The sampling unit was defined as South African retail banking consumers above 18 years with a mobile phone.
Extend	The extended research was in Kwazulu Natal and Mpumalanga.
Time	The time of the sample survey was from 01 December 2021 to 31 January 2022.

Source: Adapted from Malhotra (2010)

II. Sampling frame

In this study, the population is represented by retail banking consumers who used or never used digital banking to transact in the South African context. There are two reasons for exploring the study of the overall country. Firstly, the average South African population experienced substantial convergence of digital inequality; it gives this study an in-depth understating of consumer behaviour toward the adoption of digital banking. The data was collected during Covid 19 pandemic restrictions. Hence, the online survey was rolled out to observe Covid 19 restrictions and protocols.

III. Sampling techniques

According to Cooper and Schindler (2018), there are two sampling categories: probability sampling and non-probability sampling. In probability sampling, a sample is selected using random selection so that each unit selected from the population is known and usually equal for all units (Bryman & Bell, 2017). Bryman and Bell (2017) suggest that a researcher is likely to obtain a representative sample when this method of selection from the population is employed because probability sampling aims at keeping sampling error to a minimum.

In the present research, it was found that it might be more desirable for the nature and the purpose of the research to apply non-probability sampling in the form of snowballing technique. Snowball sampling implies that one participant of the target population is asked to direct the researcher to others who are in the same target population. In other words, referrals of participants grow the sample. In this research, the survey link was sent to an employee in South African university. Thereafter, survey link was then distributed to other employees and students in different universities and departments. Another participant also sent it to family and friends across nine provinces. Through these referrals both digital banking users and non-users were reached, since people who know each other trigger the population (Cooper & Schindler,2018).

IV. Sample size

In establishing the appropriate sample size for the study, one major challenge was encountered in defining a large enough sample to satisfy the assumptions of multivariate statistical techniques. The researcher considered optimising costs and time associated with collecting data from a large sample. Three criteria were followed in determining the sample size: (a) minimum sample size to perform analysis, which is considered meaningful, (b) sample sizes used in previous studies, and (c) statistical methods of determining adequate sample sizes.

a) ***Minimum sample size:*** To perform meaningful analysis, methodology specialists recommend that larger samples yield better results (Costello & Osborne, 2005; Boivin & Ng, 2006). The recommended minimum size for studies using multivariate data analysis techniques is at least 300 respondents (Briggs & MacCallum, 2003; Pallant, 2020).

b) ***Sample sizes from past studies:*** Past quantitative studies on digital banking adoption using banking customers used a sample of between 250 and 2000 respondents. For instance, Shambare (2012) used a sample size of 1828; Maduku (2014) used a sample of 394; Mujinga et al. (2016) used a sample size of 324 and Aguidissou et al. (2017) used a sample of 1516 respondents. From these studies, an average size of similar studies is 1015 respondents.

c) ***The statistical method of determining adequate sample sizes:*** When determining a sample size from a large population, researchers often recommend a ratio of the number of items to respondents (Field, 2009; Podsakoff, MacKenzie & Podsakoff, 2012) and indicate a range from 5:1 to 10:1. That is to say, at the upper extreme, for every question (or item), there should be at least ten respondents (Pallant, 2020). Despite a great deal of contestation as to what constitutes a minimum acceptable sample, the 10:1 criterion was applied in this study as a rule of thumb. The questionnaire (see Appendix B) contains 35 items to be factor analysed: this transforms to a minimal sample size of (35 x 10) 350 respondents. The subsequent section highlights the response rate obtained from the study's total sample.

V. Response rate

As depicted in Table 4.4, upon completion of data collection, 338 questionnaires were returned. Out of these questionnaires, 24 were unusable because they were not past pre-screening. This culminated in 338 questionnaires that were retained for data analysis's purpose, giving a 93 percent response rate. Based on recommendations by researchers such as Carley-Baxter et al. (2009) and Morton et al. (2012), in surveys, a response rate which is above 50 percent is considered acceptable. The response rate for this study is presented in Table 4.4.

Table 4.4: Response rate

Description of Parameter	Statistic
Total number of returned questionnaires	362
Unusable responses	24
Valid questionnaires retained	338
Usable response rate	93%

Source: Developed for this research

VI. Cost and time

The availability of costs and research grants impacts the research problems and topics investigated, methodology selected, and the sampling techniques applied (Perry, 1998). This present study was influenced by time and cost constraints in joint with postgraduate studies. The author resorted to online data collection to balance the sampling adequacy of inferential statistical tests and time, cost limitations and Covid 19 restrictions. The questionnaire has been distributed to all nine provinces in South Africa using snowballing sample. As snowballing allows, the researcher asked the participants to forward the survey link to other contacts. 362 responses were received within eight weeks, which was deemed sufficient to satisfy the minimum requirements to test the model. The research's total cost is indicated on the research budget (See Appendix A).

4.3.4.2 Data collection

There are several ways of data collection. According to Fisher (2007), the most common data collection methods are interviews, questionnaires, panels-including focus groups, observation-including participant observation, documents, and databases. To complete this research, the author used primary data. Primary data will be collected through a questionnaire.

In the present study, a questionnaire survey was employed as an instrument for data collection for multiple reasons. First, a questionnaire survey was suitable for the type of data that the researcher gathered as a significant part of the study concerned the respondent's perceptions of digital banking and how these perceptions influence their use of self-service banking. Second, Saunders et al. (2019) point out that questionnaires can be employed to examine and explain relationships between variables, particularly cause-and-effect relationships. There were additional reasons to use a questionnaire survey, including the need for a large sample, the need to cover a wide geographic area across South Africa, and the fact that a questionnaire survey is much cheaper.

The data collection instrument consisted of questions measuring different aspects pertaining to respondents' demographic characteristics, mobile marketing usage profiles, internet familiarity and the parameters. Table 4.5 describes the structure and rationale of the questionnaire.

Table 4.5: Data Collection Instrument

Section	Section summary	Scale development	Rationale
A	Pre-screening.	Developed for this research.	To select suitable respondents for this study.
B	Respondents' demographic characteristics.	Mbah (2010), Developed for this research.	To describe the demographic characteristics of the respondents.
C	Digital banking channels usage.	Beneke (2011), Developed for this research.	To determine the respondents' involvement in digital banking.
D	Factors influencing consumer adoption of digital banking.	Shambare (2012), Maduku (2014), Aguidissou et al. (2017).	To measure the readiness of digital banking and adoption of SSTs banking technologies.

Source: Developed for this research

i. Questionnaire design

Questionnaires are used for descriptive or explanatory research. Explanatory or analytical research will allow a researcher to test and explain relationships between dependent and

independent variables (Saunders et al., 2019). In designing the questionnaires for this study five fundamental issues were considered:

- Categories of questions
- Number and content of questions
- Structure and layout of the questionnaire
- Typical question format
- The wording of question
- The questionnaire for this study consists of the following sections:

Section A

This section includes pre-screening questions, such as age, bank account. These questions are used as the selection criteria to participate in the rest of the study.

Section B

To gauge the respondents' profiles, the demographics, such as gender, age, ethnic group, and highest academic qualification level are being covered.

Section C

The variables are stated in Section C. These include banking profiles such as channels used to transact, mobile banking usage, and smartphone usage. The aim is to establish the self-service banking technology's user patterns.

Section D

It includes all measured independent variable constructs as presented in Table 4.6. The researcher wants to establish the factors that influence the adoption self-service banking technologies. All questionnaires were adapted from previous researchers (Parasuraman 2000; Ratchford & Barnhart, 2012; Elliott et al., 2009; Chang and Kannan, 2006; Rose & Fogarty, 2010; Wood & Moreau, 2006; Mallat & Tuunainen, 2008; Kim et al., 2010; Rogers, 1995, Davis, 1989). Table 4.6 details the adapted questionnaire based on the literature review in Chapters 2 and 3.

Table 4. 6: Research Model questions

Research model	Critical factors	Questions	References
IDT	Relative advantage	Digital banking offers better capability than other banking channels.	Moore and Benbasat (1991); Rogers (1995); Mcknight et al. (2002)
		Adopting digital banking will allow me to conduct banking transactions more efficiently.	
		Digital banking saves time when performing transactions.	
		Adopting digital banking is useful for managing my finances.	
	Observability	Digital banking is convenient.	
		Digital banking is cost effective.	
		Digital banking is easy to use.	
	Structural assurance	I feel safe conducting digital banking transactions because of its cyber security mechanism.	
		I feel safe conducting digital banking transactions because of its data protection policy.	
		I feel safe conducting digital banking transactions because of its customer privacy policy.	
TRI	Optimism	Digital banking is compatible with my lifestyle.	Parasuraman (2000); Ratchford and Barnhart (2012); Elliott et al. (2009); Chang and Kannan (2006); Rose and Fogarty (2010); Wood and Moreau (2006)
		Using digital banking fits well with the way I like to manage my finances.	
		Using digital banking to conduct banking transactions fits into my working style.	
	Innovativeness	I can keep up with the latest banking self-services technologies.	
		I have the necessary resources to use digital banking.	
		I have the necessary knowledge to use digital banking.	
	Discomfort	Digital banking is complex to use.	
		Digital banking requires a lot of effort.	
		Digital banking requires complex setup process.	
	Insecurity	Do you need training or guidance on the use digital banking functions?	

		Have you received training or guidance on the use of digital banking functions?	
		Do you understand security and privacy use of digital banking?	
TAM	PU	I believe using a digital banking would be useful to me.	Suhaimi & Hassan (2018); Venkatesh, and Bala (2008); Davis (1989); Setia et al. (2013); Davis et al. (1989)
		I believe using digital banking would enable me to accomplish transactions more quickly.	
		I believe using digital banking would make my banking easier.	
	PEOU	Learning to use digital banking is easy.	Suhaimi & Hassan (2018); Venkatesh, and Bala (2008); Davis (1993); Setia et al. (2013); Davis et al. (1989)
		Using digital banking is clear and understandable.	
		It is easy to become skilful at using digital banking.	
	PCR	I believe digital bank channels are trustworthy.	Mallat & Tuunainen (2008); Kim et al. (2010)
		I believe digital banks keeps its promises and commitments.	
		I believe digital banks consider customers as a top priority.	

Source: Developed for this research

According to McKinnon's (1988) replication logic was used in creating the structure of the questionnaires. As soon as the information has been collected from respondents in the study, all data were recorded using numerical codes to categorise responses to each item on the research instrument. The 5-point Likert scale was applied with 1= strongly agree, 2= agree, 3= neutral, 4= disagree and 5= strongly disagree. All missing data were also indicated by codes. For example, if a respondent did not indicate gender, code 9 was used. Items with missing data were then excluded from the subsequent analysis of data. A copy of the data collection instrument can be found in Annexure B.

ii. Pilot Questionnaire

Given that the study distributes the survey questionnaire across all provinces in South Africa, Saunders et al. (2019) point out that the pilot test aims to refine the questionnaire without encountering any difficulties answering the questions. Moreover, it will enable the

researcher to assess the questionnaire's validity and reliability (Saunders et al., 2019). Churchill (1999) emphasises the importance of the pre-test when he states that 'the pre-test is the most inexpensive insurance the researcher can buy to assure the success of the questionnaire and the research project'. In the present study, the researcher conducted two pilot tests of the questionnaire. In the first pilot test, the questionnaire was sent to the supervisor (Prof: Shambare), and in the second instance, it was distributed to ten academics at universities.

First, the respondents were asked to complete the questionnaire and then comment on its length, wording, sequence, and instructions. This pilot test revealed that the respondents, on average, spent about 20-30 minutes completing the questionnaire. The researcher received valuable comments on the questionnaire. One of the significant modifications that came out of this pilot was that the scales for Section D of the questionnaires were reduced from 7 to 5 points. The feedback given by respondents was that people tend to be confused and cannot cope well with a seven-point Likert scale for two reasons. Firstly, most research adopted a five-point Likert scale (Shambare, 2012; Maduku, 2014). Therefore, it is expected that once people there get used to one kind of scale is hard for them to deal with other Likert scales. The second reason is that a five-point Likert scale is easier to follow because every scale point has an evident label.

4.3.4.3 Data analysis

The purpose of analysing the collected data is to assess the hypothesis to answer the investigative research questions and objectives. In this research descriptive statistical approach for the data analysis was followed because it is a common method for quantitative business and social research (Saunders et al., 2019). Factor analysis and structural equation model (SEM) were used to examine the relationship between constructs in the proposed model. There entire tests were performed with SPSS plus AMOS version 28 statistical software to test hypotheses and estimate path models involving latent variables observed through multiple indicators.

1. Factor analysis

Factor analysis is a collection of methods used to examine how underlying constructs influence the responses to measured variables. Given the number of techniques available in factor analysis design, it was critical for the researcher to clearly report each step and provide support for why specific choices were made. This enables the evaluation of the research design and the potential for replicability. The researcher outlined the five elements

of factor analysis that were thoughtfully planned, for this study namely: *(a) model of analysis;(b) sample size criteria; (c) method of extraction; (d) rotation method, and (e) criteria for factor.*

Table 4.7: Elements of factor analysis

Elements of factor analysis	**Researcher chosen factor analysis**	**Justification**
Model of analysis	Common factor analysis (CFA)	CFA analyses only the reliable common variance of data. • CFA provides a more accurate result.
Assessment of the suitability of the data	Kaiser-Meyer-Olkin and Bartlett's test of Sphericity	KMO as it tests the adequacy of the sample size. Bartlett's test of Sphericity tests the null hypothesis, H0:
Sample size	338 participants	Tabachnick and Fidell (2007) recommend at least 300 participants. Comrey and Lee (2013) and indicates a sample of one hundred is poor, 200 is fair, 300 is good, 500 is exceptionally good, and 1000 or more is excellent.
Extraction Method	Kaiser's (Eigenvalue) Criterion	In factor analysis, the remarkable factors having eigenvalue greater than one are retained.
Rotation method	Orthogonal factor rotation	It uses several techniques: correlation method, factor analysis, principal component analysis, cluster analysis of symptoms and subjects, latent class analysis, and structural equation modelling (Comrey & Lee, 2013; Henson & Roberts, 1996; Widamen, 2007).

Source: Developed for this research

2. Structural Equation Modelling (SEM)

SEM is designed to evaluate how well a proposed conceptual model that contains observed indicators and hypothetical constructs explains or fits the collected data (Bollen, 1989; Hoyle, 1995; Yoon et al., 2001). It also provides the ability to measure or specify the causal relationships among sets of unobserved (latent) variables, while describing the amount of un-explained variance (Davies et al., 1999; Turner & Reisinger, 2001). The hypothesised model in this study was designed to measure causal relationships among the unobserved

constructs that were set up based on prior empirical research and theory. The SEM procedure was an appropriate solution for this proposed hypothetical model of this study.

4.4 Validity and reliability

To improve the quality of any study, researchers often rely on reliability and validity. The literature consistently points out that reliability and validity are the two critical criteria for evaluating the robustness of any study (Blumberg et al., 2008; Healy & Perry, 2000; Malhotra, 2010).

i. ***Reliability*** refers to the consistency or repeatability of the instrument, using the same procedure, and arriving at the same findings. There are diverse types of reliability namely test re-test, internal consistency, and alternative form. The objective of reliability analysis is to: prevent theory falsification, minimise errors and bias and test the existing theory (Saunders et al., 2019).

   The reliability of the study was explained in the research methodology. The research type, research methods, data collection and data analysis were clarified. The reasons behind those chosen research type and research methods were discussed as well. The data collection methods and data analysis, including the target group were demonstrated comprehensively.

   All stages of the study were demonstrated to assure that similar result, or with slight differences, would be reached in case similar studies are conducted in the future. Therefore, the reliability and consistency of the result are guaranteed.

ii. ***Validity*** addresses the issue of whether the instrument measures what it intends to measure (Saunders et al., 2019). There are diverse types of validity namely construct validity, internal validity, criterion-related validity, and content validity. For this study, construct validity will be used because it is concerned with the fact that measurement questions measure the presence of those constructs such as attitude scales, aptitude, and personality. According to Saunders et al. (2019), construct validity refers to the extent to which the measurement questions measure the constructs that the researcher intended to measure.

The researcher used the following methods: where possible, the items used for the development of the construct were adapted from preceding research to ensure the content validity of the scale will be attained (Macharia & Okunoye, 2013). The researcher consulted with bank employees and specialists on the contents of the questionnaire, using a pilot study. All the extracted and quoted information were referenced carefully to ensure that information can be traced back to the original sources. Therefore, the validity of this study can be guaranteed.

4.5 Limitations of methodology

As with any research, this thesis is not free from limitations associated with the methodology (Shiu et al., 2009). The limitations as they relate to this study are as follows:

a. ***Sample:*** A South African citizen with bank account sample was used in the study; results may therefore not necessarily be generalised to other banking consumer segments.

b. ***Financial constraints****:* since the researchers had a limited budget to conduct the research, aspects of the methodology had to be tailored to the budget. For instance, the thesis's financial constraints influenced the choice of sample and data collection techniques.

c. ***Time constraints****:* This study had to be completed within a specified time frame to meet the doctoral degree requirements. Therefore, specific research designs such as longitudinal methodologies could not have been used.

d. ***Measurement instrument:*** The instrument comprised only structured questions, and respondents were limited to a fixed set of responses.

e. ***Geographic scope:*** the study was restricted to South African citizens, and results may not be generalisable to other settings.

The limitations mentioned above apply to this research and have been considered in discussing the findings.

4.6 Ethical Considerations

To protect research respondents from any potential adverse impact arising from this study, this study followed the regulations and procedures specified by the University of Western Cape Research Ethics Committee. The following measures were implemented:

I. The data collection instrument was submitted to the University of Western Cape Research Ethics Committee to ensure that it conformed to its regulations.

II. Informed consent – research participants were advised of their involvement in the research beforehand. Research assistants explained to all respondents faithfully what they were required to do and their rights as participants of the research, such as their right to pull out from participation at any phase of the research. After this, all respondents' consent was required and protected before the commencement of the survey.

III. Right to privacy – respondents' personal information and sentiments were treated confidentially. Respondents were reminded not to supply details about themself and any other evidence that might indicate their identities.

IV. Dignity - the dignity and character of all participants were upheld and not exposed to uncomfortable behaviour.

V. Honesty – Results of the study were reported honestly even when the results turned out to be contrary or different from the researcher's expectations. Moreover, studies other than the researchers were cited correctly.

4.7 Conclusion

This study explores the justification and reasons for adopting a specific research methodology/design. The researcher structured a methodological framework based on research onion (Saunders et al., 2019). The adopted philosophy is positivism, deductive approach, the mono method quantitative, cross-sectional survey strategy (South African banking consumers), and data were analysed using quantitative confirmatory factor analysis. The following chapter presents the findings that emerged from the data analysis.

CHAPTER 5
DATA ANALYSIS AND RESULTS

5.1 Chapter overview

Chapter 4 described the methodological approaches pertaining to this thesis, including methods applied to collect primary data. Subsequently, the collected data were analysed to assist in answering research questions as well as testing the proposed conceptual model and hypotheses. The results of the data analysis are presented and discussed in this chapter. However, before discussing the results an outline of the various data analysis procedures that were employed in the study is presented. The sections of the chapter, thus, are structured as follows: First, the demographic characteristics of the sample are described. Thereafter, a discussion on the respondents' digital banking and digital banking usage patterns is delineated which is then followed by a discussion outlining the respondents' self-service digital technologies usage. Lastly, tests of hypotheses are presented.

5.2 Introduction

The presentation of the results from the data analysis in this chapter focuses on South African banking customers, the study investigates the behavioural intention to adopt digital banking. To examine the model, the assumption test and the descriptive techniques were applied.

Descriptive statistics involved two steps: In the first step, the reliability and validity of variables in the research model were assessed using Confirmatory Factor Analysis (CFA) or measurement model. To check reliability Cronbach's alpha and construct reliability tests were used. The rule of thumb for either reliability test (Cronbach's alpha or construct reliability) estimate is that 0.7 or higher suggests good reliability. Reliability between 0.6 and 0.7 may be acceptable provided that another indicator of a model's construct validity is good.

Then, based on the results in step one, the data were analysed in step two by applying Structural Equation Modeling (SEM) using Maximum Likelihood Estimation. The goodness of fit assumptions of using SEM archived. In order to evaluate the fitness of the measurement and the structural model; Chi-Square and its associated degrees of freedom, RMSEA, Normed Chi Square as well as TLI and CFI were used as GOF criteria because in line with this Tabachnick and Fidell (2007), and Hair, Black & Anderson (2010) suggested that in order to evaluate the acceptability of the model, the researcher should report one absolute fit index (RMSEA or SRMR), one incremental fit index (CFI or TLI), one goodness of fit index (CFI or

TLI) and one badness of fit index (RMSEA or SRMR) together with Chi-Square and its associated degrees of freedom.

5.3 The demographic characteristics of the sample

The researcher also considered demographic factors affecting consumer digital banking behaviour. Akinci et al. (2004) research focused on academics and their behaviour in the adoption of digital banking services. They explored the demographic, attitude, and behavioral characteristics (Sikantsi, 2019). Supathanish (2010) investigated the barriers to the adoption of digital banking. The study based in Thailand found factors like lack of awareness, lack of perceived creditability, and lack of perception of digital banking. Wai-Ching (2008) tested ten attributes of digital banking adoption in Malaysia and found all of them to be significant. These attributes are the convenience of usage, accessibility features availability, bank management and image, security, privacy, design, content, speed, and fees and charges.

Familiarity with computers and technology is also a key factor that affects the adoption of digital banking (Karjaluoto et al., 2002a; Ghazinoory & AfshariMofrad, 2012; Igbaria et al., 1995; Servon & Kaestner; 2008). The results depicted in Table 5.1 reveal the demographic characteristics of the respondents in terms of, gender, age, income, marital status, province, gross income, and employment, respectively.

Table 5. 1: Demographic profile sample

Demographic characteristics		**Percentage (%)**
Gender	Male	45,3
	Female	55,7
Age	< 35	32.2
	36- 45	37.3
	55+	30.5
Marital Status	Single	43.5
	Married	51.5
	Separated/Divorced	5.0
Highest Qualifications	Grade 12	17.8
	Undergraduate	30.5
	Postgraduate	51.8
Provinces	Gauteng	65.1
	Northwest	5.9
	Limpopo	13.3
	Mpumalanga	2.4
	Free State	2.4
	Eastern Cape	2.7
	Western Cape	7.1
	KwaZulu-Natal	1.2
Cross Income	< R20 000	33.1
	R20 0001.00 – R40 000	34.0
	>R40 001.00	32.8
Employment	Employed	71.6
	Self Employed	10.1
	Unemployed	18.3

Source: Developed for this research

The demographic profile of respondents indicated that females have a higher frequency of 185 (55.7 percent). This implies that females have a better digital banking user experience as compared to males. In line with this finding, a study conducted by Aguidissou et al. (2017); Sikantsi (2019); Rootman and Krüger (2020) indicated that females represent the segment with the highest usage of digital banking. Regarding the age category, most of the respondents with higher frequency are in the category of 36 - 45 years (37.3 percent). This suggests that most digital banking users are middle aged or in other words middle aged adults' customers

have better digital banking adoption as compared to <35 and 55+ aged customers. Related to educational level, most of the respondents are postgraduate degree holders with a frequency of 175 (51.8 percent). This also suggests that educated people having a postgraduate degree and above educational level have better digital banking adoption compared to those who have first-degree education.

Concerning marital status, more than half of the respondents are married with a frequency of 174 (51.5 percent). This implies that married customers have better digital banking adoption as compared to single and divorced counterparts. Table 5.1 indicates the average monthly income category of respondents and it revealed that most of them (34 percent) have an average monthly net income of between R20 000 and R40 000.

This implies that most digital banking adopters are those who have better average monthly net income. Table 5.1 also shows that customers who reside in Gauteng have the highest frequency of 220 (71.6), this implies that Gauteng customer is in an advantageous position to adopt digital banking compared to other provinces in the country. Finally, Table 5.1 shows the employment status of respondents, and it revealed that a greater number of respondents 242 (71.6 percent) were employed which indicate that employed customer has better digital banking adoption as compared to self-employed and unemployed customers.

5.4 Self-service channels used

Table 5.2 established that most of the respondents (78.1 percent) use mobile banking to conduct banking transactions, followed by 64.8 percent using internet banking (web-based). On the other hand, 58.9percent of the respondents revealed that they use cell phone banking (SMS and USSD) to transact. Similarly, 39.9 percent of respondents still use ATMs to conduct banking transactions. Lastly, telephone banking counted for 7.4 percent. Mobile banking services accounted for most of the users of SST mainly because of the strict rule of covid-19. The increased use of mobile banking may be attributed to the increased use of smartphones in South Africa. COVID-19 has fundamentally changed consumers' behaviours in banking industries including using mobile banking as a preferred method of conducting banking transactions. Telephone banking is low in terms of usage; this is in line with (Shambare, 2012).

Table 5. 2: Self-service channels use to transact

Mode	Frequency	Percentage
ATM	135	39.9
Cellphone banking	199	58.9
Contactless	53	15.7
Internet Banking	219	64.8
Mobile banking	264	78.1
Telephone	25	7.4

***Note*:** Percentage exceeded due to multiplicity of the responses
Source: Developed for this research

5.5 Extent to which the self-service channels technologies used

The researcher explores the extent to which self-service channel banking technologies were used. The results on Table 5:3 shows that mobile banking (mean =4.52; SD =1.51) is followed by internet banking (mean =3.87; SD =1.76). Moreover, cell phone banking and ATMs were also among the channels that were frequently used (mean =3.66; SD=1.77, 3.23; SD =1.30 respectively). The consumers' telephone channels remain less frequent (mean =2.17; SD =1.25). Mobile banking and internet banking are data-centric driven technologies; these technologies can be accessed conveniently, anywhere, anytime, and have proven to be the most frequently used.

Table 5.3: Extent do you use self-service channels technologies(1=Never,6=Daily)

Self-Service Technologies: Digital Banking				
	Minimum	**Maximum**	**Mean**	**Std. Deviation**
ATM	1.00	6.00	3.23	1.30
Branch	1.00	6.00	2.17	1.25
Cellphone	1.00	6.00	3.66	1.77
Internet	1.00	6.00	3.87	1.76
Mobile	1.00	6.00	4.59	1.51
Telephone	1.00	6.00	2.00	1.42

Source: Developed for this research

5.6 Zero rating to transact on a mobile device

Figure 5.1 illustrate that out of 338 respondents, 38.17 percent are aware of their bank offering zero-rating to conduct banking using mobile banking, 29,89 percent are not aware of their bank offering zero-rating for accessing self-service channels, and 31,95 percent indicated that they do not know if their bank offers free internet to access self-service channel such as Mobile

banking. According to Louw and Nieuwenhuizen (2020), five central banks in South Africa offer their Mobile banking services as a zero-rated data app which means that no data usage costs will be incurred as agreed upon by internet service providers and mobile network providers for end-users when making use of the app to transact. The zero-rated benefit of using smartphone apps in an environment where broadband data are still relatively expensive offers banks further incentive to adopt a mobile-first strategy (Louw & Nieuwenhuizen, 2020).

Zero rating/Free data for transacting on Self-service technologies: Digital banking

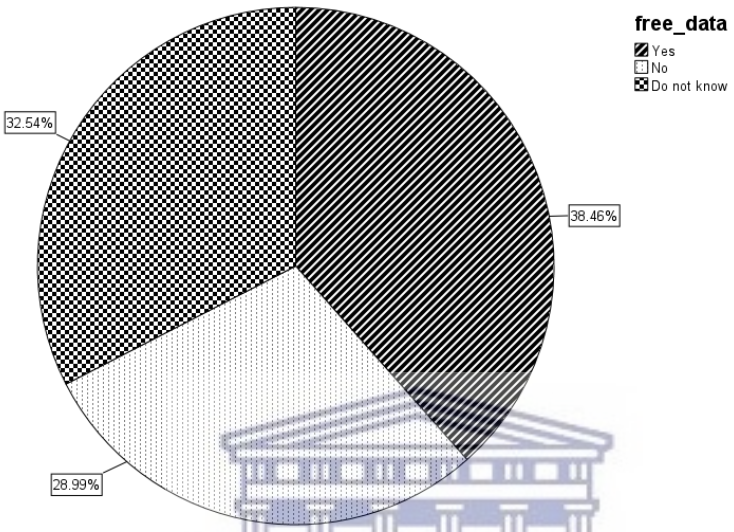


Figure 5.1: Depicts free data/telephone costs to use their self-service platforms
Source: Developed for this research

5.7 Descriptive analysis

Table 5.4 shows the mean and standard deviation of variable in a proposed model. The results shows that the mean of perceived ease, perceived usefulness, observability, structural assurance, perceived creditability, relative advantage is high, which means the respondents expect ease, convenience, and flexibility if they adopt one of the self-service channels in the form of digital banking. Optimism and innovativeness are also high, the consumers are ready to adopt self-service channels in the form of digital. However, discomfort and insecurity show the respondents perceived adoption of digital banking is risky compared to brick-and-mortar bank (Mutahar, Daud, Ramayah, Isaac & Aldholay, 2018). Moreover, behavioural intention in adoption of digital banking in the future is also high (M=4.43; SD = 0.801).

Table 5.4: Descriptive statistics

Construct	Mean	Std. Deviation
Perceived usefulness	4.1538	1.02909
Perceived ease of use	4.0158	.91894
Perceived creditability	4.0158	.91894
Structural Assurance	4.0010	1.01765
Observability	4.3590	.87610
Relative Advantage	4.4098	.86559
Optimism	4.2179	.92382
Discomfort	2.6686	1.45285
Insecurity	1.8866	.95805
Behavioural Intention	4.4260	.80134
Innovativeness	4.4093	.75643
Behavioural Intention	4.4260	.80134

Source: Developed for this research

5.8 Self-Service technologies: digital banking channel preference.

To assess the impact of perceived attributes and personal personality in self-service channel preference in digital banking. It was imperative to compare the service-channel preferences in this study. When consumers prefer certain channel over the other in the digital banking space, they are more likely that will use that channel to transact. Table 5.5 summarised the results of structural modified model. Perceived attribute was statistically insignificant as it was proved in this study. As such predictors (Relative advantage, Observability, Structural assurance) were removed as illustrated on Table 5.5.

Path coefficient analyses were conducted using AMOS 28.0 to assess the self-service channel preferences and the pattern of the causal relationships between the latent constructs (Byrne, 2010; Hair et al., 2010). As seen on Table 5.5, in the case of Internet banking, mobile banking, and cell phone banking, all the causal paths were found to be significant in antecedent perception. As for ATM, however, two causal paths were found to be significant, and one was found to be non-significant (observability → behavioural intentions). Only mobile banking causal paths were found to be significant in antecedent personality. In terms of antecedent customer beliefs, all channels were found to be significant. Digital banking blends web-based banking and mobile banking. It leverages innovative technology and software to provide consumers with everything that a brick-and-mortar bank can do, within the comfort of their

homes, 24/7 access to banking platforms. It is spearheaded by new-age technologies like Internet of Things (IoT), cloud computing, automation, natural language processing, machine learning, robotics, predictive analytics and blockchain to deliver updated banking services (OECD, 2021).

Table 5.5: Self-service technologies: digital banking channel preference

Channel	Antecedent	Hypothesize Relationship	R^2	β	CR	$Pvalue$	$Results$
Internet	Perception	RA->BI	0.314	0.40	2.733	0.006	Significant
		OB->BI		0.15	6.072	0.001	Significant
		SLA->BI		0.14	2.333	0.020	Significant
	Personality	INS->BI	0.223	-0.87	-1.395	0.163	Not Significant
		INN->BI		0.34	4.287	0.001	Significant
		OPT->BI		0.16	2.020	0.043	Significant
	Consumer beliefs	PCR->BI	0.142	0.325	5.056	0.001	Significant
		PU->BI		0.177	2.718	0.007	Significant
Mobile banking	Perception	SLA->BI	0.334	0.17	3.228	0.001	Significant
		RA->BI		0.40	7.742	0.001	Significant
		OB->BI		0.17	1.397	0.162	Not Significant
	Personality	INS->BI	0.261	-0.125	-2.299	0.021	Significant
		INN->BI		0.35	5.082	0.001	Significant
		OPT->BI		0.181	2.681	0.007	Significant
	Consumer beliefs	PCR->BI	0.17	0.337	5/838	0.001	Significant
		PU->BI		0.205	3.479	0.001	Significant
Cell phone banking	Perception	SLA->BI	0.442	0.38	3.944	0.001	Significant
		RA->BI		0.17	6.209	0.001	Significant
		OB->BI		0.21	2.553	0.011	Significant
	Personality	INS->BI	0.349	-0.092	-1.543	0.123	Not Significant
		INN->BI		0.410	5.520	0.001	Significant
		OPT->BI		0.222	3.074	0.002	Significant
	Consumer beliefs	PCR->BI	0.228	0.408	6.301	0.001	Significant
		PU->BI		0.205	3.136	0.002	Significant
ATM	Perception	SLA->BI	0.340	0.25	3.649	0.001	Significant
		RA->BI		0.38	4,656	0.001	Significant
		OB->BI		0.07	0.712	0.477	Not Significant
	Personality	INS->BI	0.27	-0.08	1.035	0.301	Not Significant
		INN->BI		0.279	2.822	0.005	Significant
		OPT->BI		0.277	2.893	0.004	Significant
	Consumer beliefs	PCR-BI	0.164	0.346	4.286	0.001	Significant
		PU->BI		0.189	2.322	0.030	Significant

Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10
Source: Developed for this research

I. Personality on internet

The results on Table 5.5 below demonstrated that he relationship between insecurity and behavioural intention was statistically insignificant (β =-0.87; t =1.395; p value =0.163). Subsequently, relationship between innovation and

behavioural intention; relationship between optimism and behavioural intention is statically significant (β =0.34; t =4.287; p value =0.01 and β =0.16; t =2.020; p value =0.043 respectively). Insecurity, optimism, and innovativeness explain 22.3% of the variance in personal personality. Hypothesized H2a was not supported.

II. Personality on mobile banking

The results on Table 5.5 below demonstrated that the relationship between insecurity and behavioural intention was statistically significant (β =-0.125; t =2.229; p value =0.021). Similarly, relationship between innovation and behavioural intention; relationship between optimism and behavioural intention was statically significant (β =0.35; t =5.082; p value = 0.001and β =0.402; t =2.681; p value =0.007 respectively). Insecurity, optimism, and innovativeness explain 26.1% of the variance in personal personality Thus H2 was supported.

III. Personality on cell phone banking

The results on Table 5.5 below demonstrated that the relationship between insecurity and behavioural intention was statistically insignificant (β =-0,092; t =1.543; p value =0.123). Similarly, relationship between innovation and behavioural intention; relationship between optimism and behavioural intention was statically significant (β =0.410; t =5.520; p value = 0.001and β =0.222; t =3.074; p value =0,002 respectively). Insecurity, optimism, and innovativeness explain 34.9% of the variance in personal personality. Thus, H2c was not supported.

IV. Personality on ATM

The results on Table 5.5 below demonstrated that the relationship between insecurity and behavioural intention was statistically insignificant (β =-0.08; t =1.035; p value =0.301). Similarly, relationship between innovation and behavioural intention; relationship between optimism and behavioural intention was statically significant (β =0.279; t =2.822; p value = 0.005 and β =0.277; t =2.893; p value =0.004 respectively). Insecurity, optimism, and innovativeness explain 27.0% of the variance in personal personality Thus H2d was not supported.

5.9 Assessing normality

Testing the presence of normality is essential in multivariate analysis (Hair et al., 2010).

Consequently, if the data is not normally distributed, it may affect the reliability and validity of the results. IBM SPSS-AMOS 26 was used to test if the data were normally distributed.

5.9.1 Normality Test

The normality test was divided into Univariate Normality and Multivariate Normality Test. Univariate uses skewness and kurtosis to test normality, while multivariate use Mardia's coefficient to test normality. The results of the multivariate test show that the data is normally distributed. Bollen (1989) pointed out that when Mardia's coefficient is less than $p(p+2)$, where p is the number of observable variables, the sample showed that the data is normally distributed. Table 5.6, the Mardia coefficient of 448,374 is less than Mardia's calculated coefficient of 1295. As per Table 5.6 Kolmogorov-Smirnov test was depicted significant

Table 5.6: N.omality Test

			Univariate		Multivariate		Kolmogorov-Smirnov	
Variable	**MIN**	**MA**	**SKEW**	**C.R.**	**Kurtosis**	**C.R.**	**Statistic**	**Pvalue**
bi4	1.000	5.000	-1.518	-11.392	2.123	7.969	0.349	<0.001
bi3	1.000	5.000	-1.533	-11.509	2.155	8.085	0.349	<0.001
bi2	1.000	5.000	-1.548	-11.618	2.235	8.386	0.349	<0.001
bi1	1.000	5.000	-1.548	-11.618	2.235	8.386	0.349	<0.001
inn3	1.000	5.000	-1.333	-10.006	1.679	6.300	0.337	<0.001
ins3	1.000	5.000	.887	6.655	0.180	0.675	0.254	<0.001
ins2	1.000	5.000	.965	7.244	0.277	1.040	0.273	<0.001
ins1	1.000	5.000	.901	6.761	0.172	0.644	0.261	<0.001
dis3	1.000	5.000	.196	1.475	-1.400	-5.252	0.180	<0.001
dis2	1.000	5.000	.584	4.383	-1.220	-4.578	0.258	<0.001
dis1	1.000	5.000	.277	2.080	-1.445	-5.421	0,200	<0.001
inn2	1.000	5.000	-1.322	-9.922	1.525	5.723	0.336	<0.001
inn1	1.000	5.000	-1.248	-9.368	1.364	5.118	0.323	<0.001
opt3	1.000	5.000	-1.097	-8.237	0.837	3.142	0.285	<0.001
opt2	1.000	5.000	-1.127	-8.456	0.884	3.316	0.292	<0.001
opt1	1.000	5.000	-1.111	-8.338	0.839	3.148	0.290	<0.001
sla3	1.000	5.000	-1.080	-8.108	0.733	2.750	0.241	<0.001
sla2	1.000	5.000	-1.137	-8.535	1.060	3.977	0.251	<0.001
sla1	1.000	5.000	-.997	-7.481	0.629	2.361	0.223	<0.001
ra4	1.000	5.000	-1.714	-12.866	3.179	11.931	0.333	<0.001
ra3	1.000	5.000	-1.746	-13,107	3.016	11.319	0,365	<0.001
ra2	1.000	5.000	-1.289	-9.673	1,663	6.242	0.261	<0.001
ra1	1.000	5.000	-1.223	-9.182	1.131	4.244	0.314	<0.001
ob3	1.000	5.000	-1.512	-11.346	2.119	7.953	0.332	<0.001
ob2	1.000	5.000	-1.516	-11.381	2,081	7.808	0.337	<0.001
ob1	1.000	5.000	-1.538	-11.544	2,197	8.243	0.335	<0.001
pcr3	1.000	5.000	-.774	-5.809	0.318	1.193	0.218	<0.001
pcr2	1.000	5.000	-.817	-6.132	0.498	1.870	0.222	<0.001
Pcr1	1.000	5.000	-.817	-6.135	0.495	1.859	0.226	<0.001
peou3	1.000	5.000	-1.416	-10.629	2,191	8.222	0.296	<0.001
peou2	1.000	5.000	-1.617	-12.139	3.022	11.339	0.309	<0.001
peou1	1.000	5.000	-1.470	-11.035	2.426	9.104	0.296	<0.001
pu3	1.000	5.000	-1.337	-10.038	1.274	4.780	0,257	<0.001
pu2	1.000	5.000	-1.378	-10.339	1.203	4.513	0.293	<0.001
pu1	1.000	5.000	-1.228	-9.220	0.899	3.372	0.266	<0.001
Multivariate					448.374	80.988		

Note: Mardia coefficient = p(p+2) =1295
Source: Developed for this research

5.10 Confirmatory factor analysis

This study has followed three major steps for factor analysis: a) assessment of the suitability of the data, b) factor extraction, and c) factor rotation and interpretation.

5.10.1 Assessment of the suitability of the data

To analyse the digital readiness and adoption of self-service banking technologies in South African context, Kaiser-Meyer-Olkin was used to measure the suitability of data for factor analysis. Similarly, Bartlett's test of Sphericity is computed to detect the appropriateness of the data set for functioning factor analysis (Pett, Lackey & Sullivan, 2003).

The value of KMO varies from 0 to 1, and KMO overall should be 0.6 or higher to perform factor analysis (Hair et al., 2010). If not, it is necessary to drop the variables with the lowest anti-image value until the overall rise above 0.6. The KMO values range from 0.773, the smallest, to 0.816, the highest, as demonstrated on Table 5.7. Bartlett's Test of Sphericity and the KMO reveal that both were highly significant and concluded that this variable was suitable for the factor analysis, as demonstrated on Table 5.7.

Table 5.7: KMO and Bartlett's Test of Independent Variables

Constructs	**Bartlett's Test of Sphericity**			**Kaiser-Meyer-Olkin Measure of Sampling Adequacy**
	Approx. Chi-Square	**df**	**Sig**	
Perceived Usefulness	953.214	3	<.001	.774
Perceived Ease of Use	1400.214	3	<.001	.783
Perceived creditability	1867.18	3	.000	.749
Relative Advantage	1420.672	6	<.001	.816
Observability	1336.303	3	<.001	.780
Structural Assurance	1243.076	3	<.001	.777
Optimism	2375.769	3	.000	.793
Innovativeness	1535.660	3	.000	.785
Insecurity	1778.468	3	.000	.773
Discomfort	1001.654	3	<.001	.762
Behavioural Intention	2302.314	6	.000	.890

Source: Developed for this research

5.10.2 Factor Extraction

Kaiser's criterion and Varimax rotation are used to determine the number of initial unrotated factors to be extracted. The eigenvalues associated with each factor represent the variance explained by those specific linear components. The coefficient value less than 0.4 is suppressed that will suppress the presentation of any factor loadings with values less than 0.4.

Table 5.8 demonstrates the eigenvalues and total variance. The extraction method of factor analysis used in this study is principal component analysis followed by varimax rotation in Table 5.9. Before extraction, 35 linear components are identified within the data set. After extraction and rotation, there are ten distinct linear components within the data set for the eigenvalue > 1. The ten factors are extracted accounting for a combined 91.4% of the total variance. It is suggested that the proportion of the total variance explained by the retained factors should be at least 50%. The result shows that 91.5% common variance shared by 35 variables can be accounted by ten factors. This is the reflection of KMO value, 0.816, which can be considered good and indicates that factor analysis is useful for the variables. This initial solution suggests that the final solution will extract not more than ten factors. The first ten component in chronological order has explained 36,7%; 46,6%; 55,2%; 62,1%; 68,6%; 74,5%; 79,7; 84,3%; 88,0%; 91.4% of the total variance with eigenvalue in chronological order 12,8%; 3,4%; 3,0%; 2,4%; 2,2%; 2,0%; 1,8%; 1,6%; 1,3%; 1,1%.

Table 5.8: Eigenvalues (EV) and Total Variance

	Total Variance Explained: Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% Of Variance**	**Cumulative %**	**Total**	**% Of Variance**	**Cumulative %**
1	12.874	36.782	36.782	12.874	36.782	36.782
2	3.441	9.832	46.614	3.441	9.832	46.614
3	3.034	8.669	55.283	3.034	8.669	55.283
4	2.407	6.876	62.159	2.407	6.876	62.159
5	2.282	6.520	68.679	2.282	6.520	68.679
6	2.038	5.822	74.501	2.038	5.822	74.501
7	1.829	5.225	79.726	1.829	5.225	79.726
8	1.611	4.603	84.329	1.611	4.603	84.329
9	1.320	3.770	88,099	1.320	3.770	88.099
10	1.184	3.384	91.483	1.184	3.384	91.483
11	0.930	2.656	94.139			
12	0.267	0.762	94.901			
13	0.241	0.688	95,589			
14	0.168	0.480	96.069			
15	0.153	0.437	96.506			
16	0.133	0.379	96.885			
17	0.123	0.352	97.236			
18	0.106	0.302	97.538			
19	0.091.	0.260	97.798			
20	0.083	0.236	98.034			
21	0.078	0.223	98.258			
22	0.069	0.198	98.455			
23	0.066	0.190	98.645			
24	0.064	0.183	98.828			
25	0.059	0.169	98.997			
26	0.054	0.153	99.150			
27	0.053	0.151	99.301			
28	0.050	0.142	99.443			
29	0.048	0.136	99.579			
30	0.042	0.121	99.700			
31	0.034	0.098	99.798			
32	0.024	0.068	99.867			
33	0.018	0.053	99.919			
34	0.017	0.049	99.968			
35	0.011	0.032	100.000			

Source: Developed for this research

5.10.3 Factor Loading

The researcher has executed the extraction method based on principal component analysis and the orthogonal rotation method based on varimax with Kaiser normalization. Factor loading values communicates the relationship of each variable to the underlying factors. The variables with large loadings values > 0.40 indicate that they are representative of the factor.

The underlying structure of 35 items was analysed using principal component analysis followed by varimax rotation. The factor analyses revealed ten dimensions underlying

customer behaviour in the adoption of digital banking. They are IDT dimensions with factor loadings (relative advantage: F3, observability: F5), Perceived creditability dimension (perceived creditability: F6, structural assurance: F10), TAM dimension (perceived ease of use: F7, perceived usefulness: F9), TRI dimensions (optimism: F1, innovativeness: F1 discomfort: F8, insecurity: F4) and lastly behavioural intention: F2). The total variance is explained by factors as indicated on Table 5.9, which suggests that the 10 factors account for 91.483% of the total variance. Factor values in this study range from 0.77 and 0.96. This higher result of value indicates that the items measured join into a single construct and the items are statistically significant.

Furthermore, the values on Table 5.9 indicate the proportion of each variable's variance that can be explained by the retained factors. Variables with high values are well represented in the common factor space, while variables with low values are not well represented. If the value's communality should be more than 0.5, then proceed to the further step for factor analysis (Mahmood Alwan et al., 2021); otherwise, these variables are removed from the additional factor analysis step. In addition, as illustrated in Table 5.9 all the variables are above 0.5 and the lowest being 0.795 and the highest was 0.974. So, we can proceed with further action for factor analysis.

Table 5.9: Varimax rotation and communalities extraction

	Component										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Communalities**
OPT1	.841										.909
OPT2	.838										.904
OPT3	.837										.896
INN1	.772										.863
INN2	.779										.856
INN3	.772										.862
BI1		.887									.954
BI2		.902									.960
BI3		.882									.948
BI4		.890									.941
RA1			.797								.795
RA2			.773								.799
RA3			.849								.871
RA4			.815								.873
INS1				.953							.955
INS2				.956							.975
INS3				.967							.974
OB1					.921						.952
OB2					.918						.955
OB3					.889						.936
PCR1						.798					.904
PCR2						.805					.914
PCR3						.806					.912
PEOU1							.872				.943
PEOU2							.879				.959
PEOU3							.871				.949
DIS1								.942			.909
DIS2								.929			.894
DIS3								.959			.932
PU1									.934		.899
PU2									.943		.913
PU3									.919		.907
SLA1										.843	.929
SLA2										.862	.947
SLA3										.802	.928
The sum of all communality values is the total communality value											320.23
The percentage of variation explained in our model											0.915

Source: Developed for this research

5.11 Structural equation model (SEM)

In SEM, there is a need to distinguish between dependent and independent variables. SEM assumes the covariance between the independent variables, which is represented by two-headed arrows and the causal relationship from an independent variable to a dependent variable is represented by one arrow. Therefore, the relationship between constructs is specified after transitioning from the measurement model to the structural model.

5.11.1 Measurement model

The measurement model tests (see Figure 5.2) was modified so that it came to represent the theoretical causal model of interest in this study. Indicators with less than 0.30 of coefficient alpha were deleted, and this theoretical model was evaluated and revised until a theoretically meaningful as well as statistically acceptable model was achieved. One of the indicators of destination loyalty on exogenous variables was highly correlated with one indicator in the pull motivation construct. Thus, after examining the model fits of the overall measurement model that excludes the correlated indicator, one indicator was deleted because the model without this indicator produced better-fit indices. The fit of the indicators to the construct and construct reliability and validity were tested. Furthermore, reliability refers to the consistency of measurement, while validity refers to the extent to which an instrument measures what it is intended to measure (Hair et al., 2010).

The results of the measurement model with seven constructs and 35 indicators were derived from confirmatory factor analysis (CFA). This measurement model described the nature of the relationship between latent constructs and the manifest indicators that measured those latent constructs. Three types of overall model fit measures were utilized in this study: absolute fit measures (AFM), incremental fit measures (IFM), and parsimonious fit measures (PFM). An absolute fit index was used to directly evaluate how well the priori theoretical model fits the sample data, and an incremental fit index assessed the proportionate fit by comparing a target model with a more restricted, nested baseline model (Hu & Bentler, 1999). A parsimonious fit measure was used to diagnose whether model fit has been achieved by over fitting the data with too many coefficients.

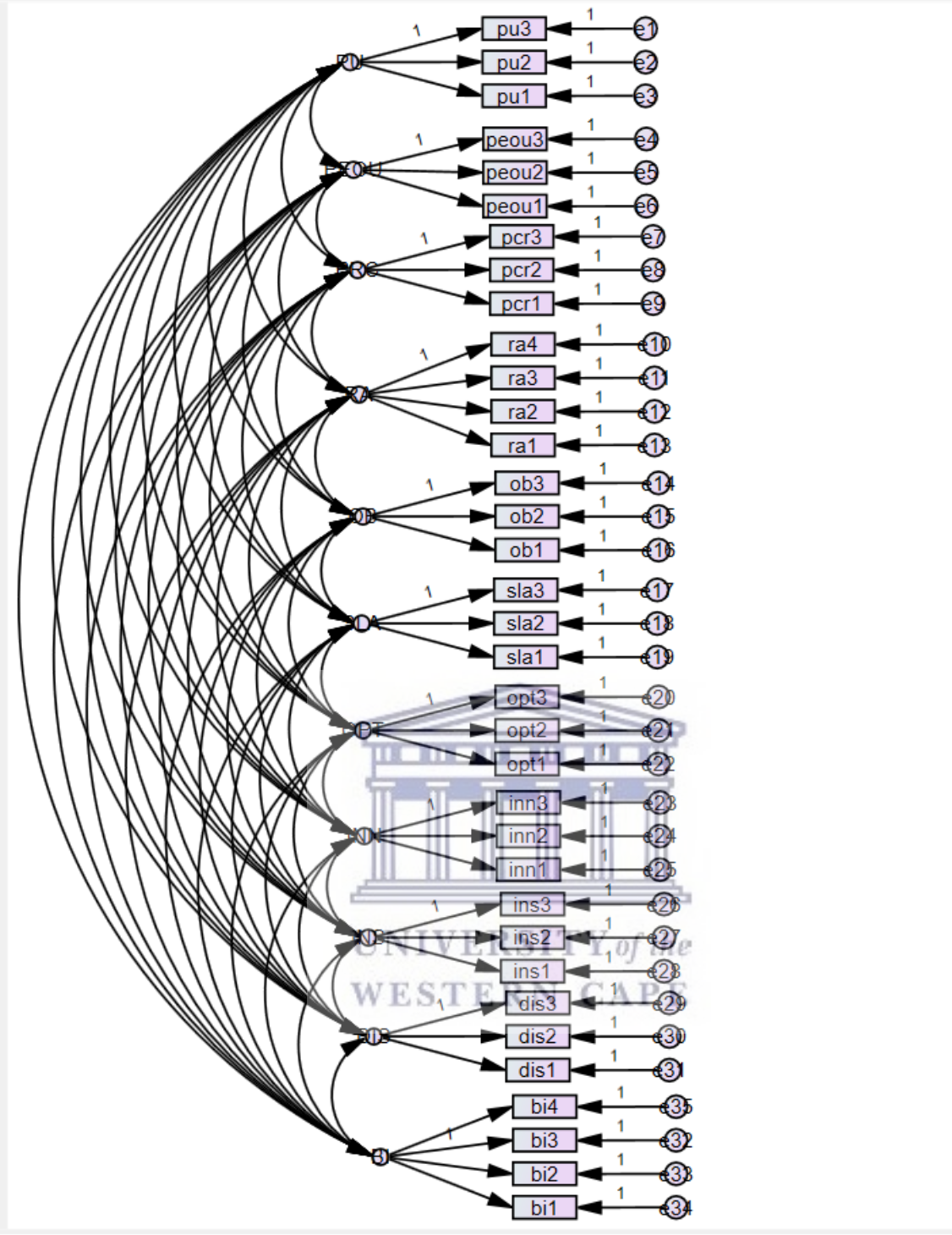


Figure 5.2: Depict measurement model
Source: Amos 28 – Developed for this study

Some fit indices should be considered to assess the model goodness-of-fit (Kline, 2016; Hair et al., 2010). The researcher adopted the maximum-likelihood method to estimate the model's parameters, where all analyses were conducted on variance-covariance matrices (Hair et al., 2010). First, it was determined using the Chi-square(χ^2) p-value. The χ^2 computed for this data yielded a statistically significant result at the p value = 0.000. These results would lead us to

reject our hypothesis that this model is a good representation of the data. However, the chi-square(χ^2) statistic is not without its problems. Dickey (1996) argues that the "chi-square(χ^2) statistics are largely inflated by sample sizes and must be used with considerable" caution". Previous researchers also caution against using the chi-square statistic and suggest using other test statistics such as the RMSEA (Fan, 1996). In this study, Chi-square was not considered to assess the model goodness-of-fit. The chi-square may be helpful only when comparing different CFA models to help see which is the best fit for the data (Robert, 1999).

In this study, all three types of goodness of fit indices indicated that the overall measurement model was acceptable in that the proposed model fit the collected data with a sample size of 338.: w 2 (36) =43.87, p value=0.17, goodness-of-fit index (GFI)= 0.95, root mean square residual (RMSR)=0.03, root mean square error of approximation (RMSEA)=0.03, adjusted goodness-of-fit (AGFI)=0.91. non-normed fit index (NNFI)=0.96. parsimonious normed fit index (PNFI)=0.59, comparative fit index (CFI)=0.97. incremental fit index (IFI)=0.979, and relative fit index (RFI)=0.85 (Table 4). After assessing the overall model, the psychometric properties of each latent construct were evaluated separately through examining the completely standardized loading, error variance, the construct reliability, and the variance extracted.

Table 5.10 shows the results of the Chi-square test with the degree of freedom (505) which is within the range of the number of distinct sample moments (665) and the number of distinct parameters to be estimated (160). The ratio of the χ^2 statistic to its degree of freedom (χ^2/df) was used, with a value of less than 5 indicating an acceptable fit (Hair et el., 2010; Byrne, 2010; Hu & Bentler, 1999). Hair et al. (2010) suggested the following indices indicate Normed Fit Index (NFI); Root Mean Square Residuals (RMSR); Comparative Fit Index (CFI); the Root Mean Square Error of Approximation (RMSEA). The RMSEA is an error of approximation index that assesses how a model fits well in the population (Steiger & Lind, 1980). RMSEA is a fit adjusting for the model parsimony and is a population-based index. The CFI is a statistic that performs well even when the sample size is small (Tabachnick and Fidell, 2007; Bentler, 1990, Hair et al.,2010)

The measurement model revealed the following results Chi-square value of 919.91; df= 505; χ^2/df= 1,820. CFI for the model was 0.978, which is above a recommended cut-off of 0.90. NFI of the model was 0.952, which is above the recommended cut-off. The point of noting was the value of RMSEA of 0.049, which is higher than the recommended cut-off of ≤0.08. Similarly, all the values are above-recommended cut-off, as illustrated in Table 5.10.

Table 5.10: Depict model fit summary

Model Fit Summary			
Model Goodness-Fit Indexes	**Recommended cut-off**	**Result Model**	**Comment**
Chi-square/DF		919.91/505	Acceptable
Chi-square/df	≤5.00	1.820	Acceptable
NFI	≥ 0.90	0.952	Acceptable
CFI	≥ 0.90	0.978	Acceptable
IFI	≥ 0.90	0.974	Acceptable
TLI	≥ 0.90	0.974	Acceptable
PNFI	>0.60	0.808	Acceptable
PCLOSE	>0.05	0.579	Acceptable
SRMR	< 0.06	0.031	Acceptable
RMSEA	≤0.08	0.049	Acceptable

*Note: N = 338, *p <0.05*
Source: Developed for this research

5.11.2 Reliability and Validity

This study used validity and reliability for evaluating its robustness (Blumberg et al., 2008; Healy & Perry, 2000; Malhotra, 2010). The results are demonstrated on Table 5:11.

1. Reliability

There are two common measures of construct reliability: Cronbach alpha and composite reliability. Coefficient alpha is used as a more conservative measure of items, and it estimates the multiple item scale's reliability. The internal reliability of a construct is said to be achieved when the Cronbach's Alpha value is 0.7 or higher (Nunnally, 1978; Bagozzi & Yi, 1988**;** Pallant, 2020; Field, 2009; Fornell & Larcker, 1981). The loading values should be higher than 0.70, and it should be considered for deletion if removal of the indicator with a loading of 0.4 and below.

Unlike Cronbach alpha, which the non-PLS model usually uses, composite reliability does not assume an equivalency among the measure with the assumption that indicators are equally weighted (Chin et al., 1992). Composite reliability is more concerned with individual reliability, referring to different outer loadings of the indicator variables (Hair et al., 2010). The cut off for composite reliability is the same as any measure of reliability, and a score

between 0 .6 and 0.7 is a good indicator of construct reliability (Fornell & Larcker, 1981, Hamid et al., 2017). In this study, the researcher tested both Cronbach using SPSS 28.0 and composite reliability using IBM SPSS-AMOS 26; both achieved above 90, which means the scale's internal consistency is acceptable, as illustrated on Table 5.11.

.

2. Validity

According to Hair et al. (2010), validity is defined as "the extent to which a set of measured variables represent the latent theoretical construct they are designed to measure". It examines how well the results obtained from a measure fit the test's theories (Bryman & Bell, 2017; Saunders et al., 2019; Hamid et al., 2017). Validity addresses the issue of whether the researcher is measuring what they intend to measure (Saunders et al, 2019).

- ***Content validity***

  The content validity of the study was assured through an in-depth literature review and expert opinion (academics, industry researchers). Further, a pilot survey was conducted to test the questionnaire. All items included in the questionnaire were suitable for further proceeding. Measurement scales used in the current study were adopted from past studies, including Perceived ease of use (Rauniar et al., 2014), Perceived usefulness (Choi & Chung, 2013; Rauniar et al., 2014), behavioural intention (Choi and Chung, 2013) and IU (Agarwal & Prasad, 1998). Since the study adopted scales from several previous studies, factor analysis was done to verify the underlying structure of the variables before it proceeds with further analysis.

- ***Construct Validity***

  Construct reliability is concerned with how a researcher measure what is intended to assess. Construct validity is associated with both positivist and quantitative research. It provides answers to whether the instrument used in the test tap the actual concept theorised in the study. Construct validity was examined by convergent validity and discriminant validity.

Table 5.11: Depict construct reliability and convergent validity

	Constructs	Items	Factor loadings >0.5	Composite Reliability (CR) (.0.7)	AVE= $\sum \lambda^2/n$ (>0.5)
TAM	Perceived Usefulness	PU1	0.936	0.946	0,.853
		PU2	0.946		
		PU3	0.919		
	Perceived Ease of Use	PEOU1	0.872	0.974	0.926
		PEOU2	0.879		
		PEOU3	0.871		
	Perceived creditability	PCR1	0.798	0.986	0.960
		PCR2	0.805		
		PCR3	0.805		
IDT	Relative Advantage	RA1	0.788	0.943	0.806
		RA2	0.773		
		RA3	0.849		
		RA4	0.816		
	Observability	OB1	0.921	0.971	0.918
		OB2	0.918		
		OB3	0.889		
	Structural Assurance	SLA1	0.843	0.966	0.906
		SLA2	0.862		
		SLA3	0.803		
TRI	Optimism	OPT1	0.840	0.994	0.983
		OPT2	0.837		
		OPT3	0.837		
	Innovativeness	INN1	0.780	0.979	0.940
		INN2	0.773		
		INN3	0.773		
	Insecurity	INS1	0.953	0.984	0.954
		INS2	0.966		
		IN3	0.967		
	Discomfort	DIS1	0.942	0.949	0.861
		DIS2	0.929		
		DIS3	0.959		
TAM	Behavioural Intention	BI1	0.887	0.983	0.934
		BI2	0.901		
		BI3	0.882		
		BI4	0.890		

Source: Developed for this research

- ***Convergent Validity***

  Convergent validity is how a measure correlates positively with an alternative measure of the same construct. The average variance shared between a construct and its measures should be greater than that shared with the other constructs in the same model (Hamid et al., 2017). In examining the convergent validity of a measure in Amos 26, the average variance extracted (AVE) and item factor loadings are assessed (Hair et al., 2010). AVE value equal to or higher than 0.50 indicates that, on average, the construct explained more than half of the variance of its indicators. Moreover, an AVE with a lesser value than 0.50 suggests that more error remains in the items than the average variance explained by the constructs. The rule of thumb is that an AVE value greater or equal to 0.50 is acceptable (Hair et al., 2010; Fornell & Larcker 1981; Hamid et al., 2017). Table 5.12 indicate that all AVE are above 0,5, in line with (Hair et al., 2010; Fornell & Larcker, 1981).

- ***Discriminatory validity***

  Discriminant validity is concerned with the uniqueness of a construct, whether the phenomenon captured by a construct is deviating and different from other constructs in the model (Hair et al., 2010). The discriminant validity can be assessed by comparing the square root of the AVE values with latent variable correlations (Fornell & Larcker, 1981). The square roots of AVE coefficients are presented in the correlation matrix along the diagonal. The squared root of each construct's AVE should be greater than its highest correlation with any other construct to evidence discriminant validity (Hair et al., 2010). Table 5.12 indicate that all the constructs are unique and distinct, and as a factor correlation coefficient for all construct is less than 0.85. This is in line with the recommendation by (Kline, 2016).

Table 5.12: Depict discriminant validity by Fornel-Lacker criterion

Construct	PU	PEOU	TR	OB	PCR	SLA	OPT	DIS	INS	INN	BI
PU	**0.924**										
PEOU	0.269	**0.962**									
PCR	0.119	0.462	**0.980**								
OB	0.233	0.452	0.390	**0.958**							
RA	0.239	0.499	0.510	0,391	**0.898**						
SLA	0.122	0.449	0.564	0,384	0.436	**0.952**					
OPT	0.153	0.342	0.453	0.277	0.318	0.512	**0.991**				
DIS	-0.044	-0.037	0.008	-0,065	-0.050	0.143	0.049	**0.928**			
INS	0.014	-0.217	-0.242	-0,122	-0.205	-0.168	-0.158	0.182	**0.977**		
INN	0.118	0.410	0.408	0,307	0.463	0.505	0.610	0.081	-0.200	**0.969**	
BI	0.215	0.379	0.401	0,366	0.537	0.413	0.420	-0.017	-0.240	0.480	**0.967**

Source: Developed for this research

5.11.3 Structural Model

The second model is a structural model. Structural model, also known as a path, is a statistical technique used to examine causal relationships between two or more variables. Structural model in path models represents the hypotheses of the researcher. The sample suggests a good fit of the model. The Goodness of fit index measures the fit between observed and predicted from the proposed model. It calculates the minimum discrepancy function necessary to achieve an acceptable fit under maximum likelihood conditions (Steiger, 2007).

Goodness of Fit Index takes values of ≤ 1, where 1 represents an acceptable fit. The proposed model was tested, and the following results were observed from Table 5.13, Chi-square value of 1325.823/df= 536; χ^2/df= 2.474. GFI for the model was 0.812, which is below the recommended cut-off of 0,90. RMSR was 0.200, which is below the recommended cut-off of 0.06 RMSEA value for the model was 0.066, which is within recommended cut-off of ≤0.08. All other values are within the recommended cut-off of 0.95, as demonstrated in Table 5.13. Although the proposed model fit the model. The path between BI -> PU (t =1,1593, p value=0.111) was non-significant and a path between BI ->TR (t =1,213, p value =0.225) was non-significant.

The path was statistically significant. Deleting the non-significant path is not just improving parsimony but also improving the RMSEA in terms of p value. The researcher deleted the non-significant and isolated mediating variables with the dependent variable. The next step was to delete other variables recommended by AMOS and test the model. All IDT constructs, one TRI construct and perceived creditability antecedent in the form of structural assurance were

removed from the model. The next step was to evaluate models individually, i.e., IDT constructs with TAM mediators (perceived ease of use, perceived usefulness, and perceived creditability) and technological readiness with TAM mediators (perceived ease of use, perceived usefulness, and perceived creditability).

Table 5.13: Depict model fit summary of structural model

Model Fit Summary			
Model Goodness-Fit Indexes	**Recommended cut-off**	**Result Model**	**Comments**
Chi-square		272,277/194	Acceptable
Chi-square/df	≤5.00	1.406	Acceptable
GFI	≥ 0.90	0.812	Acceptable
AGFI	≥ 0.90	0.779	Acceptable
NFI	≥ 0.90	0.970	Acceptable
CFI	≥ 0.90	0.994	Acceptable
IFI	≥ 0.90	0.994	Acceptable
TLI	≥ 0.90	0.993	Acceptable
PNFI	>0.60	0.808	Acceptable
PCLOSE	>0.05	0.998	Acceptable
SRMR	< 0.06	0.034	Acceptable
RMSEA	≤0.08	0.035	Acceptable

Source: Developed for this research

Model 1. was tested individually to check which variables in these two antecedents' variables is a critically affect the adoption of digital banking. As demonstrated in Table 5.14, the mediation path analysis (path connected to the dependent variable) was used as a gatekeeper to evaluate the critical construct that affects the adoption of digital banking. If the mediation paths for any specific models listed below are non-significant, then the construct is deemed to be non-critical in affecting the adoption of digital banking in this study.

This study model was tested individually to examine which antecedent variables critically affect the adoption of digital banking. The mediating path was non-significant (β = 0,58; t = 1,118; p value =0.263), above the threshold of 0.05(see Table 5.14). Then based on this study, if the criteria were not met, then the antecedent's variable that is insignificant gets deleted.

Table 5.14: Depict the IDT model results

Relationship	Estimates	Critical Value	P value	Path	Results
PCR <---SLA	.350	8.910	<0.001	Direct effect	Significant
PCR<---OB	.137	3.182	0.001	Direct effect	Significant
PCR <---RA	.316	6.821	<0.001	Direct effect	Significant
CPR <---SLA	.126	3.176	0.001	Direct effect	Significant
BI <---RA	.368	7.727	<0.001	Direct effect	Significant
BI <-- OB	.123	2.940	0.003	Direct effect	Significant
BI<---CPR	.058	1.118	0.263	Mediating effect	Non-Significant

Source: Developed for this research

The next step was to evaluate model 2(Personal personality with consumer beliefs). Personal personality was mediated by perceived usefulness, perceived ease of use and perceived creditability. The mediating path BI <-CPR has positive effect (β =0,183; t = 3,464; p value =0,01) and BI <-PU has positive effect (β =0.273; t = 4,870; p value =0,08) thus both are statistically significant. Based on these results, the TRI model was adopted for this research. Hypotheses were tested using this model.

The parameters of a structural model are the variances, regression coefficients and covariances among variables. Figure 5.3 illustrate a typical modified structural model along with its key components.

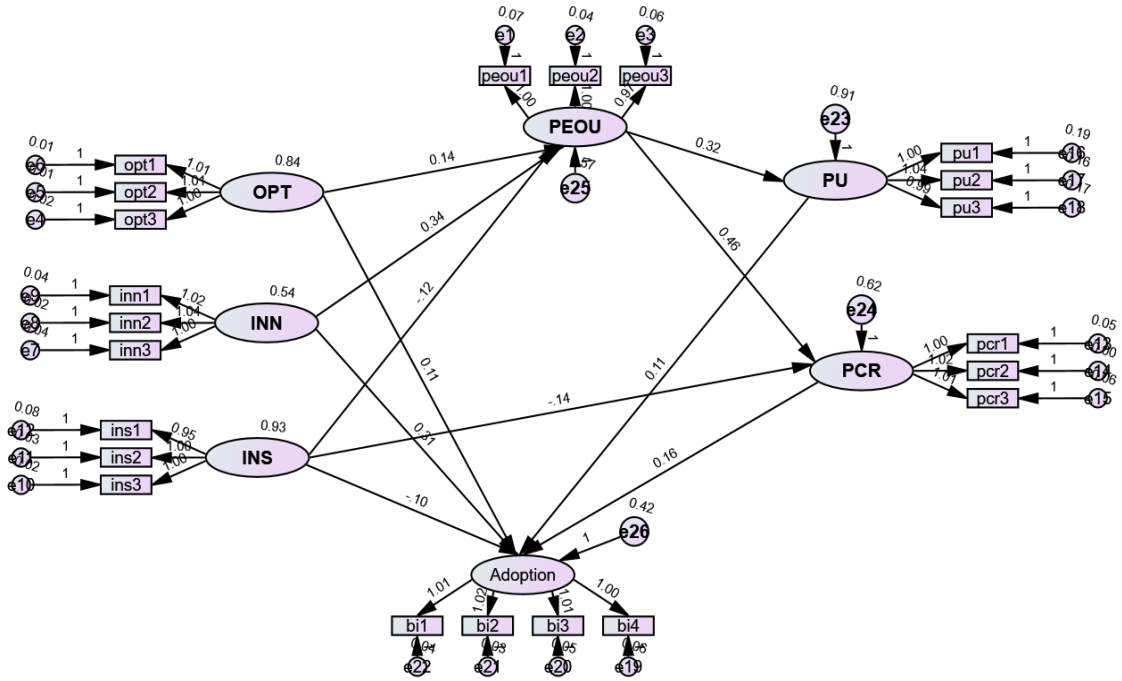


Figure 5.3: Modified structural model
Source: Developed for this research

In comparing model fit for three models, as depicted on Table 5.15. The results show that model fit has improved. GFI has improved from 0.812 below the threshold of >0.90 to 0.934. AGFI has improved from 0/779 below the threshold of 0.90 to 0.914. Overall, there was an improvement in all model values; the point of noting SRMR was improved from 0.200 below the threshold of 0.06 to 0.041 above the cut-off threshold, and RMSEA improved from 0.066 to 0.034. Based on this comparison, the TRI model was adopted as the final model used to test hypotheses, mediation, and moderation effect.

Table 5.15: Depict Comparison of structural model fit.

Model Fit	Proposed Model	IDT Model	TRI model
Chi square	1325,823	244,609	272,771
DF	536	109	194
D/F	2.472	2.244	1.406
GFI	0.812	.923	0.934
AGFI	0.779	,.89.	0.914
NFI	0.931	.972	0.979
RFI	0.924	.966	0.975
IFI	0.958	.985	0.993
TLI	0.953	.981	0.994
CFI	0.958	.984	0.994
RMSEA	0.066	.061	0.034
SRMR	0.200	0.041	0.035
PCLOSE	Not estimated	0,041	0.998

Source: Developed for this research

5.11.4 Modified structural model.

The researcher removed all paths that were statistical non-significant in terms of chi-square difference or critical ratio test of the significance of the structural coefficients. The researcher follows previous researchers who indicated that modifying the model is an important part in structural model (Byrne, 2010). The next step to test the relationships between the exogenous and endogenous latent variables, which can be done during the structural model stage (Hair et al., 2010).

Before testing the hypotheses, it is imperative to follow the same criteria to measure the goodness-of-fit for the final model as suggested by (Hair et al., 2010). The models were accessed using several indices. If the model's fitness were high, its usability would be satisfactory. The model fit results indicated that the model sufficiently fits well in the sample. All the goodness-of-fit indices were satisfied with their relative thresholds recommended by (Hair et al., 2010; Hu & Bentler,1999; Tabachnick & Fidell, 2007). The results are as follows: Chi-square =272,771; df =194; CMIN/DF = 1.406; GFI =0.934; AGFI =0.914; CFI =0.994; NFI=0.979; RMSEA= 0.034; SRMR= 0.035; pvalue= 0,998. Moreover, all the results are illustrated in Table 5.16.

Table 5.16: Model fit summary of modified structural model

Model Fit Summary – Structural model			
Model Goodness-Fit Indexes	**Recommended cut-off**	**Result Model**	**Comment**
Chi-square/DF		272,277/194	N/A
Chi-square/df	≤5.00	1.406	Acceptable
GFI	≥ 0.90	0.934	Acceptable
AGFI	≥ 0.90	0.914	Acceptable
NFI	≥ 0.90	0.979	Acceptable
CFI	≥ 0.90	0.994	Acceptable
IFI	≥ 0.90	0.994	Acceptable
TLI	≥ 0.90	0.993	Acceptable
PNFI	>0.60	0.808	Acceptable
PCLOSE	>0.05	0.998	Acceptable
SRMR	< 0.06	0.034	Acceptable
RMSEA	≤0.08	0.035	Acceptable

Source: Developed for this research

Table 5.16 indicates that the structural model fit was acceptable. The next step was to examine the relationship between the exogenous and endogenous latent variables. For hypotheses testing purposes, parameter estimates, coefficients and the level of statistical significance are often expressed as p value. Parameter estimates generate the estimated population covariance matrix for the model (Tabachnick & Fidell, 2007). Coefficient values are derived by dividing the variance estimate by standard error (S.E). When the critical value (C.R.) is greater than |1,96| for a regression weight (standardised estimate), the parameter is statistically significant at the 0.05 level. Byrne (2010) argues that the larger sample sizes are associated with larger standardised residuals because the size of the standard errors of the fitted residuals is often inversely related to sample size. For this reason, he recommended the use of larger cut-off values such as |2.58|, which corresponds to the 0.01 level.

5.11.5 Assessment of predictive power of the model

Coefficient of determination (R^2) measures the model's predictive accuracy. Another way to view R^2 is to represent the exogenous variable's combined effect on the endogenous variable(s). This effect ranges from 0 to 1, with 1 representing complete predictive accuracy. Though R^2 is a valuable tool in assessing the quality of a SEM model, too much reliance on R^2 can prove problematic.

Coefficient of determination R^2 represents the endogenous construct's amount; this study represents perceived ease of use, perceived usefulness, perceived creditability, and behavioural intention as illustrated on Table 5.17. Consequently, if researchers attempt to compare models with different specifications of the same endogenous constructs, reliance only on R^2 may result in the researcher selecting a less efficient model. For example, the R^2 will increase even if a non-significant yet slightly correlated construct is added to the model. As a result, if the researcher's only goal is to improve the R^2, the researcher would benefit from adding additional exogenous constructs even if the relationships are not meaningful. Instead, the decision for a model should be based on the adjusted R^2, which penalises increasing model complexity by reducing the (adjusted) R^2 when additional constructs are added to the model.

Table 5.17: Squared Multiple Correlations

Constructs	**R^2(Squared Multiple Correlations**
Perceived Ease of Use (PEOU)	0.20
Perceived creditability (TR)	0.325
Perceived Usefulness (PU)	0.72
Behavioural Intention (BI)	0.32

Source: Developed for this research

5.11.6 Modified structural model hypothesis testing

As depicted in Figure 5.18, all hypotheses were evaluated using structural equation modelling with AMOS software version 28.0. Table 5.18 displays the results of the structural path analysis, which provide the rationale for evaluating the hypotheses. The p-values associated with each standardised path estimate are used to determine significance at an alpha level of 0.05.

Table 5.18: Structural path analysis result

Hypothesis	Relationship	Estimate	SE	CR	P-value	Findings
H1	PEOU <--- INS	-.0136	.045	-2.652	.008	Supported
H2	PEOU<--- INN	0.309	.074	4.651	***	Supported
H3	PEOU<--- OPT	0.140	.058	2.179	.029	Supported
H4	PCR<--- INS	-.0121	.044	-2.582	.010	Supported
H5	PCR <--- OPT	0.323	.048	6.638	***	Supported
H6	PCR <--- PEOU	0.317	.053	6.533	***	Supported
H7	BI <--- INS	-0.120	.039	-2.520	,012	Supported
H8	BI <--- INN	0.294	.064	4.930	**.	Supported
H9	BI <--- OPT	0.118	.052	1.966	.05	Supported
H10	BI <--- CPR	0.183	.046	3.464	***	Supported
H11	BI <--- PU	0.144	3.024	3.024	.002	Supported
H12	PU <---PEOU	0.273	.065	4.870	***	Supported

Notes: **** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10*
Source: Developed for this research

Testing the hypotheses indicated that the insecurity variables have a negative effect on perceived ease of use (β =-0.136; t = -2.662; p value =0.08). Innovativeness has positive effect on perceived ease of use (β =0.309; t = 4.651; p value <0,01) were related to adoption of SST in the form of digital banking. Optimism has positive effect on perceived ease of use (β =0.140; t = 2.179; p value =0.29) were related to adoption of SST in the form digital banking. Insecurity has negative effect on perceived creditability (β =-0.121; t = -2.582; p value =0.010). Optimism has positive effect on perceived creditability (β =0.323; t =6.638; p value =0.05). Insecurity has negative effect on behavioural intention (β =-0.120; t = -2.520; p value =0.012).

Innovativeness has positive effect on behavioural intention (β =0.294; t = 4.930; p value =0.01). Optimism has positive effect on behavioural intention (β =0.118; t = 1.966; p value =0.05. Perceived creditability has positive effect on behavioural intention (β =0.183; t = 3.464; p value =0.01). Perceived usefulness has positive effect on behavioural intention (β =-0.144; t = 3.024; p value =0.02) were related to adoption of digital baking. Perceived ease of use has positive effect on Perceived usefulness (β =0.273; t = 4.870; p value =0.08). In conclusion, the results show perceived creditability, innovativeness, optimism, and perceived usefulness have a stronger effect on behavioural intention to adopt digital baking.

The coefficient of determination for this proposed model shows that perceived optimism, innovativeness, and insecurity explain 20% of the variance in perceived ease of use.

Insecurity, optimism, and perceived ease of use explain 32.5% of the variance in perceived creditability. Insecurity, optimism, innovativeness, and perceived ease of use explain 32% of behavioural intention variables. Perceived ease of use explains 72% of the variable in perceived usefulness, as illustrated in Table 5.7. The R^2 of the perceived usefulness in the current study is considered substantial (Hair et al., 2010). The findings supported the role of perceived ease of use and perceived usefulness on behavioural intention to adopt digital banking.

5.11.7 Mediation

Mediation represents a situation in which a mediator variable, to some extent, absorbs the effect of an exogenous on an endogenous construct in the path model. The researcher employed AMOS (a covariance-based SEM application) to run mediation analysis by assigning the value of 3000 bootstrap samples and the biased corrected interval at 95% (Hair et al., 2010). AMOS can be used to test any complicated interdependent model (involving more than one mediation equation), and we can run parallel and sequential mediation in a single model without breaking it into parts. Subsequently, sequential/serial mediating was used to examine the effect of multiple mediations in the adoption of SST in the form of digital banking, as illustrated on Figure 5.4. Serial mediation applied for this study where variables affect each other in a chain.

Three steps in this study were carried out to evaluate the influence of the mediation.

(1) determining whether the indirect effect is present (i.e., statistically significant).

(2) classifying whether the mediate effect is either partial or full.

(3) determining whether the indirect effect is non-significant; thus, there is no mediation.

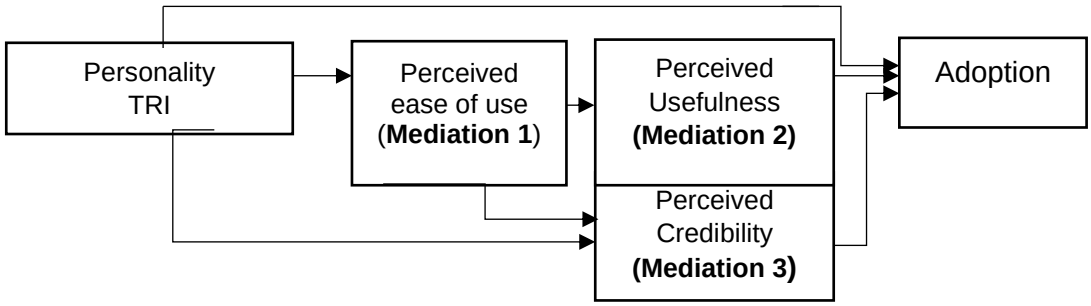


Figure 5. 4: Depict sequential or parallel mediation
Source: Developed for this research

The perceived ease of use and perceived usefulness significantly mediate the relationship between insecurity and behavioural attention (β =-,.004; t =2.333; p <0.05; CI [-0.21, -0,002] amongst digital banking adopters. Moreover, perceived ease of use and perceived usefulness found to significantly mediate the relationship between insecurity and behavioural intention amongst the SST adopters in the form of digital banking (β =-.007; t =2.333; p <0.05; CI [-0.21; -0,002]).

Perceived creditability mediates the relationship between insecurity and behavioural intention amongst the adopters of digital banking (β =-.012; t =3.333; p <0.05; CI [0.001;0.028]). Perceived ease of use and perceived useful mediate the relationship between innovativeness and behavioural intention (β = -.019; t =3.800; p <0.05; CI [0.001;0.028]). This result shows that innovativeness affects both indirect and direct effect on behavioural intention on digital banking. Similarly, perceived ease of use and perceived creditability mediate the relationship between innovativeness and behavioural intention amongst the adopters of digital banking (β =-.012; t =3.333; p <0.05; CI [.005; 0.028]). Perceived ease of use and perceived creditability mediate the relationship between optimism and behavioural intention (β =.005; t =7.143; p <0.05; CI [.001;0.016]). This result shows that optimism affect both indirect and direct effect on behavioural intention on digital banking. There is full mediation between optimism and behavioural intention since direct is insignificant (β =.006; t =1.96; p <0.05; CI [.001; 0.020]).

Perceived ease of use and perceived usefulness mediate the relationship between optimism and behavioural intention (β =.050; t =2.777; p <0.05; CI [.001,0.016]). However, innovativeness affects only indirect behavioural intention on digital banking; thus, mediation (Perceived ease of use and perceived usefulness) fully affects optimism and behavioural intention. Table 5:19 indicate mediation results impacted as follows:

Table 5.19: Depict mediation results

Sequential multiple mediation results						
Relationship	**Direct effect**	**Indirect effect**	**95% CI**		**P-value**	**Mediation**
Indirect			**Lower**	**Upper**		
INS --> PEOU --> PU --> BI	0.098	-.004	-.021	-.002	.004	Partial
INS --> PEOU --> PCR --> BI	0.098	-.007	.001	.028	.008	Partial
INS --> PCR --> BI	0.098	-.018	-.048	-.009	.007	Partial
INN --> PEOU --> PU --> BI	0.315	.012	.005	.028	.001	Partial
INN --> PEOU --> PCR --> BI	0.315	.019	.007	.041	.001	Partial
OPT --> PEOU --> PU --> BI	0.101(ns)	.005	.001	.016	.049	Full
OPT --> PEOU --> PCR --> BI	0.101(ns)	.006	.001	.020	.050	Full
OPT --> PCR --> BI	0.101(ns)	.050	.026	.085	.001	Full

Source: Developed for this research

5.11.8 Moderation effect

Structural equation modelling (SEM) is one popular statistical software to test a moderation model and conduct a formal test on moderation effects. In SEM, the moderation effect can be specified as an indirect effect (Alwin & Hauser, 1975; Bollen, 1989; Hair et al., 2010; Bryne, 2010), such as the indirect effect of an independent variable (X) on a dependent variable (Y) via a mediator (M) in which X affects M, which in turn affects. There are two SEM approaches, the single group and multigroup analysis. The Multigroup analysis approach has advantages over the single-group approach incorporating a categorical moderator in the model. (1) it does not depend on the assumption of equal variances. The parameter estimates and statistical inferences are not affected by the assumption violated. (2) it is less complicated to specify the group difference in more than one indirect effect (Ryu & Cheong, 2017).

However, there are numerous methods for making statistical inferences about the simple indirect effects and inferences about the group difference in the indirect effect. Bootstrapping was adopted for this study, and these bootstrapping methods can provide interval estimates without relying on a distribution assumption. For this reason, bootstrapping techniques have been recommended for testing indirect effects in previous studies (Ryu & Cheong 2017; MacKinnon et al., 2004; Preacher & Hayes, 2004). The bootstrapping methods can be applied for obtaining interval estimates for any effect of interest, e.g., simple indirect effect in Group 1, simple indirect effect in Group 2, group difference in the indirect effect. In bootstrapping

methods, many bootstrap samples (e.g., 3,000 bootstrap samples), whose sizes are the same as the original sample size, are drawn from the original sample with replacement. An estimate is obtained in each bootstrap sample.

Multigroup analysis was employed to test the moderating effects of demographic characteristics (age, level of education, level of income) and technological awareness between technology readiness dimensions (optimism, innovativeness, innovativeness) and consumer decision (perceived usefulness, perceived ease of use and perceived creditability). Multigroup analysis is a type of moderator analysis where the moderator variable is categorical (usually with two categories) and is assumed to potentially affect all SEM: an emerging tool relationship between exogenous and endogenous. Multigroup has been used previously in various disciplines. Elbanna et al. (2013) demonstrates that the role of intuition in strategic decision-making differs significantly in situations of low vs high environmental hostility. Moreover, Krishanan, Teng & Khalidah (2017) showed that the consumer's perceived interactively and intention to use mobile banking is significantly differed amongst levels of education (undergraduate vs Postgraduate). To test for a possible difference between age, levels of education, technology awareness, and income levels.

- **Age as a moderator**

The moderating effect of age was tested through multigroup analysis. The results indicated that 109 respondents are below 35 years, and 229 of the respondents are above 35 years. The entire sample was divided into two sub-groups into age groups under 35 and above 35 years. Each group exceeds the minimum sample recommended by Kline,2016. The fit indices of the structural models of the two groups were accepted, as illustrated in Figure 5.9. To establish if invariance is present between the groups, each estimated path was constrained to be equal in both groups. A significant difference in x^2 between the unconstrained and the constrained model indicates that the strength of the path coefficient differs between groups (Hair et al., 2010). The difference between the chi-square of the unconstrained and constrained group of ages is equal to Δx^2 =23.31 with the difference in the degree of freedom of Δdf of 12, p value = 0.025, implying that age moderates at least one of the paths in the model. Hence hypothesis **H5** was supported. Table 5.21 shows the results of multi-group comparison test for all the eight paths.

Table 5.20: TEST 1: Demographics: Age

	AGE						
TEST 1	**Model**	**Chi-Square**	**DF**	**RMSEA**	**CFI**	**CMIN**	**P-value**
	Unconstrained	508.445	388	.030	.991	1.310	0.025
	Constrained	531.755	400	.031	.990	1.329	
	Difference	23.31	2	-0.01	0.01	0.019	

Source: Developed for this research

The multigroup analysis for age shows a strong positive moderator effect on the relationship between innovativeness and behavioural intention, insecurity ->perceived creditability and optimism -> perceived creditability. Regarding path innovativeness->behavioural intention, both ages have a strong moderating effect on both ages. Similarly on path optimism >perceived creditability, only respondent above 35 years are strongly moderated (p value =0.000), however respondents below 35 years are non-significant (p value =.0.106). The path perceived ease -> insecurity, innovativeness->perceived ease of use, optimism->perceived ease of use, insecurity ->behavioural intention, and optimism->behavioural intention is not moderating both ages.

Table 5.21: Multigroup analysis: age

	Relationship	**< 35 Years**				**>35 Years - Unconstrained)**			**Invariant**	
				W	**P**	**W**	**P**	**Critical Ratio**	**CMIN**	**P**
TEST 2	PEOU	<---	INS	-0.174	0.050	-0.095	0.068	0.767	.586	,444
	PEOU	<---	INN	0.452	0.000	0.248	0.007	-1.336	1.776	,183
	PEOU	<---	OPT	0.053	0.580	0.189	0.009	1.131	1.269	,260
	PCR	<---	INS	-0.235	0.004	-0.054	0.293	1.891*	3.548	,060
	PCR	<---	OPT	0.128	0.106	0.408	0.000	2.841***	7.920	,005
	BI	<---	INS	-0.048	0.442	-0.119	0.015	-0.901	.820	,365
	BI	<---	INN	0.163	0.048	0.400	0.000	1.976**	3.604	,058
	BI	<---	OPT	0.167	0.010	0.054	0.466	-1.14.8	1.291	,256

Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10
Source: Developed for this research

- **Technology awareness**

The entire sample was divided into two sub-group in terms of users using digital banking to transact and non-users of digital banking. The results indicated that 266 respondents currently use digital banking to transact, while 72 showed they are not using or stopped using digital banking to transact. Each group exceeds the minimum sample recommended by Kline, 2016. To establish if invariance were present between the groups, each estimated path was constrained to be equal in both groups. A significant difference in x^2 between the unconstrained and the constrained model indicates that the strength of the path coefficient differs between groups (Hair et al., 2010). The difference between the chi-square of an unconstrained and constrained group of technology awareness is equal to Δx^2 =22.021 with the difference in the degree of freedom of Δdf of 2, p value = 0.037 as depicted in Table 5.22, implying that users or non-users moderate at least one of the paths in the model. Hence hypothesis **H11** was supported. Table 5.23 shows the results of multi-group comparison test for all the eight paths.

Table 5.22: TEST 1: Technology awareness

	TECHNOLOGY AWARENESS						
	Model	**Chi-Square**	**DF**	**RMSEA**	**CFI**	**CMIN**	**P-value**
TEST 1	Unconstrained	535.728	388	.040	.989	1.381	0.037
	Constrained	557.749	400	.041	.988	1.394	
	Difference	22,021	2	0.001	0.001	-13	

Source: Developed for this research

The multigroup analysis for technological awareness shows a moderator effect on the relationship between innovativeness and behavioural intention, optimism, and perceived ease of use. The path perceived ease -> insecurity, innovativeness->perceived ease of use, insecurity ->behavioural intention, and optimism->behavioural intention is not moderating both technology users and non-users.

Table 5.23: TEST2: Multigroup analysis: Technology awareness

	Path relationship			TECHNOLOGY AWARENESS				Critical ratio
				Users		Non-Users		
				Estimate	P	Estimate	P	
TEST 2	PEOU	<---	INS	-0.150	0.005	-0.030	0.665	1.374
	PEOU	<---	IN	0.325	0.000	0.321	0.001	-0.026
	PEOU	<---	OPT	0,.171	0.019	-0.031	0.702	-1.844*
	PCR	<---	INS	-0.095	0.052	-0.169	0.078	-0.684
	PCR	<---	OPT	0.371	0.000	0.153	0.148	-1.848*
	BI	<---	INS	-0.102	0.025	-0.052	0.406	0.638
	BI	<---	INN	0.421	0.000	0.125	0.152	-2.494**
	BI	<---	OPT	0.027	0.678	0.136	0.065	1,100

Source: Developed for this research

- **Level of education**

The moderating effect of the level of education was tested through multigroup analysis. The entire sample was divided into two sub-group in terms of levels of undergraduate groups and postgraduate groups. The results indicated that 163 of the respondents are undergraduate and 175 of the respondents are postgraduate. Each group exceeds the minimum sample recommended by (Kline, 2016).

To establish invariance between the groups, each estimated path was constrained to be equal (see Table 5.24) in both groups (Byrne, 2010). A significant difference in chi-square (x^2) between the unconstrained and the constrained model indicates that the path coefficient's strength does not differ between groups at p >0,05. Hence hypothesis **H9** was not supported.

Table 5.24: TEST 3: depict invariant between the group (Undergraduate versus Postgraduate)

	LEVEL OF EDUCATION							
	Model		**Chi-Square**	**DF**	**RMSEA**	**CFI**	**CMIN**	**P-Value**
STEP 3	Unconstrained		518.640	388	.037	.991	1.337	0,360
	Constrained		518.640	400	.047	.990	1.329	
	Model Comparison	INS-PEOU	518.649	389	.037	.990	3.319	.069
		INN-PEOU	519.182	389	.037	.990	1.913	.167
		OPT-PEOU	518.660	389	.037	.990	3.974	.046
		INS-TR	**522.827**	389	.040	.990	4.363	.037
		OPT-TR	518.757	389	.037	.990	12.501	.000
		INS-BI	518.961	389	.037	,990	.471	.492
		INN-BI	518.645	389	.037	,990	1.213	.271
		OPT-BI	519.888	389	.030	,990	1.577	.209

Source: Developed for the study

Invariance path analysis was performed by placing the constraint on the path with a chi-square of invariance = 4.187 which means this path is different across the group with a degree of freedom of 1, p <0.05 and when comparing the confidence interval in both levels of education there is a significant moderating effect (3.84). Level of education explained a significant amount of variance in digital banking adoption, = .539. The path perceived ease ->insecurity, innovativeness->perceived ease of use, optimism->perceived ease of use, optimism->perceived creditability, insecurity->behavioural intention, innovativeness->behavioural intention and optimism->behavioural intention is not moderating both level of education.

Table 5.25: Depict Invariant of level of education

	Level of education									
	Relationship			Undergraduate		Postgraduate - Unconstrained)			Invariant	
				W	P	W	P	Z-value	CMIN	P
TEST 4	PEOU	<---	INS	-0.114	0,103	-0.123	0.034	-0.098	.010	.922
	PEOU	<---	INN	0.405	0.000	0.294	0.003	-0.737	.542	.462
	PEOU	<---	OPT	0.120	0.151	0.137	0.094	0.142	.020	.887
	PCR	<---	INS	-0.212	0,002	-0.031	0.584	**2.055****	**4.187**	**.041**
	PCR	<---	OPT	0.333	0.000	0.300	0.000	-0.343	.117	.732
	BI	<---	INS	-0.116	0.032	-0.072	0.190	0,.567	.321	.571
	BI	<---	INN	0.310	0.000	0.320	0.000	0.073	.005	.942
	BI	<---	OPT	0.041	0.532	0.157	0.053	1.106	1,.248	.264

Source: Developed for this research

- **Level of income**

The results indicated that 150 of the respondents are low-income earners and 188 of the respondents are high-income earners. A significant difference in chi-square (x^2) between the unconstrained and the constrained model indicates that the path coefficient's strength differs between low- and high-income group (Δx^2 = 43.61; df =2; p value =0.000), suggesting significant moderating effects of level of income. Hence hypothesis H7 was supported.

Table 5.26: Level of income

	Level of income						
	Model	**Chi-Square**	**DF**	**RMSEA**	**CFI**	**CMIN**	**P-value**
TEST 1	Unconstrained	530.616	390	.033	989	1.361	0.000
	Constrained	574.232	401	.036	.987	1.432	
	Difference	43.61	2	0.001	0.001	-13	

Source: Developed for this research

Table 5.27 below shows that level of income has strong positive moderator effect on the path optimism->perceived ease of use, insecurity ->perceived creditability, and optimism -> perceived creditability. Regarding path optimism->perceived creditability, have strongest moderating effect on both level of income ($t = 3.580.;\Delta x^2 = 12.501$). Thus, H7d and H7e are accepted. The path perceived ease of use -> insecurity, innovativeness->perceived

ease of use, optimism->perceived ease of use, insecurity ->behavioural intention, innovativeness->behavioural intention, and optimism->behavioural intention is not moderating level of income.

Table 5.27: TEST 2: depict respondents' level of income

	Level of income									
	Relationship			Low		High		CR ratio	Invariance analysis	
				Estimate	P	Estimate	P	z-score	Δx^2	P
TEST 2	PEOU	<--	INS	0.028	0.748	-0.154	0.002	-1.834*	3.319	.069
	PEOU	<--	INN	0.484	0.000	0.273	0,.002	-1.386	1.913	.167
	PEOU	<--	OPT	0.274	0.005	0.034	0.626	-2.002**	3.974	.046
	TR	<--	INS	-0.225	0.002	-0.034	0.510	2.106**	4.363	.037
	TR	<--	OPT	0.547	0.000	0.192	0.001	-3.58***	12.501	.000
	BI	<--	INS	-0.134	0.040	-0,.078	0.101	0.691	1.577	.209
	BI	<--	INN	0.402	0.000	0.263	0.002	-1.111	7.881	.005
	BI	<--	OPT	-0.011	0.900	0.125	0.064	1.245	2.761	.097

Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10
Source: Developed for this research

5.12 Conclusion

The data analysis employed in this thesis was presented and explained in this chapter. Various statistical tests, including descriptive, chi-square and factor analyses, and SEM were conducted to explain the characteristics of the sample and more importantly to test the proposed conceptual model. As advised by Perry (2002), further discussion of the tests of the model and how they relate to existing literature and their implications is continued in Chapter 6.

CHAPTER 6
DISCUSSION OF MAIN FINDINGS, IMPLICATIONS, AND CONCLUSIONS

6.1 Chapter overview

Consistent with the six-chapter thesis structure, this chapter discusses the implications of the findings on the theory and practice of marketing banking innovations (Perry, 1988: 2002). Next, the study's contribution to the body of knowledge, including a revised conceptual frame incorporating results discussed in previous chapters, will be described. Lastly, the chapter closes with a description of limitations and proposed areas for further research.

6.2 Introduction and study summary

The research objectives set out in Chapter 1 will be evaluated in this concluding chapter. In the previous chapters, an extensive review of the existing literature revealed, among other things, the following:

a. Despite the plethora of disruptions within the banking industry globally, marketers in developing countries are still lagging in understanding technology readiness and the consumer behaviour to adopt digital banking channels. Furthermore, the literature on the determinants of digital banking mobile adoption, particularly in the South African context, remained inconsistent mainly and fragmented, as most previous studies are based on one channel of digital banking (Brown et al., 2003; Shambare, 2012 & Maduku, 2014).

b. Given the above, devising appropriate digital banking strategies becomes problematic, and without a clear sense of which direction to take, marketing managers personality considerable difficulty formulating strategies. Thus, there is a need for further research in the area.

Having identified the gaps in this context of the literature, the following research problem was formulated:

> *There is deficiency of research literature on digital readiness and the adoption of self-service banking technologies from a South African perspective.*

To address the research problem above, the conceptual in chapter 3 was articulated. A literature review indicated a gap within a body of knowledge regarding consumers' behavioural intention to adopt digital banking in South African context. In line with this gap, the research question and hypotheses were formulated and presented in Chapter 1 and justified in Chapter 3. Additionally, the conceptual frame developed in Chapters 2 and 3 was a baseline for data collection. In Chapter 4, the methodology used to answer the research question and to test hypotheses was discussed. Chapter 5 provided an outline of the data analysis procedures. Implications and recommendations, including suggestions for future research, were the highlights of Chapter 6.

6.3 Findings

The following conclusions of the findings are derived from descriptive and inferential data analysis as presented in chapter 5.

6.3.1 Objective 1: personality has the greatest predictive power in influencing the adoption of digital banking in South Africa.

1. **Optimism has positive effect on perceived ease of use**

   The critical path (2.179) test results for Hypothesis 1 show a positive relationship between personality (Optimism) and consumers' belief (Perceived ease of use) of using digital banking. This implies that the more optimistic the users are, the higher or more positive their perception of the benefits of using self-service technologies in the context of digital banking. The findings are consistent with previous research (Qasem, 2021; Naidu & Sainy, 2018; Shambare, 2013; Adiyarta, Napitupulu, Rahim, Abdullah & Setiawan, 2018; Walczuch et al, 2007, Kou, Liu & Ma, 2013). Lin and Chang (2011) argue that optimism is associated with a positive view of technology and the belief that technology will improve control, flexibility, and efficiency.

2. **Innovativeness has effect on perceived ease of use**

   Innovativeness has been defined as the likelihood and willingness of an individual to adopt an innovative technology at an early stage of release or innovation. The results for hypothesis 2 revealed a strong relationship between innovativeness and perceived ease of use (CR =.188, p.0001). According to the findings, innovativeness, as defined in this study, is related to the perceived ease of use of digital banking in SA. That is, the higher the level of perceived ease of use of using innovative technology, the higher the level of innovativeness. The findings are consistent with previous research (Qasem,

2021; Naidu & Sainy, 2018, Shambare, 2013; Nugroho & Fajar, 2017; Adiyarta et al, 2018). Contrary to previous study conducted by Humbani and Wiese (2018) found that innovativeness is non-significant predictors of the adoption of mobile payment services.

3. The insecurity has effect on behavioural intention

The findings also show that if insecurity exists, consumers who exhibit these behaviours are less likely to want to use self-service channels such as digital banking. It was clear that if consumers felt their safety was jeopardized when using digital banking and transacting online, they were more likely to have a higher level of perceived risk. According to the findings of this study, insecurity can lead to increased levels of discomfort among digital banking consumers. Hence this finding has negative effect on behavioural intention to adopt innovative technologies. This is in consistent with previous studies that also support these relationship (Nugroho & Fajar, 2017; Adiyarta et al., 2018; Sarkar, Chauhan & Khare, 2020).

4. The effect of perceived usefulness on behavioural Intention

Based on hypothesis testing, the variable of perceived usefulness on the behaviour intention to adopt digital banking has a t critical value of 3.024 which is greater than |1.96|. Perceived Usefulness is one of the most important indicators in digital banking (Humbani & Wiese, 2020; Dakduk, Horst, Santalla, Molina & Malavé, 2017; Nugroho & Fajar, 2017; Jaradat & Al-Mashaqba, 2014; Kitsios et al., 2021). Likewise, in digital banking, consumers will tend to use digital banking compared to brick and mortar methods based on the benefits such as convenience, flexibility and 24-hour feature availability. When compared with brick-and-mortar methods, consumers must adjust to bank working hours to conduct banking transactions. This finding of this study is congruent with previous studies (Smit, 2017; Lee & Cheng, 2011; Pai & Huang, 2011; Venkatesh & Bala, 2008; Zhang, 2016) that indicates perceived usefulness has a positive impact on behavioural intention. Hence the hypothesis was strongly significant.

5. The effect of insecurity on perceived ease of use

The relationship between insecurity and PEOU is consistent with previous literature (Parasuraman, 2000; Parasuraman & Colby, 2015) That is, the greater consumers' insecurity, the lower their perceived PEOU toward digital banking. Consumers who are technologically insecure may be concerned about the negative consequences of mobility and ubiquity, such as complexity or a lack of trust in the system when using digital banking (Kou et al., 2013). Hence hypothesis was significant. This is in line with previous studies found that insecurity has negative impact on adoption of innovative technology

(Humbani, 2018; Walczuch et al., 2007; Adiyarta et al., 2018; Nugroho & Fajar, 2017; Sarkar et al, 2020).

6. The effect of perceived ease of use on perceived usefulness

The findings in this study show that perceived ease of use has a significant relationship with perceived usefulness. Perceived usefulness is determined by perceived ease of use because if individuals feel that the innovative technology is more useful, they also perceive it to be easier to use (Venkatesh & Davis, 2000). Therefore, simple access to digital banking would help consumers reach their banking objectives. Similarly, the results are congruent with previous researchers (Alneme, 2022; Kuo et al., 2013; Humbani & Wiese, 2018; Chawla & Joshi, 2019; Dakduk et al., 2017; Mew & Millan, 2021; Nugroho & Fajar, 2017; Sarkar, 2020). In addition, the usefulness in terms of cost saving, time, and access to services, as well as the usefulness of self-service channels, are important components of the intention to use digital banking (Musyaffi, 2021).

7. The effect of perceived ease of use on perceived credibility

The consumers' levels of perceived credibility toward a self-service channel will increase as the users believe or perceive that they do not need to spend much effort to learn how to operate or use it. This is in line with the previous researchers (Primanda, Setyaning, Hidayat, & Ekasasi, 2020; Sarkar et al., 2020; Wilson, Ken & Tan, 2021) which state that consumers who perceive trust in using digital banking to transact are likely to continue using digital banking in the future or influence their friends and families to adopt the innovative technology.

8. The effect of perceived credibility on behavioural intention

The findings show that perceived credibility affects the behavioural intention to adopt digital banking. This corroborates studies that speak of the direct and positive relationship between perceived credibility and behavioural intention by consumers (Ramos et al., 2018; Jain & Agarwal, 2019; Chawla & Joshi, 2019; Mew & Millan, 2021; Primanda et al., 2020) by implying that consumers recognise that the use of digital banking is helpful and convenient in conducting banking operations and have also assumed that digital banking service is reliable. In addition, if the respondent has a positive belief concerning their bank, they present an intention to trust in their self-service channel, and, therefore, this will positively affect their intention to use the application (Marret et al., 2015; Chawla & Joshi, 2019).

9. The effect of optimism on behavioural intention

The study's findings revealed that optimism has a significant positive effect on behavioural intention. This is consistent with previous research (Shim, Han & Ha, 2020; Wiese & Humbani, 2020). This is because individuals with optimistic tendencies perceive self-service challenges in the form of digital banking positively, which influences behavioural intention. Bank customers are optimistic about new self-service, implying that they have a favourable opinion of the innovative technology and believe that it provides convenience, flexibility, and efficiency, as well as 24/7 access to banking functions (0ECD, 2020).

10. The effect of innovativeness on behavioural intention

According to the findings of this study, an individual's level of innovativeness is correlated with the degree to which they want to use digital banking. The current finding is consistent with findings that were made in the past (Wiese & Humbani, 2020; Hassan et al., 2018; Saprikis et al., 2021; Shim et al., 2020; Wu & Lai, 2021; Simarmata & Hia, 2020), regarding the behaviours associated with the introduction of innovative technologies. However, among all the factors that were considered for this research, innovativeness was empirically considered to be the driver of enhancing the intention to adopt digital banking. This finding demonstrates that the components of innovativeness are significant in influencing individuals toward the adoption of digital banking. We interpreted that when innovativeness is high, consumers can easily approach self-service technologies without anxiety.

6.3.2 Objective two (2): The role of demographics and technological awareness in moderating the relationship between personality and consumer beliefs.

1. The effect of age on personality and consumer beliefs.

A study conducted by Chawla and Joshi (2018) found that demographic variables such as age have a considerable moderating effect on the adoption of mobile technologies. Age as a moderator variable, multi-group analysis results showed that the effect of optimism on perceived credibility and innovativeness on behavioural intention had relatively higher strength at the young age group (below 35 years). This young age group is very receptive to new technological discoveries and advancements; self-service technology usage becomes a lifestyle and elevates their social standing (Alnemer, 2022; Neto & de Figueiredo, 2022; Abu-Taieh, 2022).

2. The effect of level of education on personality and consumer beliefs.

Level of education as a moderator variable, multi-group analysis results showed that both groups are not different at the model level. This is consistent with the study by Chawla and Joshi (2019) that found that level of education does not affect perceived ease of use, perceived convenience, and attitude. This result agrees with the survey done by Discovery (2022) which found that the responses of the consumers over the age of 60 were congruent with the rest of the respondents under the age of 60 in terms of their comfort levels being fully digital. Contrary, past researchers Rogers (2003); Liebermann and Stashevsky (2002) and Rhee and Kim (2004) argue that level of education moderates the relationship between the perceived dimension and behavioural intention or usage of the new technology. Furthermore, the study by Abu-Taieh (2022) reiterates that educational level has a significant relationship with mobile commerce usage activities.

3. The effect of income on personality and consumer beliefs.

Income level as a moderator variable, multi-group analysis results shows that optimism to perceived credibility and optimism to perceived ease of use and insecurity to perceived credibility differed significantly according to participants' perceived income level. Bank consumers who perceived their income level as medium or high were more optimistic than those who perceived it as low (Tras, Sunbul & Baltaci, 2021). This study is consistent with Carver et al. (2010), who argue that there may be a reciprocal and cyclical relationship between optimism and income.

4. The effect of technology awareness on personality and consumer beliefs

Technological awareness as a moderator, multi-group analysis results shows that the innovativeness to behavioural intention differed significantly according to participants perceived technology awareness. This study is consistent with the study conducted by Abubakar and Ahmad (2013) that examined the moderating effect of technology awareness on the relationship between intention and intention to use and found that technological awareness moderates the relationship between the variables. Moreover, Daniali, Barykin, Zendehdel, Kalinina, Kulibanova, Teor, and Senjyu (2021), argue that extensive technology awareness campaigns should target potential digital wallet payment users to advise them of the advantages of such technologies, namely convenience, the potential for time savings, and ease of usage. Consequently, marketers should intensify their awareness activities and educational programs for customers to understand the benefits of using self-service technology.

6.3.3 Objective three (3): Consumer beliefs in mediating the relationship between personality and adoption

The study explored serial mediating effects of personality variables and behavioural intention to adopt self-service technology by utilising an analytical approach (Hayes & Scharkow (2013), the path coefficients used model 6 (PROCESS). The personality variables were a statistically significant effect on the behavioural intention to adopt self-service technology. As theorised, this serialisation effect is mediated by consumer beliefs (perceived ease of use, perceived usefulness, and perceived credibility). The indirect effects were statistically significant. Behnam et al. (2020) explored the analytical approach by (Hayes, 2013). They found that the effect on knowledge management and psychological involvement had positive indirect effects on intention to use through perceived value and commitment. Furthermore, Alhassany and Faisal (2018) investigated factors influencing the internet banking adoption decision in North Cyprus consistency with this study they found that perceived usefulness partially mediates the indirect effect of the perceived ease of use (PEOU) and the subjective norm (SN) factors.

For distinct reasons, banks in South Africa should realise the importance of SST adoption. Thus, an in-depth understanding of the antecedents and consequences of self-service channel usage shall enable them to take the requisite initiatives to enhance its acceptance and ensure widespread usage. The findings of the present research specify valuable insights for bankers to help them devise strategies to encourage self-service technology usage and recommend the same to non-users.

6.4 Contributions to the body of knowledge

As expected at the doctorate level, this thesis has made new contributions to the body of knowledge in several ways. The three significant contributions to theory are the following:

I. Theoretically, this study offers an alternative lens to view the concept of consumer digital readiness and adoption of self-service banking technologies by using consumer decision theories (Bettman, 1979; Engel et al., 1978) as the underpinning theory. In line with the other authors (Shambare, 2012; Venkatesh et al., 2012) the predictive power of these study antecedents is perception (Black et al., 2001; Rogers, 1995) and personality (Agarwal & Prasad, 1998; Parasuraman, 2000).

II. By proposing age, gender, income, education, and technological awareness as a moderator in the relationship between behavioural antecedents (perception and personality) and consumer beliefs.

III. The proposed research methodology is likely to stimulate research on the effects of SEM-AMOS to analyse digital banking readiness which is presently underrepresented in South Africa (Taoana et al., 2021; Venter de Villiers et al., 2020).

6.5 Limitations

As usual in research, this thesis is not free of limitations; having said that, however, the limitations do not negatively impact the study itself. The limitations associated with the present study are as follows:

- *Conceptual frames:* firstly, the application of IDT and TRI could be viewed as a limitation since other conceptual frames such as TPB or UTAUT could have equally been used. Secondly, since the purpose was merely theory falsification (Calder et al. 1981), a sample of customers with bank accounts was sufficient and appropriate for the study, albeit a broader spectrum of customers could have also participated. It is very encouraging to note that previously validated scales were used to collect data from a relative sample of (n = 338), spanning nine provinces in South Africa.

- *Geographic scope:* the fact that this study focussed only on South Africa is a limitation. South Africa is a developing country that might have an advantage in banking technologies, compared to other countries in SADC. As a result, the findings may not apply to banking customers in less economically active and undeveloped countries. Future studies may consider a wider geographical scope to generalise across Africa.

- *Time constraints:* since the researchers had a limited time frame in which to conduct the research, several aspects of the methodology had to be tailored to the time constraints. For example, the sample size and data collection techniques were influenced by these time constraints. Cross-sectional data were used to gain perspective during a certain period, which is reflected in this analysis. Thus, a comprehensive longitudinal study is required to evaluate the patterns of adaption to new digital technologies in the banking industry.

- *Sample*: following the closure of the survey the results show that Gauteng respondents were 65.1 percent, followed by Limpopo with 13.3 percent and Western Cape with 7.1 percent. The other consumers from other provinces in the country have been excluded. Results were skew in favour of Gauteng; therefore, the results may not necessarily be generalised to other consumer segments, especially in the rural areas.

6.6 Future studies

Given the prior, similar future studies could consider using experimental designs to acquire an in-depth knowledge of consumers' decision-making processes. It would also be insightful to draw samples from other SADC countries to determine whether there is a typical pattern within the region. This would be particularly important to practitioners and policymakers in preparing for a unified banking sector in the region. Comparative analysis within the different remote banking channels, such as between ATMs, cell banking, internet banking, mobile banking, and chart banking, may bring a better understanding of the better consumers' decision-making regarding banking innovations and adoption.

6.7 Implications of the theory

Overall, results indicate that personality is an important antecedent predictor of consumer choice behaviour and preference patterns for digital banking channels. There is sufficient evidence to suggest that the conceptual frames applied in this study (Parasuraman, 2000; Parasuraman & Colby, 2001) and CR (Bandura, 1982; Meuter et al. 2005) are applicable in non-Western contexts and the context of developing nations., these findings contribute enormously to the practice of scientific inquiry (Hubbard & Armstrong, 1994) in that they significantly increase the expanse of the broader body of knowledge (Kuhn, 1996).

6.8 Implications for practical

First, the results show that demographic variables such as age and gender are effective predictors of SST adoption and should be embraced as segmentation variables for SST adoption. The individual-level characteristic of technology readiness represents a more promising method. This approach agrees with Parasuraman and Colby (2015), who used a streamlined technology index to segment customers. Drawing on their work, and consistent with our finding that technology readiness matters for SST adoption, the study recommends that when firms introduce an SST to a market, they initially target “explorers” (who have higher

degrees of motivation and lower levels of resistance) and “pioneers” (who tend to hold strong positive views about technology).

Second, the mediation analysis results enable bank marketers to appreciate better both direct and indirect ways SST determinants influence SST adoption. The results reveal the critical roles of usefulness, ease of use, and creditability in translating the effects of determinants on SST adoption. Using this insight, banks may (a) decide to launch a marketing communication campaign geared toward increasing awareness of SST usefulness perceptions and (b) improve customers' SST adoption by developing SST interfaces that are more intuitive. Because this is a technical challenge, as it is a marketing communications challenge, banks must ensure the integration of digital banking channels, considering customer service, IT, product development, and marketing communications departments.

Third, bank marketers should realise the importance of SST adoption predictor’s specific context. Results indicate that banking service firms are better positioned to secure SST adoption among their customers by considering the moderating roles of technology awareness dimensions and SST types. More specifically, a standardised global rollout of an SST in culturally diverse service markets is problematic.

Finally, this study's moderation analysis results point to the importance of SST type for designing effective rollout and subsequent management of SSTs. For instance, to counter the heightened negative influence of anxiety and ease of use for SST adoption, firms should invest solemn effort in preventing the embarrassment of public SST users (e.g., thoughtful location of self-service kiosks) and increase SST ease of use.

6.9 Conclusion

The study findings in Table: 6.1, shows that a customer’s intention to adopt digital banking its influenced by perceived creditability, innovativeness, and perceived usefulness. Personal innovativeness displays to be the strongest predictor of adoption commitment in the digital banking context. This factor plays a vital role as a direct driver of self-service banking technologies. This finding is consistent with those of previous papers (San Martín & Herrero, 2012; Escobar-Rodríguez & Carvajal-Trujillo, 2014). Thus, more innovative individuals about ICT will have a stronger intention to do banking transactions using different channels and devices in an omnichannel environment. Our findings show that banking customers seek innovative technology to experiment with it and be the first to try it among their family and

friends. Managers should thus take this technological profile into account and constantly roll out innovative technologies in diverse ways to attract and surprise these kinds of bankers.

Table 6.1: Final model hypothesis results

	Research Objective(s)	Hypothesis	Hypothesis Formulation	Results
Final Model Hypothesis for the study	One (1)	H2a	*Insecurity has effect on consumer's perceived ease of use.*	Supported
		H2b	*Innovativeness has effect on consumer's perceived ease of use.*	Supported
		H2c	*Optimism has effect on consumer's perceived ease of use.*	Supported
		H2d	*Insecurity has effect on consumer's perceived credibility.*	Supported
		H2e	*Optimism has effect on consumer's perceived credibility.*	Supported
		H2f	*Perceived ease of use has effect on consumer's perceived credibility.*	Supported
		H2g	*Insecurity has effect on consumer's behavioural intention.*	Supported
		H2h	*Innovativeness has effect on consumer's behavioural intention*	Supported
		H2i	*Optimism has effect on consumer's behavioural intention.*	Supported
		H2j	*Perceived usefulness has effect on consumer's behavioural intention*	Supported
		H2k	*Perceived usefulness has effect on consumer's behavioral intention.*	Supported
		H2l	*Perceived usefulness has effect on consumer's perceived usefulness.*	Supported
Sequential multiple Mediation		H4a	*Insecurity and behavioral intention through perceived ease of use and perceived usefulness.*	Supported
		H4b	*Insecurity and behavioural intention through perceived ease of use and perceived credibility*	Supported
	Two (2)	H4c	*Insecurity and behavioural intention through perceived credibility.*	Supported
		H4d	*Innovativeness and behavioral intention through perceived ease of use and perceived usefulness.*	Supported

		H4e	*Innovativeness and behavioural intention through perceived ease of use and perceived credibility*	Supported
		H4f	*Optimism and behavioral intention through perceived ease of use and perceived usefulness.*	Supported
		H4g	*Optimism and behavioural intention through perceived ease of perceived credibility.*	Supported
		H4h	*Optimism and behavioural intention through perceived credibility*	Supported
		H5	*Age moderates the relationship between personality and consumer beliefs.*	Supported
Multigroup Moderation	Three (3)	H7	*Income moderates the relationship between personality and consumer beliefs.*	Supported
		H9	*Education moderates the relationship between personality and consumer beliefs*	Not Supported
		H11	*Technology awareness moderates the relationship between personality and consumer beliefs.*	Supported

Source: Developed for this research

REFERENCES

Abdullah, F., Ward, R., & Ahmed, E. (2016). Investigating the influence of the most commonly used external variables of TAM on students' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of e-portfolios. *Computers in human behavior*, *63*, 75-90.

Abubakar, F.M., & Ahmad, H.B. (2013). The moderating effect of technology awareness on the relationship between UTAUT constructs and behavioural intention to use technology: A conceptual paper. *Australian Journal of Business and Management Research*, *3*(2), 14-23.

Abu-Taieh, E.M., AlHadid, I., Abu-Tayeh, S., Masa'deh, R.E., Alkhawaldeh, R.S., Khwaldeh, S., & Alrowwad, A.A. (2022). Continued Intention to Use of M-Banking in Jordan by Integrating UTAUT, TPB, TAM and Service Quality with ML. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(120), 1-29.

Adiyarta, K., Napitupulu, D., Rahim, R., Abdullah, D., & Setiawan, M.I. (2018). Analysis of e-learning implementation readiness based on integrated elr model. In *Journal of Physics: Conference Series,* 1007(1),1-6.

Agarwal, R., & Prasad, J. (1998) A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology. *Information Systems Research,* 9(2), 204-224.

Aggelis, V. (2005). The bible of e-banking. New technologies Publications, Athens

Agu, N.T. (2016). The adaptation of Bring Your Own Device as a Green Information Technology Practice at the North-West University (Doctoral dissertation, North-West University (South Africa)).

Aguidissou, O.C., Shambare, R., & Rugimbana, R. (2017). Internet banking adoption in South Africa: The mediating role of consumer readiness. *Journal of Economics and Behavioral Studies*, *9*(5), 6-17.

Ajzen, I. (1991). The Theory of Planned Behaviour. *Organizational Behaviour and Human Decision Processes,* 50, 179-211.

Ajzen, I., & Fishbein, M. (1988). Theory of reasoned action-Theory of planned behaviour. *University of South Florida*, 67-98.

Aker, J.C., Boumnijel, R., Mcclelland, A., & Tierney, N. (2016). Payment mechanisms and anti-poverty programs: Evidence from a Mobile Money cash transfer experiment in Niger. *Economic Development and Cultural Change,* 65(1), 1–37.

Alalwan, A.A., Dwivedi, Y.K., & Rana, N.P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*,37(3), 99-110.

Aldlaigan, A.H., & Buttle, F.A. (2001). Consumer involvement in financial services: an empirical test of two measures. *International Journal of Bank Marketing*, *19*(6), 232-245.

Alhassany, H., & Faisal, F. (2018). Factors influencing the internet banking adoption decision in North Cyprus: evidence from the partial least square approach of the structural equation modeling. *Financial Innovation*, *4*(1), 1-21.

Ali, H., & Birley, S. (1999). Integrating deductive and inductive approaches in a study of new ventures and customer perceived risk. *Qualitative market research: an international journal*.

Alkhowaiter, W.A. (2020). Digital payment and banking adoption research in Gulf countries: A systematic literature review. *International Journal of Information Management*, *53*(1), 102102.

Alnemer, H.A. (2022). Determinants of digital banking adoption in the Kingdom of Saudi Arabia: A technology acceptance model approach. *Digital Business*, *2*(2), 1-9.

Alturki, R. (2021). Research Onion for Smart IoT-Enabled Mobile Applications. *Scientific Programming*, 2021(2), 1-8.

Alwin, D.F., & Hauser, R.M. (1975). The decomposition of effects in path analysis. *American sociological review*, 37-47.

Al-Zefeiti, S.M.B., & Mohamad, N.A. (2015). Methodological considerations in studying transformational leadership and its outcomes. *International Journal of Engineering Business Management*, *7*(1), 1–11.

Amin, A., Matin, S., Islam, R., Jahan, I., & Rahman, H. (2020). Evaluating the factors influencing customer perception on online buying behavior of suburban people of Bangladesh. *Academy of Strategic Management Journal*, *19*(5), 1–18.

Ammar, A., & Ahmed, E.M. (2016). Factors influencing Sudanese microfinance intention to adopt mobile banking. Cogent Business & Management, 3(1) 1–20.

Andersone, I., & Gaile-Sarkane, E. (2010). Consumer expectancy theory for business. *The 6th International Scientific Conference "Business and Management*, 321-327.

Assensoh-Kodua, A., Migiro, S., & Mutambara, E. (2016). Mobile banking in South Africa: a systematic review of the literature. *Banks & bank systems*, 11(1), 34-41.

Azungah, T. (2018). Qualitative research: deductive and inductive approaches to data analysis. *Qualitative research journal*, *18*(4), 383-400.

Baabdullah, A.M., Alalwan, A.A., Rana, N.P., Kizgin, H., & Patil, P. (2019). Consumer use of mobile banking (M-Banking) in Saudi Arabia: Towards an integrated model. *International journal of information management*, *44*, 38-52.

Bagozzi, R. and Yi, Y. (1988). On the Evaluation of Structural Equation Models. *Journal of the Academy of Marketing Sciences, 16(1), 74-94.*

Bagus, U., Hall, C., Jeenah, U., & Sari, G. (2020). *Beyond COVID-19: Charting the road to recovery for South African insurers*. [Online]. Available at: https://www.moonstone.co.za/upmedia/uploads/library/Moonstone%20Library/Beyond-COVID-19-Charting-the-road-to-recovery-for-South-African-insurers-F.pdf. [Accessed: 15-04-2022].

Bakare, S. (2015). Varying impacts of electronic banking on the banking industry. *Journal of Electronic Banking and Commerce*, *20*(2), 1-9.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American psychologist*, *37*(2), 122

Bankole, F.O., Bankole, O.O., & Brown, I. (2017). Influences on cell phone banking adoption in South Africa: An updated perspective. *Journal of Internet Banking and Commerce*, *22*(3), 1-16.

Bantom, S.A. (2016). Accessibility to patients' own health information: A case in rural Eastern Cape. *Master Dissertation: Peninsula University of Technology, South Africa*.

Baron, R.M., & Kenny, D.A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research. Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182.

Bateson, J.E.G. (1989), Managing Services Marketing – Text and Readings, Dryden Press, Hinsdale, IL.

Beckett, A., Hewer, P., & Howcroft, B. (2000). An exposition of consumer behaviour in the financial services industry. *International Journal of Bank Marketing*, *18*(1), 15-26.

Behnam, M., Sato, M., Baker, B.J., Delshab, V., & Winand, M. (2020). Connecting customer knowledge management and intention to use sport services through psychological involvement, commitment, and customer perceived value. *Journal of Sport Management*, *34*(6), 591-603.

Bergdahl, E., & Berterö, C.M. (2015). The myth of induction in qualitative nursing research. *Nursing Philosophy*, *16*(2), 110-120.

Bernritter, S.F., Müller, B.C.N., & van Ooijen, I. (2017). Self-persuasion as marketing technique: the role of consumers' involvement. *European Journal of Marketing*, *51*(5–6), 1075–1090.

Bettman, J.R. (1979). An Information Processing Theory of Consumer Choice. *Addison Wesley, Boston.*

Bhatiasevi, V. (2015). An extended UTAUT model to explain the adoption of mobile banking, *Information Development*. 32 (4), 1-16.

Bhattacherjee, A. (2012). Scholar Commons Social Science Research: Principles, Methods, and Practices. [Online]. Available at http://scholarcommons.usf.edu/oa_textbookshttp://scholarcommons.usf.edu/oa_textbooks/3 [Accessed: 30-06-2022].

Blumberg, B., Cooper, D., & Schindler, P. (2014). *EBOOK: Business Research Methods*. McGraw Hill.

Boadi, R. (2020). A best practice framework for Public-Private Partnerships (PPPs) in road projects: the case of Ghana. University of Salford (United Kingdom).

Bollen, K.A. (1989) Structural Equations with Latent Variables. John Wiley and Sons, Inc., New York.

BPC & Fincog. (2020) Digital banking in sub-Sahara Africa. [Online]. Available at: https://www.bpcbt.com/hubfs/2022_campaigns/DGB%20report%20Africa/BPC_Digital%20banking%20in%20Africa.pdf. [Accessed: 30-06-2022].

Brown, I., Cajee, Z., Davies, D., & Stroebel, S. (2003). Cell phone banking: predictors of adoption in South Africa: An exploratory study. *International Journal of Information Management*, 23(2003), 381-394.

Brown, I., Licker, P., & Kashora, K. (2010). Customer Satisfaction with Cell Phone Banking in South Africa. *Proceedings. Paper 444.*

Bryman, A. (2017). Social research methods (5th ed.). Oxford: Oxford University Press.

Burrell, G., & Morgan, G. (1979). Sociological Paradigms and Organizational Analysis. Aldershot, UK: Gower.

Byrne, B.M. (2010). Multivariate applications series. *Structural equation modeling with AMOS: Basic concepts, applications, and programming*,*2nd edn*, New York: Taylor and Francis Group.

Carver, C.S., Scheier, M.F., & Segerstrom, S.C. (2010). Optimism. *Clinical psychology review*, *30*(7), 879-889.

Castaneda, J.A., Rodríguez, M.A., & Luque, T. (2009). Attitudes' hierarchy of effects in online user behaviour. *Online Information Review*, 33, 7-21.

Center for Strategic and International Studies. (2011). Cybersecurity Two Years Later. [Online]. Available at: https://doi.org/978-0-89206-625-4. [Accessed: 05-06-2022]

Cetină, I., Munthiu, M.C., & Rădulescu, V. (2012). Psychological and social factors that influence online consumer behavior. *Procedia-Social and Behavioral Sciences*, *62*, 184-188.

Chakraborty, S., & Mitra, D. (2018). A study on consumers adoption intention for digital wallets in India. *International Journal on Customer Relations*, *6*(1), 38-57.

Chan, S.F., Barnes, B.R., & Fukukawa, K. (2016). Consumer control, dependency and satisfaction with online service. *Asia Pacific Journal of Marketing and Logistics*, *28*(4), 594–615.

Chandrasekar, K.S., & Lemma, E.T. (2017). The Adoption of Automatic Teller Machines in Commercial Bank of Ethiopia, 5-9.

Chang, A.M., & Kannan, P.K. (2006). Employee technology readiness and adoption of wireless technology and services. In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06)*, 1-9.

Chase, R.B. (2010). Revisiting “Where Does the Customer Fit in a Service Operation?” Background and Future Development of Contact Theory. *Handbook of service science*, 11-17.

Chawla, D., & Joshi, H. (2019). Consumer attitude and intention to adopt mobile wallet in India–An empirical study. *International Journal of Bank Marketing*, 37(7), 1590-1618.

Chiemeke, S.C., & Evwiekpaefe, A.E. (2011). A conceptual framework of a modified unified theory of acceptance and use of technology (UTAUT) Model with Nigerian factors in E-commerce adoption. *Educational Research*, 2(12), 1719-1726.

Chilisa, B. (2019). *Indigenous research methodologies*. Sage publications.

Chipangura, B. (2016). A framework for providing mobile centric services to students at higher education institutions: the case of open distance learning. *Doctoral Thesis: University of South Africa, South Africa.*

Chironga, M., Cunha, L., De Grandis, H., & Kuyoro, M. (2018). Roaring to life: Growth and innovation in African retail banking. *McKinsey & Company. [Online] Available at:* https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/african%20retail%20bankings%20next%20growth%20frontier/roaring-to-life-growth-and-innovation-in-african-retail-banking-web-final.ashx. [Accessed: 30-10-2022].

Chopra, C., Gupta, S., & Manek, R. (2020). Impact of social media on consumer behaviour. *International Journal of creative research thoughts*, *8*(6), 1943-1961.

Choy, L.T. (2014). The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches. *IOSR journal of humanities and social science*, *19*(4), 99-104

Cirus, L., & Simonova, I. (2020). Rogers' Diffusion of Innovation Theory Applied on Primary Education: Case Study of Czech Teachers. *International Symposium on Educational Technology,* 33-37.

Coetzee, J. (2018). Strategic implications of Fintech on South African retail banks. *South African Journal of Economic and Management Sciences*, *21*(1), 1-11.

Coetzee, J., Van Zyl, H., & Tait, M. (2013). Perceptions of service quality by clients and contact-personnel in the South African retail banking sector. *Southern African Business Review*, *17*(1), 1-22.

Comrey, A.L., & Lee, H.B. (2013). *A first course in factor analysis*. Psychology press.

Constantinides, E. (2004). Influencing the online consumer's behavior: the Web experience. *Internet research*.

Cooper, D.R., & Schindler, P.S. (2018). *Business research methods* (13th ed.). McGraw-Hill/ Irwin.

Costa-Font, J., Mossialos, E., & Rudisill, C. (2009). Optimism and the perceptions of new risks. *Journal of risk research*, *12*(1), 27-41.

Coulter, C., Michael, C., & Poynor, L. (2007). Storytelling as pedagogy: An unexpected outcome of narrative inquiry. *Curriculum Inquiry*, 37(2), 103–122.

Dakduk, S., Horst, E.T., Santalla, Z., Molina, G., & Malavé, J. (2017). Customer behavior in electronic commerce: a Bayesian approach. *Journal of theoretical and applied electronic commerce research*, *12*(2), 1-20.

Daniali, S.M., Barykin, S.E., Zendehdel, M., Kalinina, O.V., Kulibanova, V.V., Teor, T.R., & Senjyu, T. (2022). Exploring UTAUT Model in Mobile 4.5 G Service: Moderating Social–Economic Effects of Gender and Awareness. *Social Sciences*, *11*(187), 1-13.

Darke, P.R., Brady, M.K., Benedicktus, R.L., & Wilson, A.E. (2016). Feeling close from afar: The role of psychological distance in offsetting distrust in unfamiliar online retailers. *Journal of Retailing*, *92*(3), 287-299.

Darley, W.K., Blankson, C., & Luethge, D.J. (2010). Toward an integrated framework for online consumer behavior and decision-making process: A review. *Psychology & marketing*, *27*(2), 94-116.

Das, R., Jain, K.K., & Mishra, S.K. (2018). Archival research: A neglected method in organization studies. *Benchmarking: An International Journal*, *25*(1), 138-155.

Dickey, D. (1996). Testing the fit of our models of psychological dynamics using confirmatorymethods: An introductory primer. In B. Thompson (Ed.), Advances in social sciencemethodology, 4, (pp. 219-227). Greenwich, CT: JAI Press.

Davis, F.D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International journal of man-machine studies*, *38*(3), 475-487.

Davis, F.D. (1998). Perceived usefulness, perceived ease of use and user acceptance of information technology, *MIS Quarterly* 13(3), 319–339.

Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management science*, *35*(8), 982-1003.

Dawodu, B.F., & Osondu, M.C. (2013). Adoption of automated teller machine in Nigerian banks: use enhancements and limitations. *International Journal of Computer Science and Mobile Computing A Monthly Journal of Computer Science and Information Technology, 2(8) 3*, *24*.

de Coster, R., & Mcewen, C. (2013). Consumer decision making in mobile-banking service selection. 2nd Cambridge Academic Design Management Conference, 1-14.

Dehnert, M., & Schumann, J. (2022). Uncovering the digitalization impact on consumer decision-making for checking accounts in banking. *Electronic Markets*, *32*(3), 1503-1528.

Deka, C., Sah, S., Shrivastava, A., Phukon, M., & Routray, L. (2021). Assessing a Voice-Based Conversational AI prototype for Banking Application. *8th NAFOSTED Conference on Information and Computer Science,* 211-216.

Demirci, A.E., & Ersoy, N.F. (2008). Technology readiness for innovative high-tech products: how consumers perceive and adopt new technologies. *Business Review*, *11*(1), 302-308.

Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. *The World Bank*. [Online]. Available at: http://www.worldbank.org/globalfindex/. [Accessed: 30-10-2022].

Diphoko, W. (2019). Get ready for branchless banking. [Online]. Available at: https://www.pressreader.com/south-africa/cape-times/20190301/281835759994856 [Accessed: 20-10-2022].

Discovery. (2022). *Brick-and-mortar banks may soon become a thing of the past*. [Online]. Available at: https://www.702.co.za/articles/453373/brick-and-mortar-banks-may-soon-become-a-thing-of-the-past. [Accessed: 20-10-2022].

Dholakia, N. (2012). Being critical in marketing studies: the imperative of macro perspectives. *Journal of Macromarketing*, *32*(2), 220-225.

Donga, G.T. (2020). The moderating effect of information security on the adoption of mobile marketing transactions among South African tertiary students. *Doctoral thesis: University of Venda, South Africa.*

Dunne, C. (2011). The place of the literature review in grounded theory research. *International Journal of Social Research Methodology*, 14(2), 111–124.

Dwyer, F.R., Schurr, P. H., & Oh, S. (1987). Developing buyer-seller relationships. *Journal of marketing*, *51*(2), 11-27.

Edwards, J.R., & Lambert, L.S. (2007). Methods for integrating moderation and mediation: a general analytical framework using moderated path analysis. *Psychological methods*, *12*(1), 1-22.

Elbanna, S., Child, J., & Dayan, M. (2013). A model of antecedents and consequences of intuition in strategic decision-making: Evidence from Egypt. *Long Range Planning*, *46*(1-2), 149-176.

Electrum payments. (2020) Boundless potential: How cross-border money transfer is transforming. [Online]. Available at: https://electrum.co.za/boundless-potential-how-cross-border-money-transfer-is-transforming/. [Accessed: 14-05-2022].

Elgahwash, F.O., & Freeman, M.B. (2013) Self-service technology banking preferences: Comparing libyans' behaviour in developing and developed countries *International Journal of Intelligent Information Technologies*, 9(2), 7 – 20.

Engel, J.F., Blackwell, R.D., & Miniard, P.W. (1986). *Consumer behavior*. Dryden Press.

Erasmus, A.C., Boshoff, E., & Rousseau, G.G. (2001). Consumer decision-making models within the discipline of consumer science: a critical approach. *Journal of Consumer Sciences*, *29(1), 82-90*.

Erasmus, A. E., & Mpinganjira, M. (2019). Consumer behaviour: South African psychology and marketing applications (2nd ed.) South Africa:Oxford University Press.

Escobar-Rodríguez, T., Carvajal-Trujillo, E., & Monge-Lozano, P. (2014). Factors that influence the perceived advantages and relevance of Facebook as a learning tool: An extension of the UTAUT. *Australasian Journal of Educational Technology*, *30*(2), 136-151.

Fan, X (1996). The effects of sample size, estimation methods and model specification on SEM indices. Annual Meeting of the American Educational Research Association. New York.

Fernández, M.A.S. (2019). Implementation of smart devices in the construction industry. *PhD Thesis: University of Wolverhampton.*

Field, A. (2009) Discovering Statistics Using SPSS (3rd ed.) London: Sage Publications Ltd.

Fishbein, M. (1979). A theory of reasoned action: some applications and implications. Nebraska Symposium on Motivation, 27, 65-116.

Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior*. Reading, MA: Addison-Wesley.

Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50.

Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management: An international publication of the product development & management association*, 19(2), 110-132.

Gates, G.R., & Cooksey, R.W. (1998). Learning to manage and managing to learn. *Journal of Workplace Learning,* 10(1), 5–14.

Gautam, M.S., & Matta, G.M. (2013). Indian Consumer Buying Behaviour in Financial Services. *Global Journal of Finance & Management*, *5*(10), 49-52.

Gautam, S., Jain, K., & Tripathi, S. (2017). A Study of Factors Associated with Buying of Various Financial Products. *International Journal of Applied Business and Economic Research*, 15(16), 341-351.

Ghani, E.K., Ali, M.M., Musa, M.N.R., & Omonov, A.A. (2022). The Effect of Perceived Usefulness, Reliability, and COVID-19 Pandemic on Digital Banking Effectiveness: Analysis Using Technology Acceptance Model. *Sustainability*, *14*(18), 1-16.

Gilbert, D.C. (1991). An examination of the consumer behaviour process related to tourism. Lymington,Hants: Belhaven Press.

Gill, J., Johnson, P., & Clark.M (2010). *Research Methods for Managers* (4th ed.) London:Sage

Gilliland, A., & McKemmish, S. (2004). Building an infrastructure for archival research. In Archival Science, 4(4), 143-147

Giovanis, A., Athanasopoulou, P., Assimakopoulos, C., & Sarmaniotis, C. (2019). Adoption of mobile banking services: A comparative analysis of four competing theoretical models. *International Journal of Bank Marketing*, 37(5), 1165-1189.

Global Fintex database. (2021) The Global Findex Database. [Online]. Available at: https://globalfindex.worldbank.org/. [Accessed: 18-01-2022].

Global Market Insights. (2021). Digital Banking market worth around $10 Tn by 2027. [Online]. Available at: https://www.gminsights.com/pressrelease/digital-banking-market. [Accessed: 02-11-2022].

Godoe, P., & Johansen, T. (2012). Understanding adoption of new technologies: Technology readiness and technology acceptance as an integrated concept. *Journal of European psychology students*, *3*(1), 127-139.

Gomber, P., Kauffman, R., Parker, C., & Weber, B. (2018). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. *Journal of Management Information Systems*, 35, 220-265.

Gong, W., & Li, Z.G. (2008). Mobile youth in China: a cultural perspective and marketing implications. *International Journal of Electronic Business*, *6*(3), 261-281.

Govender, I. & Sihlali, W. (2014). A study of mobile banking adoption among university students using an extended TAM. *Mediterranean journal of social sciences*, 5(7), 451-459.

Grogan, M., Donaldson, J., & Simmons, J. (2007). Disrupting the Status Quo: The Action Research Dissertation as a Transformative Strategy, 1(2), 1-12.

GSMA. (2022). *The Mobile Economy 2022*. [Online]. Available at: https://www.gsma.com/mobileeconomy/wp-content/uploads/2022/02/280222-The-Mobile-Economy-2022.pdf. [Accessed: 10-10-2022].

Hagger, M.S. (2019). The reasoned action approach and the theories of reasoned action and planned behaviour. In D. S. Dunn (Ed.) Oxford bibliographies in psychology New York: Oxford University Press.

Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. (2010). Multivariate Data Analysis: a global perspective. 7th edition Upper Saddle River, New Jersey: Pearson Education.

Hallikainen, H., & Laukkanen, T. (2016). How technology readiness explains acceptance and satisfaction of digital services in B2B healthcare sector. *PACIS 2016 Proceedings*,294-306.

Hamid, M.R., Sami, W., & Sidek, M.M. (2017, September). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. In *Journal of Physics: Conference Series*, 890(1), 1-5.

Hawkins, D., Best, R., & Coney, K. (2001). Consumer Behaviour: Building Marketing Strategy, New York Irwin: McGraw-Hill.

Hayes, A.F. (2013). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York: The Guilford Press

Hayes, A.F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: does method really matter? *Psychological science*, *24*(10), 1918-1927.

Healy, M., & Perry, C. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative market research: An international journal*, 3(3), 118-126.

Henderson, R.H., & Sundaresan, T. (1982). Cluster sampling to assess immunization coverage: A review of experience with a simplified sampling method. *Bulletin of the World Health Organization*, 60(2), 253-260.

Henrich, J., Heine, S.J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33(2-3), 61-135.

Henson, R.K., & Roberts, J.K. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educational and Psychological measurement*, *66*(3), 393-416.

Hermes, A., & Riedl, R. (2021). Influence of personality traits on choice of retail purchasing channel: Literature review and research agenda. *Journal of Theoretical and Applied Electronic Commerce Research*, *16*(7), 3299-3320.

Hernández, B., Jiménez, J., & José Martín, M. (2011). Age, gender and income: do they really moderate online shopping behaviour? *Online information review*, *35*(1), 113-133.

Hoenig, T.M. (1995). The evolution of the payments system: A US perspective. *Economic Review-Federal Reserve Bank of Kansas City*, *80*, 5-9.

Hofstede, G. (1983). Dimensions of national cultures in fifty countries and three regions. *Expiscations in cross-cultural psychology*, 335-355.

Hofstede, G. (1984). *Culture's consequences: International differences in work-related values*, 5. Newbury Park, CA: Sage.

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online readings in psychology and culture*, *2*(1), 2307-0919.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2005). *Cultures and organizations: Software of the mind* , 2. New York: Mcgraw-hill.

Holmbeck, G.N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: examples from the child-clinical and pediatric psychology literatures. *Journal of consulting and clinical psychology*, *65*(4), 599-610.

Hosseini, M., Shajari, S., Akbarabadi, M. (2022). Identifying multi-channel value co-creator groups in the banking industry. *Journal of Retailing and Consumer Services*, 65, 1-10.

Howard, J.A. (1969). *The Theory of Buyer Behavior.* London: John Wiley and Sons, Inc.

Hsu, M.H., & Chiu, C.M. (2004). Internet self-efficacy and electronic service acceptance. *Decision support systems*, *38*(3), 369-381.

Hsu, M.H., & Chiu, C.M. (2004). Internet self-efficacy and electronic service acceptance. *Decision support systems*, *38*(3), 369-381.

Hsu, M.H., Ju, T.L., Yen, C.H., & Chang, C.M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International journal of human-computer studies*, *65*(2), 153-169.

Hu, L.T., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, *6*(1), 1-55.

Hubbard, R., & Armstrong, J.S. (1994). Replications and extensions in marketing: Rarely published but quite contrary. *International Journal of Research in Marketing*, *11*(3), 233-248.

Humbani, M., & Wiese, M. (2018). A cashless society for all: Determining consumers' readiness to adopt mobile payment services. *Journal of African Business*, *19*(3), 409-429.

Hussain, A.S.A.A., Abeysekara, A.M.K., Hansani, H.L.U., Thelijjagoda, S., & Madhavika, W.D.N. (2020). Service Quality and Customer Satisfaction in Banking Sector during COVID-19: An Empirical Analysis of Sri Lanka. *Global Journal of management and business research*, *20*(B11), 23-29.

Hyde, K.F. (2000). Recognizing deductive processes in qualitative research. Qualitative Market Research: *An International Journal*, 3(2), 82–90.

Idris, B. (2014). Customer satisfaction of automated teller machine (ATM) based on service quality. *The West East Institute 41 International Academic Conference Proceedings New Orleans, USA.*

Islam, Md., & Ahmed, I. (2020). Individuals' Behavioural Intention to Adopt Internet Banking System in Bangladesh: An Approach to Extend Technology Acceptance Model. *International Journal of Progressive Sciences and Technologies*, 24(1999), 520-532.

Jain, P. & Agarwal, G. (2019). Factors affecting mobile banking adoption: an empirical study in Gwalior region. *The International Journal of Digital Accounting Research*, 19(4), 79-101.

Jain, V., Sharma, P., Kumar, A., & Kansal, A. (2020). Digital Banking: A Case Study of India. *Solid State Technology*, 63(6), 3-5.

Jaradat, M.I.R. M., & Al-Mashaqba, A.M. (2014). Understanding the adoption and usage of mobile payment services by using TAM3. *International Journal of Business Information Systems*, *16*(3), 271-296.

Jaradat, M.I.R. M., & Faqih, K.M. (2014). Investigating the moderating effects of gender and self-efficacy in the context of mobile payment adoption: A developing country perspective. *International Journal of Business and Management*, *9*(11), 147-169.

Jegede, C.A. (2014). Effects of automated teller machine on the performance of Nigerian banks. *American Journal of Applied Mathematics and Statistics*, *2*(1), 40-46.

Joachim, V., Spieth, P., & Heidenreich, S. (2018). Active innovation resistance: An empirical study on functional and psychological barriers to innovation adoption in different contexts. *Industrial Marketing Management*, *71*, 95-107.

Kang, M.J., & Hwang, Y.C. (2022). Exploring the Factors Affecting the Continued Usage Intention of IoT-Based Healthcare Wearable Devices Using the TAM Model. *Sustainability*, *14*(19), 1-25.

Katz, E., & Blumler, J.G. (1974). The uses of mass communications: Current perspectives on gratifications research.

Kaur, P., Dhir, A., Bodhi, R., Singh, T., & Almotairi, M. (2020). Why do people use and recommend m-wallets? *Journal of Retailing and Consumer Services*, *56*, 1-10.

Keramati, A., Taeb, R., Larijani, A.M., & Mojir, N. (2012). A combinative model of behavioural and technical factors affecting 'Mobile'-payment services adoption: an empirical study. *The Service Industries Journal*, *32*(9), 1489-1504.

Kiliari, G., & Koesrindartoto, D.P. (2019). Proceeding Book of the 4th ICMEM 2019 and the 11th IICIES.

Kim, C., Tao, W., Shin, N., & Kim, K.S. (2010). An empirical study of customers' perceptions of security and trust in e-payment systems. *Electronic commerce research and applications*, 9(1), 84-95.

Kirana, M.Y., & Havidz, S.A.H. (2020, August). Financial literacy and mobile payment usage as financial inclusion determinants. In *2020 International Conference on Information Management and Technology (ICIMTech)*, 905-910.

Kitsios, F., Giatsidis, I., & Kamariotou, M. (2021). Digital transformation and strategy in the banking sector: Evaluating the acceptance rate of e-services. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(3), 1-14.

Klapper, L., Miller, M., & Hess, J. 2019. Leveraging Digital Financial Solutions to Promote Formal Business Participation*. World Bank, Washington, DC. [Online]. Available at: https://openknowledge.worldbank.org/handle/10986/31654 [Accessed: 30-10-2022].*

Kline, R.B. (2016). Principles and Practice of Structural Equation Modeling, (4th ed.) New York, NY: The Guilford Press.

Koenig-Lewis, N., Palmer, A., & Moll, A. (2010). Predicting young consumers' take up of mobile banking services. *International journal of bank marketing*, 28(5), 410-432.

Kotler, P. (1973). Atmospherics as a marketing tool. *Journal of retailing*, *49*(4), 48-64.

Kotler, P. and Keller, K. (2011). Marketing Management (14th ed.) London: Pearson Education.

Kou, K.M., Liu, C.F., & Ma, C.C. (2013). An investigation of the effect of nurses' technology readiness on the acceptance of mobile electronic medical record systems. *BMC medical informatics and decision making*, *13*(1), 1-14.

Krishanan, D., Teng, K.L.L., & Khalidah, S. (2017). Moderating effects of age & education on consumers' perceived interactivity & intention to use mobile banking in Malaysia: a structural equation modeling approach. *Journal of Global Business and Social Entrepreneurship (GBSE),* 1(3), 152–163.

Kuhn, T.S. (1996), The structure of Scientific Revolution, University of Chicago Press, Chicago.

Kuo, Y.C., Walker, A.E., Belland, B.R., & Schroder, K.E. (2013). A predictive study of student satisfaction in online education programs. *International Review of Research in Open and Distributed Learning*, *14*(1), 16-39.

Kouladoum, J.C., Wirajing, M.A.K., & Nchofoung, T.N. (2022). Digital technologies and financial inclusion in Sub-Saharan Africa. *Telecommunications Policy*, 1-37.

Kumari, A., & Devi, N.C. (2022). Determinants of user's behavioural intention to use blockchain technology in the digital banking services. *International Journal of Electronic Finance*, *11*(2), 159–174.

Kwan, S.H. (1991). Reexamination of interest rate sensitivity of commercial bank stock returns using a random coefficient model. *Journal of Financial Services Research*, 5(1), 61–76.

Kwateng, K.O., Atiemo, K.A.O., & Appiah, C. (2018). Acceptance and use of mobile banking: an application of UTAUT2. *Journal of enterprise information management*, 32(1),118-151.

Laghmari, S. (2020). Digital Banking in Africa: Origins and Development Outlook. [Online]. Available at: https://infomineo.com/digital-banking-in-africa-origins-and-development-outlook/ [Accessed: 20-10-2022].

Lai, P. (2017). The literature review of technology adoption models and theories for the novelty technology. *Journal of Information Systems and Technology Management*, *14*(1), 21-38.

Lantos, G.P. (2015). *Consumer behavior in action: Real-life applications for marketing managers*. Routledge.

Larkotey, O.W. (2012). Attitudes of Customers toward the use of ATMs in Sub Saharan Africa: A Case Study of Ghana. *International Research Journal of Computer Science Engineering and Applications, 20(29), 30-39.*

Laukkanen, T., & Pasanen, M. (2008). Mobile banking innovators and early adopters: How they differ from other online users? *Journal of Financial Services Marketing*, *13*(2), 86-94.

Lee, J.C., & Chen, X. (2022). Exploring users' adoption intentions in the evolution of artificial intelligence mobile banking applications: the intelligent and anthropomorphic perspectives. *International Journal of Bank Marketing*, 40(4), 631-658.

Lee, J.M., & Kim, H.J. (2020a), Determinants of adoption and continuance intentions toward Internet-only banks. *International Journal of Bank Marketing*, 38(40), 843-865.

Lee, P.K., Cheng, T.E., Yeung, A.C., & Lai, K.H. (2011). An empirical study of transformational leadership, team performance and service quality in retail banks. *Omega*, *39*(6), 690-701.

Lee, S., Park, G., Yoon, B., & Park, J. (2010). Open innovation in SMEs: An intermediated network model. *Research policy*, *39*(2), 290-300.

Lee, Y., Kozar, K.A., & Larsen, K.R. (2003). The technology acceptance model: Past, present, and future. *Communications of the Association for information systems*, *12*(1), 50.

Lestari, E.R., & Ardianti, F.L. (2019). Technological capability and business success: The mediating role of innovation. In *IOP Conference Series: Earth and Environmental Science*, 250(1), 012039.

Li, Y., Wang, T., Kang, M., Zhang, Y., & Chen, Y. (2017). Understanding users' intentions towards the internet consumer credit platform: Evidence from China.

Liébana-Cabanillas, F., García-Maroto, I., Muñoz-Leiva, F., & Ramos-de-Luna, I. (2020). Mobile payment adoption in the age of digital transformation: The case of Apple Pay. *Sustainability*, *12*(13), 5443

Liebermann, Y., & Stashevsky, S. (2002). Perceived risks as barriers to Internet and e-commerce usage. *Qualitative Market Research: An International Journal*, 5(4), 291-300.

Liljander, V., Gillberg, F., Gummerus, J., & van Riel, A. (2006). Technology readiness and the evaluation and adoption of self-service technologies. *Journal of Retailing and Consumer Services*, *13*(3), 177-191.

Lin, C.H., Shih, H.Y., & Sher, P.J. (2007). Integrating technology readiness into technology acceptance: The TRAM model. *Psychology & Marketing*, *24*(7), 641-657.

Lin, H.F. (2011). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. *International journal of information management*, *31*(3), 252-260.

Lin, J.S.C., & Hsieh, P.L. (2006). The role of technology readiness in customers' perception and adoption of self-service technologies. *International Journal of Service Industry Management*, 17(5), 497-517.

Lockett, A., & Littler, D. (1997). The adoption of direct banking services. *Journal of marketing management*, *13*(8), 791-811.

Louw, C., & Nieuwenhuizen, C. (2019). Online, community-driven E-commerce platforms and the rise of lifestyle commerce: A conceptual study. In *Seventh annual winter global business conference, 12(4), 1-8*.

Louw, C. & Nieuwenhuizen, C. (2020). Digitalisation strategies in a South African banking context: A consumer services analysis. *South African Journal of Information Management.* 22(1), 1-8.

Lucena-Molina, J.J. (2016). Epistemology applied to conclusions of expert reports. *Forensic Science International*, *264*, 122–131.

Lund, B.D., Omame, I., Tijani, S., & Agbaji, D. (2020). Perceptions toward artificial intelligence among academic library employees and alignment with the diffusion of innovations' adopter categories. *College and Research Libraries*, *81*(5), 865–882.

MacKinnon, D.P. (2011). Integrating mediators and moderators in research design. *Research on social work practice*, *21*(6), 675-681.

MacKinnon, D.P., Lockwood, C.M., Hoffman, J.M., West, S.G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological methods*, *7*(1), 83-104.

MacKinnon, D.P., Lockwood, C.M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate behavioral research*, *39*(1), 99-128.

Maduku, D.K. (2014). Customers' adoption and use of e-banking services: the South African perspective. *Banks and Bank systems*, *9*(2), 67-77.

Maduku, D.K. (2016). The effect of institutional trust on internet banking acceptance: Perspectives of South African banking retail customers. *South African Journal of Economic and Management Sciences*, *19*(4), 533-548.

Maduku, D.K., & Mpinganjira, M. (2012). An empirical investigation into customers' attitude towards usage of cell phone banking in Gauteng, South Africa. *Journal of Contemporary Management*, *9*(1), 172-189.

Magboul, I., & Abbad, M. (2018). Antecedents and adoption of e-banking in bank performance: The perspective of private bank employees. *Interdisciplinary Journal of Information, Knowledge, and Management*, *13*, 361-381.

Mahansaria, D., & Roy, U.K. (2019). Secure Authentication for ATM transactions using NFC technology. *International Carnahan Conference on Security Technology (ICCST)*, 1-5.

Mahlangu, A. (2022) RCS acquires Mobicred in a bid to attract digital-savvy SA youth. [Online]. Available at: https://www.businesslive.co.za/bd/companies/financial-services/2022-04-04-rcs-acquires-mobicred-in-a-bid-to-attract-digital-savvy-sa-youth/ [Accessed:14-04 -2022]

Mahmood Alwan, I., Hadi Irhaif, N., & Najim Abdullah, A. (2021). *Analysis and testing of the most important factors affecting (COVID-19)*. *9*(1), 3–10.

Mainardes, E.W., Rosa, C.A. D.M., & Nossa, S.N. (2020). Omnichannel strategy and customer loyalty in banking. *International Journal of Bank Marketing*, *38*(4), 799-822.

Malhotra, N. 2010. *Marketing Research: An Applied Orientation (6th ed.)* Upper Saddle River, NJ: Pearson.

Mallat, N. (2007). Exploring consumer adoption of mobile payments–A qualitative study. *The Journal of Strategic Information Systems*, *16*(4), 413-432.

Mallat, N., & Tuunainen, V.K. (2008). Exploring merchant adoption of mobile payment systems: An empirical study. *E-service Journal*, *6*(2), 24-57.

Manikandan, M., & Chandramohan, S. (2016). Self -service banking technologies -opportunities and challenges. International Journal of Innovative Knowledge Concepts, 2, 1-4.

Manrai, R., & Gupta, K. P. (2022). A study on factors influencing mobile payment adoption using theory of diffusion of innovation. *International Journal of Business Information Systems*, *39*(2), 219-240.

Marakarkandy, B., Yajnik, N., & Dasgupta, C. (2017). Enabling internet banking adoption: an empirical examination with an augmented technology acceptance model (TAM). *Journal of Enterprise Information Management*, 30(2), 263-294.

Marr, NE., & Prendergast, G.P. (1993). Consumer adoption of self-service technologies in retail banking: is expert opinion supported by consumer research? *International Journal of Bank Marketing* 11(1), 3-10.

Matlala, P., (2016). Consumers' adoption of app-based banking in the city of Tshwane. *Masters' dissertation: Tshwane University of Technology, South Africa.*

Mbama, C.I., & Ezepue, P.O. (2018). Digital banking, customer experience and bank financial performance: UK customers' perceptions. *International Journal of Bank Marketing*, 12 (4), 432-451.

McCloskey, D.W. (2006). The importance of ease of use, usefulness, and trust to online consumers: An examination of the technology acceptance model with older customers. *Journal of Organizational and End User Computing (JOEUC)*, *18*(3), 47-65.

McDonough, K. (2017). Experimental research methods. *The Routledge Handbook of Instructed Second Language Acquisition*, January 2003, 562–576.

McKinnon, J. (1988). Reliability and validity in field research: some strategies and tactics. *Accounting, Auditing & Accountability Journal*, *1*(1), 34-54.

McKnight, D.H., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. *Information systems research*, *13*(3): 334-359.

McMullen, C., & Braithwaite, I. (2013). Narrative inquiry and the study of collaborative branding activity. *Electronic Journal of Business Research Methods*, 11(2):92–104.

Melnikovas, A. (2018). Towards an explicit research methodology: Adapting research onion model for futures studies. *Journal of Futures Studies*, *23*(2), 29–44.

Merhi, M., Hone, K., Tarhini, A., & Ameen, N. (2021). An empirical examination of the moderating role of age and gender in consumer mobile banking use: a cross-national, quantitative study. *Journal of Enterprise Information Management*, *34*(4), 1144-1168.

Meuter, M. L., Bitner, M. J., Ostrom, A. L., & Brown, S. W. (2005). Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies. *Journal of marketing*, *69*(2), 61-83.

Meuter, M., Ostrom, A., Roundtree, R., & Bitner, M. (2000). Self-Service Technologies: Understanding customer satisfaction with technology-based service encounters. *Journal of Marketing*, 64(3), 50-64.

Mew, J., & Millan, E. (2021). Mobile wallets: key drivers and deterrents of consumers' intention to adopt. *The International Review of Retail, Distribution and Consumer Research*, *31*(2), 182-210.

Mick, D.G., & Fournier, S. (1998). Paradoxes of technology: Consumer cognizance, emotions, and coping strategies. *Journal of Consumer research*, *25*(2), 123-143.

Mishra, V., & Bisht, SS. (2013). Mobile banking in a developing economy: A customer-centric model for policy formulation. *Telecommunications Policy*, *37*(6-7), 503-514.

Mohajan, H.K. (2020). Quantitative research: A successful investigation in natural and social sciences. *Journal of Economic Development, Environment and People*, *9*(4), 50-79.

Mols, N.P. (1998). The Internet and the banks' strategic distribution channel decisions. *Internet Research*, *8*(4), 331-337.

Moodley, P., Buthelezi, M., & Cloete, J. (2021). Consumer perception towards online shopping behaviour in South Africa. *The Retail and Marketing Review*, *17*(2), 108-118.

Moore, G.C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research*, 2(3), 192-222.

Morake, A., Khoza, L.T., & Bokaba, T. (2021). Biometric technology in banking institutions: The customers' perspectives.*SA Journal of Information Management*,*23*(1), 12.

Mothibi, K. & Rahulani, A. (2021), Digital Banking Trends in South Africa. [Online]. Available at: https://www.fsca.co.za/Regulatory%20Frameworks/FinTechDocuments/Digital%20Banking%20Slides.pdf . [Accessed: 21-08-2022]

Mthombeni, N. (2022). Demand for bank branches is rapidly falling: But is SA ready? [Online]. Available at: https://www.news24.com/fin24/opinion/prime-nolwandle-mthombeni-demand-for-bank-branches-is-rapidly-falling-but-is-sa-ready-20220420. [Accessed: 30-09-2022].

Mujinga, M., Eloff, M.M., & Kroeze, J.H. (2016). Online banking users' perceptions in South Africa: An exploratory empirical study. *IST-Africa Week Conference*,1-7.

Mukhari, S. (2016). Teachers' experience of information and communication technology use for teaching and learning in urban schools. *Doctoral thesis University of South Africa, South Africa*.

Musyaffi, A.M., Mulyani, S., Suraida, I., & Sukmadilaga, C. (2021). Lack of Readiness of Digital Banking Channel Acceptance: Study on Tam 3 and Technology Readiness. *Academy of Strategic Management Journal*, *20*(1),1-18.

Mutahar, A.M., Daud, N.M., Ramayah, T., Isaac, O., & Aldholay, A.H. (2018). The effect of awareness and perceived risk on the technology acceptance model (TAM): mobile banking in Yemen. *International Journal of Services and Standards*, *12*(2), 180-204.

Muzurura, J., & Chigora, F. (2019). Consumers' behavioural intention to adopt mobile banking in rural Sub-Saharan Africa using an extension of technology acceptance model: Lessons from Zimbabwe. *International Journal of Business, Economics and Management*, *6*(6), 316-334.

Naidu, A., & Sainy, R. (2018). Does technology readiness predict banking self-service technologies usage in India? *International Journal of Electronic Banking*, *1*(2), 129-149.

Ndlovu, I., & Ndlovu, M. (2017). Mobile banking, the future to rural financial inclusion: A case study of Zimbabwe. Journal of Humanities and Social Services, 9(4): 70-75

Neto, F.L.A., & de Figueiredo, J.C.B. (2022). Effects of age and income moderation on adoption of mobile payments in Brazil. *Innovation & Management Review*.

Nicosia, F.M., & Mayer, R.N. (1976). Toward a sociology of consumption. *Journal of consumer research*, *3*(2), 65-75.

Niemand, C.J.P., & Chauke, H., 2017, 'The use of mobile applications by public transport commuters in Gauteng, South Africa', *South African Journal of Information Management*, 19(1), 1-9.

Ngidi V., (2019). Determinants of ICT adoption by small and medium enterprises in Pietermaritzburg. *Master Dissertation: University of Kwa-Zulu Natal*, N.

Nkoyi, A. Tait, M., & van der Walt, F. (2019). Predicting the attitude towards electronic banking continued usage intentions among rural banking customers in South Africa. *South African Journal of Information Management*. 21(1), 1-8.

Nugroho, M.A., & Fajar, M.A. (2017). Effects of technology readiness towards acceptance of mandatory web-based attendance system. *Procedia Computer Science*, *124*, 319-328.

Nunnally, J.C. (1994). *Psychometric theory (3rd ed.)* Tata McGraw-hill education.

OANDA. (2022). Currency Converter. [Online]. Available at: https://www1.oanda.com/lang/en/currency/converter/. [Accessed: 06-11-2022].

OECD. (2021). Artificial Intelligence, Machine Learning and Big Data in Finance: Opportunities, Challenges, and Implications for Policy Makers. [Online]. Available at: https://www.oecd.org/finance/artificial-intelligence-machine-learningbig-data-in-finance.htm. [Accessed: 30-06-2022].

Omoge, A.P., Gala, P. & Horky, A. (2022), Disruptive technology and AI in the banking industry of an emerging market. *International Journal of Bank Marketing*, 40(6), 1217-1247.

Pai, F.Y., & Huang, K.I. (2011). Applying the technology acceptance model to the introduction of healthcare information systems. *Technological Forecasting and Social Change*, *78*(4), 650-660.

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*, London: McGraw-Hill, Open University Press.

Parasuraman, A. (2000). Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. *Journal of service research*, *2*(4), 307-320.

Park, J., Hong, E., & Le., H.T. (2021) Adopting autonomous vehicles: The moderating effects of demographic variables. *Journal of Retailing and Consumer Services, 63, 1-8.*

Park, YS., Konge, L., & Artino, AR. (2020). The positivism paradigm of research. *Academic Medicine*, *95*(5), 690-694.

Pathirage, C.P., Amaratunga, R.D.G., & Haigh, R.P. (2008). The role of philosophical context in the development of theory: Towards methodological pluralism. *The Built and Human Environment Review*, 1(1), 1-10.

Pedersen, P.E. (2005). Adoption of mobile Internet services: An exploratory study of mobile commerce early adopters. *Journal of organisational computing and electronic commerce*, *15*(3), 203-222.

Perry, C. (1998). Processes of a case study methodology for postgraduate research in marketing. *European journal of marketing*, *32*(9-10), 785-802.

Perry, C. (2002). A structured approach to presenting theses: notes for students and their supervisors. *International Journal of Organizational Behaviour,* 16 (1), 1-12.

Persaud, A., & Azhar, I. (2012). Innovative mobile marketing via smartphones: Are consumers ready? *Marketing Intelligence and Planning*, *30*(4), 418–443.

Pett, M.A., Lackey, N.R., & Sullivan, J.J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research*, California: Sage Publications Inc.

Phiri, A. (2017). Investigating the factors influencing consumers ' adoption of mobile banking services in Tshwane. *Journal of Information Engineering and Application,* 7(9), 1–9.

Ponto, J. (2015). Understanding and evaluating survey research. *Journal of the advanced practitioner in oncology*, 6(2), 168-171.

Poppe, E., Jaeger-Erben, M., & Proske, M. (2020). The smartphone evolution-an analysis of the design evolution and environmental impact of smartphones. [Online] Available at: https://www.researchgate.net/publication/344190475 [Accessed: 10-10-2022]

Porter, C.E., & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of business research*,*59*(9), 999-1007.

Prasad, R.K., & Jha, M. (2014). Consumer buying decisions models: A descriptive study. *International Journal of Innovation and applied studies*, 6(3), 335-351.

Preacher, K.J., & Hayes, A.F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, instruments, & computers*, *36*(4), 717-731.

Preacher, KJ., & Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods*, *40*(3), 879-891.

Prendergast, G.P. (1993). Self-service technologies in retail banking: current and expected adoption patterns. International Journal of Bank Marketing,11(7), 29-35.

Primanda, R., Setyaning, A.N., Hidayat, A., & Ekasasi, S.R. (2020). The role of trust on perceived usefulness and perceived ease of use toward purchase intention among Yogyakarta's students. *Jurnal Inovasi Bisnis dan Manajemen Indonesia*, *3*(3), 316-326.

Qasem, Z., 2021. The effect of positive TRI traits on centennials adoption of try-on technology in the context of E-fashion retailing. *International Journal of Information Management*, *56*, 1-11.

Rafikasari, E.F., & Iriawan, N. (2021). Estimation of Technology Acceptance Model (TAM) on the Adoption of Technology in the Learning Process Using Structural Equation Modeling (SEM) with Bayesian Approach. *International Conference on Computer Science and Artificial Intelligence, 1(1),* 86-91.

Ragnvald, S. (2001). Self-Service Banking: Value Creation Models and Information Exchange. *Informing Science: The International Journal of an Emerging Trans discipline,* 4(4), 139-148.

Rahi, S. (2017). Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & Management Sciences*, *6*(2), 1-5.

Ramavhona, T.C., & Mokwena, S. (2016). Factors influencing Internet banking adoption in South African rural areas. *South African Journal of Information Management*, 18(2),1-8.

Ramos, F.L., Ferreira, J.B., Freitas, A.S.D., & Rodrigues, J.W. (2018). The effect of trust in the intention to use m-banking. *BBR. Brazilian Business Review*, *15*(2), 75-191.

Ratchford, M., & Barnhart, M. (2012). Development and validation of the technology adoption propensity (TAP) index. *Journal of Business Research*, *65*(8), 1209-1215.

Rauniar, R., Rawski, G., Yang, J., & Johnson, B. (2014). Technology acceptance model (TAM) and social media usage: An empirical study on Facebook. *Journal of Enterprise Information Management*, 27(1), 6-30.

Realini, C., & Mehta, K. (2015). *Financial Inclusion at the Bottom of the Pyramid***,** Canada: Friesen Press.

Reiter, S., Stewart, G., & Bruce, C. (2011). A strategy for delayed research method selection: Deciding between grounded theory and phenomenology. Electronic Journal of Business Research Methods, 9(1), 35–46.

Riquelme, H.E., & Rios, R.E. (2010). The moderating effect of gender in the adoption of mobile banking. *International Journal of bank marketing*, *28*(5), 328-341.

Rhee, K.Y., & Kim, W.B. (2004). The adoption and use of the Internet in South Korea. *Journal of Computer-Mediated Communication*, JCMC943, *9*(4), 1-16.

Roberts, E.S. (1999). In defence of the survey method: An illustration from a study of user information satisfaction. *Accounting and Finance*, 39(1), 53–77.

Roberts-Lombard, M., & Parumasur, S.B. (2017). Consumer behaviour *(*4th ed.) Cape town, Claremont: Juta.

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

Rogers, E.M. (2003). *Diffusion of innovation* (5th ed.) New York: Free Press.

Rootman, C., & Krüger, J. (2020). Increasing customer adoption of the mobile payment technology Zapper in South Africa. *Journal of African Business*, *21*(4), 509-528.

Rose, J., & Fogarty, G.J. (2010). Technology readiness and segmentation profile of mature consumers. In *Proceedings of the 4th Biennial Conference of the Academy of World Business, Marketing and Management Development 4(1), 57-65.*

Rugimbana, R., & Iversen, P. (1994). Perceived Attributes of ATMs and The Marketing Implications. *International Journal of Bank Marketing* 12(2), 30-35.

Ryabikina, Z., Bogomolova, E., & Ozhigova, L. (2020). Personality identity in the terms of virtualization of being. *E3S Web of Conferences*, 210, 20016.

Ryu, E., & Cheong, J. (2017). Comparing indirect effects in different groups in single-group and multi-group structural equation models. *Frontiers in psychology*, *8(1)*, 747.

Safi, A., Raghda, A., & Badr, M. (2021). Adopted research designs by tourism and hospitality postgraduates in the light of research onion. In *International Journal of Tourism and Hospitality Management,* 4(2), 98-124.

Sahin, I. (2006). Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory. In *The Turkish Online Journal of Educational Technology*, 5(2), 14-23.

Said, T. (2018). Statistical Analysis: Internal-Consistency Reliability and Construct Validity. *European Centre for Research Training and Development UK*. 6(1), 27-38.

San Martín, H., & Herrero, Á. (2012). Influence of the user's psychological factors on the online purchase intention in rural tourism: Integrating innovativeness to the UTAUT framework. *Tourism management*, *33*(2), 341-350.

Sardana, V., & Singhania, S. (2018). Digital technology in the realm of banking: A review of literature. *International Journal of Research in Finance and Management*, *1*(2), 28-32.

Sarkar, S., Chauhan, S., & Khare, A. (2020). A meta-analysis of antecedents and consequences of trust in mobile commerce. *International Journal of Information Management*, *50*, 286-301.

Saunders, M.N.K., Lewis., P. & Thornhill, A. (2019) Research Methods for Business Students (8th ed.) New York: Pearson.

Savin-Baden, M., & Van Niekerk, L. (2007). Narrative inquiry: Theory and practice. Journal of Geography in Higher Education, 31(3), 459–472.

Saxena, R., Sinha, M., & Majra, M. (2016). Banking in India: Role of self-service technologies. *Thriving in a New World Economy* (pp. 186-189). Springer, Cham.

Scheier, M.F., & Carver, C.S. (1985). The Self-Consciousness Scale: A revised version for use with general populations. *Journal of Applied Social Psychology*, *15*(8), 687-699.

Schiffman, L., Kanuk, L. L & Wisenblit, J. (2010). Consumer behavior (10th ed.). New York: Pearson Prentice Hall.

Schreieck, M., & Wiesche, M. (2017). How established companies leverage IT platforms for value co-creation–insights from banking, 1726-174.

Schuberth, F. (2021). Confirmatory composite analysis using partial least squares: setting the record straight. *Review of Managerial Science*, *15*(5), 1311-1345.

Sekantsi, L.P. (2019). Digital financial services uptake in Africa and its role in financial inclusion of women. *Journal of Digital Banking*, *4*(2), 161-174.

Sethuraman J., Vijayabanu C., & Therasa C. (2016). A study on channel preferences among urban and rural banking customers. *Indian Journal of Science and Technology*, *9*(27), 1-9.

Setia, P., Setia, P., Venkatesh, V., & Joglekar, S. (2013). Leveraging digital technologies: How information quality leads to localized capabilities and customer service performance. *MIS quarterly*, 37(2), 565-590.

Shahid, S., Jamid U.l., Islam, J.U.I., Malik, S., & Hasan U. (2022). Examining consumer experience in using m-banking apps: A study of its antecedents and outcomes. *Journal of Retailing and Consumer Services, 65(102870).*

Shambare, R. (2013). Factors influencing the adoption of cell phone banking by South African students. *African Journal of Business Management*, *7*(1), 30-38.

Shambare, R. (2012). Predicting consumer preference for Remote Banking Services in South Africa and Zimbabwe: The role of consumer perspectives versus, personality variables. *Doctoral Thesis: Tshwane University of Technology, South Africa.*

Shambare, R. (2011). Cell phone banking adoption in South Africa. Business and economic research, 1(1), 1-15.

Shambare, R., Frouws, M. & Naidoo, V. (2010). South African consumers' complaint patterns. *Journal of business research*, 4 (1-2), 65–71.

Shambare, R. & Shambare, K. (2016). The adoption of tablet PCs by South African college students: an application of the technology acceptance model. *Problems and Perspectives in Management*. 14(1), 20-26.

Sharma, B. & Dubey, M. (2022). Digital banking: a need of time. *International Journal of and Applied Research,* 9(3), 504-513.

Shim, H.S., Han, S.L., & Ha, J. (2020). The effects of consumer readiness on the adoption of self-service technology: Moderating effects of consumer traits and situational factors. *Sustainability*, *13*(1), 95.

Shin, J., Jian, L., Driscoll, K., & Bar, F. (2018). The diffusion of misinformation on social media: Temporal pattern, message, and source. *Computers in Human Behavior*, *83*, 278-287.

Shrout, P.E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: new procedures and recommendations. *Psychological methods*, *7*(4), 422.

Sibanda, W., Ndiweni, E., Boulkeroua, M., Echchabi, A., & Ndlovu, T. (2020). Digital technology disruption on bank business models. *International Journal of Business Performance Management*,*21*(1-2), 184-213.

Simarmata, M. T., & Hia, I. J. (2020). The role of personal innovativeness on behavioral intention of Information Technology. *Journal of Economics and Business*, *1*(2), 18-29.

Singh, A., Kaur, A., & Gupta, D. (2021). Brief study to explore trust and security challenges in cloud computing. IOP *Conference Series: Materials Science and Engineering*, 1022(1).1-9.

Smit, C.S. (2017). *Technology Readiness and Mobile Self-Service Technology Adoption in the Airline Industry*, *master dissertation;University of Johannesburg ,South Africa.*

Soiferman, L.K. (2010). Compare and Contrast Inductive and Deductive Research Approaches, 1-23.

Solomon, M.R. (2021). *The New Chameleons: How to Connect with Consumers who Defy Categorization.* New York: Kogan Page Limited.

Starman, A. (2013). The case study as a type of qualitative research. *Journal of Contemporary Educational Studies*, 64(1), 28-43.

Statista (2022). Distribution of unbanked population from 2011 to 2021, by region. [Online]. Available at: https://www.statista.com/statistics/553180/distribution-of-unbanked-population-by-region/ [Accessed: 30-10-2022].

Steiger, J. H., & Lind, J. C. (1980). Statistically Based Tests for the Number of Common Factors. *Paper Presented at the Psychometric Society Annual Meeting, Iowa City, IA.*

Steinhardt, F., Dolva, A.S., Jahnsen, R., & Ullenhag, A. (2022). Exploring two subdimensions of participation, involvement, and engagement: A scoping review. *Scandinavian Journal of Occupational Therapy*, *29*(6), 441–463

Sloboda, L., Dunas, N., & Limański, A. (2018). Contemporary challenges and risks of retail banking development in Ukraine. *Banks & bank systems*, 3(1), 88-97.

Smit, C., Roberts-Lombard, M. & Mpinganjira, M., (2018). Technology readiness and mobile self-service technology adoption in the airline industry: An emerging market perspective. *Acta Commercii* 18(1), 1-12.

Sowunmi, F.A., Amoo, Z.O., Olaleye, S.O., & Salako, M.A. (2014). Effect of Automated Teller Machine (ATM) on demand for money in Isolo local government area of Lagos State, Nigeria. *Journal of Applied Business and Economics*, *16*(3), 171-180.

Sridharan, S., & Malladi, K. (2016). New generation ATM terminal services. *2016 International Conference on Computer Communication and Informatics, ICCC*, 1-6.

Statistics of South Africa. (2020). *Mid-year population estimates* [Online]. Available from: http://www.statssa.gov.za/publications/P0302/P03022011.pdf [Accessed: 21-07-2021].

Steiger, J.H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual differences*, *42*(5), 893-898.

Suhaimi, A.I.H., & Hassan, M.S.B.A. (2018). Determinants of branchless digital banking acceptance among generation Y in Malaysia. *Conference on e-Learning, e-Management and e-Services (IC3e)*, 103-108.

Sun, H., & Zhang, P. (2006). The role of moderating factors in user technology acceptance. *International journal of human-computer studies*,*64*(2), 53-78.

Suwannakul, E., (2021). Role of Technology Readiness in Airline Passengers' Perceptions of Self-service Technology Quality. *African Journal of Hospitality, Tourism and Leisure, 10(2), 670-681.*

Swanson, E. (1988). Information System Implementation: Bridging the gap between design and utilization. Homewood, IL: Irwin.

Swanson, R.A. (1988). Research and development (and other life and death matters). *Performance Improvement Quarterly*, *1*(1), 69-82.

Tabachnick, B.G., & Fidell, L. S. (2007). *Experimental designs using ANOVA* (Vol. 724). Belmont, CA: Thomson/Brooks/Cole.

Taherdoost, H. (2016). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *International Journal of Academic Research in Management,* 5(1): 28-36.

Tan, M., & Teo, T.S. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for information Systems*, *1*(1), 1-44.

Tanakinjal, G.H. (2006). *Short Message Service (SMS) and Banking.* (PhD Marketing Colloquium), University of Otago, Otago, New Zealand. Available at: http://eprints.otago.ac.nz/562/. [Accessed 01-08-2022]

Taoana, M.C., Quaye, E.S., & Abratt, R. (2021). Antecedents of brand loyalty in South African retail banking. *Journal of Financial Services Marketing*, 27(1), 65-80.

Taylor, S., & Todd, P. (1995). Decomposition and crossover effects in the theory of planned behavior: A study of consumer adoption intentions. *International journal of research in marketing*, *12*(2), 137-15.

Thibaut, J.W., & Kelley, H.H. (1959). *The Social Psychology of Groups (1st ed*.) New York:Routledge.

Thomas, J. (2019). The future of banking. [Online]. Available at: https://theaseanpost.com/article/future-banking [Accessed 21-08-2022].

Thong, J.Y., Hong, S.J., & Tam, K.Y. (2006). The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance. *International Journal of human-computer studies*, *64*(9), 799-810.

Tras, Z., Sunbul, M.G., & Baltaci, U.B. (2021). Investigation of the relationships between optimism, perceived social support, and hope. *ie: inquiry in education*, *13*(1), 1-19.

Tsumake, O.P., (2020). Assessing technology adoption at a university of technology: a case study of electronic response system. *Master Dissertation: Central University of Technology Free State.*

Uduma, I.A., & Sylva, W. (2015). A critique of the adequacy of positivist and interpretivist views of organisational studies for understanding the 21st century organisation (s). *International Journal of Business and Management Review*, *3*(8), 44-52.

Vale, P. (2017). An exploration of the prior conceptual understanding of measurement of first year national certificate (vocational) engineering students. *Doctoral Thesis; Rhodes University, South Africa*.

Vanitha, M.C.L. (2013). A study on mobile banking. *International journal of scientific research and management,* 71-77.

van de Ven, A.H. (2007). *Engaged scholarship: A guide for organizational and social research. New York, NY: Oxford University Press*.

van Nes, A., & Yamu, C. (2020). Exploring challenges in space syntax theory building: The use of positivist and hermeneutic explanatory models. *Sustainability, 12*(17), 1-21.

.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision sciences*, *39*(2), 273-315.

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

Venkatesh, V., Thong, J.Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 157-178.

Venter de Villiers, M., Chuchu, T., & Chavarika, G.V. (2020). An investigation on mobile banking and co-creation services adoption intention in South Africa, 14(11), 137-151.

Vizcarguenaga-Aguirre, I., & López-Robles, R. (2020). *Mono, mixed or multiple strategy approach: a descriptive study of the latest published articles in the International Journal of Project Management*. *3rd International Conference on Research and Education in Project Management.*

Walczuch, R., Lemmink, J., & Streukens, S. (2007). The effect of service employees' technology readiness on technology acceptance. *Information & management*, *44*(2), 206-215.

Walker, W. (2005). The strengths and weaknesses of research designs involving quantitative measures. *Journal of research in nursing*, *10*(5), 571-582.

Wan, W.W., Luk, C.L., & Chow, C.W. (2005). Customers' adoption of banking channels in Hong Kong. *International Journal of bank marketing*, *23*(3), 255-272.

Warren, M. (2007). The digital vicious cycle: Links between social disadvantage and digital exclusion in rural areas. *Telecommunications Policy*, 31(6), 374–388.

Weichert, M. (2017). The future of payments: how FinTech players are accelerating customer-driven innovation in financial services. *Journal of payments strategy & systems*, 11(1), 23-33.

Wilson, N., Keni, K., & Tan, P.H.P. (2021). The role of perceived usefulness and perceived ease-of-use toward satisfaction and trust which influence computer consumers' loyalty in China. *Gadjah Mada International Journal of Business*, *23*(3), 262-294.

Weijters, B., Rangarajan, D., Falk, T., & Schillewaert, N. (2007). Determinants and outcomes of customers' use of self-service technology in a retail setting. *Journal of Service Research*, *10*(1), 3-21.

Wiese, M., & Humbani, M. (2020). Exploring technology readiness for mobile payment app users. *The International Review of Retail, Distribution and Consumer Research*, *30*(2), 23-142

Wimalaratne, P.L.I., & Kulatunga, U. (2022). A methodology to study the complexity of buildability in construction projects: Phenomenological research perspective. In: Sandanayake, Y.G., Gunatilake, S. & Waidyasekara, K.G.A.S. (eds). *Proceedings of the 10th World Construction Symposium*, 24-26 June 2022, Sri Lanka. [Online]. 14-26.

Witts, W., & Kessy, S. (2021). Demographics as Moderator Between Perceived Easy of Use, Individual Awareness and Adoption of Mobile Financial Services. *International Journal of Business and Management*, *16*(12), 56–67.

Wood, S.L., & Moreau, C.P. (2006). From fear to loathing? How emotion influences the evaluation and early use of innovations. *Journal of Marketing*, *70*(3), 44-57.

Wu, W.H., Wu, Y.C.J., Chen, C.Y., Kao, H.Y., Lin, C.H., & Huang, S.H. (2012). Review of trends from mobile learning studies: A meta-analysis. *Computers & education*, *59*(2), 817-827.

Yakunin, A.V., & Bodrunova, S.S. (2021). Website aesthetics and functional user states as factors of web usability. In *International Conference on Human Interaction and Emerging Technologies*, 394-401.

Yang, C., & He, J. (2018). A Study on the Relationship between Customer Participation, Perceived Control and Customer Equity—Collecting Samples from Financial Industry. *American Journal of Industrial and Business Management*, *08*(03), 777–792.

Yang, S., Li, Z., Ma, Y., & Chen, X. (2018). Does electronic banking really improve bank performance? Evidence in China. *International Journal of Economics and Finance*, *10*(2), 82-94.

Yang, Y., Liu, Y., Li, H., & Yu, B. (2015). Understanding perceived risks in mobile payment acceptance. *Industrial Management & Data Systems*, 115(2), 253-269.

Yoo, K.H & Gretzel, U. (2008). The Influence of Perceived Credibility on Preferences for Recommender Systems as Sources of Advice. *Information Technology & Tourism, 10, 133-146.*

Zarov, D., Steklova, I., Abrosimova, I., & Epifanova, G. (2020). Human Identification Metamorphoses in Virtual Space. *International Conference on Engineering Management of Communication and Technology*, 1-5.

Zeitham, V.A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: a critical review of extant knowledge. *Journal of the academy of marketing science*,*30*(4), 362-375.

Zhang, J., Zheng, W., & Wang, S. (2020). The study of the effect of online review on purchase behavior: Comparing the two research methods. *International Journal of Crowd Science*, 4(1), 73-86.

Zhu, Z., Nakata, C., Sivakumar, K., & Grewal, D. (2013). Fix it or leave it? Customer recovery from self-service technology failures. *Journal of Retailing*, 89(1), 15 - 29.

APPENDIX A: RESEARCH QUESTIONNAIRE

Dear Respondent,

Thank you for participating in this research. This questionnaire is part of a study determined to investigate "**Digital readiness and adoption of self-service banking technologies in South Africa."**

Please take note that your name is not required nor is it requested, hence confidentiality is assured. Also note that your decision to take part is entirely voluntary. The questionnaire will only take 20 – 30 minutes of your time. The answers from your questionnaire and others will be used as the main data set for the research project.

General Instructions
The following instructions and conditions must be understood by all respondents:

a) Specific instructions for each section are provided.

b) When evaluating the questions, please provide the answer from your own perspective.

c) Please complete all questions, do not leave any unanswered questions.

d) Please make use of the scale proved to you for each of the questions.

e) Please note you are deciding whether to participate by continuing to the next page. You are free to withdraw from the study at any time prior to clicking the send button.

Your cooperation will be much appreciated.

Thank you.

Ntswaki Petunia Matlala
0734257915
3985766@myuwc.ac.za

Section A: PRESCREENING QUESTIONNAIRES

1. **What is your age in years?**

18 – 25	1
26 – 35	2
36 – 45	3
46 – 55	4
55+	5

2. **Are you employed?**

Yes	1
No	2

3. **Do you have bank account?**

Yes	1
No	2

Instructions: If no, to any of the above questionnaire/s, please do not continue with the survey: Thank you

SECTION B: DEMOGRAPHICS

1. **What is your gender?**

Male	1
Female	2
Other	3

2. **What is your marital status?**

Single	1
Married	2
Separated/Divorced	3

3. **What is your ethnicity group?**

African	1
White	2

Coloured	3
Indians	4
Other specify:	5

4. Where do you reside?

Gauteng	1
North-West	2
Limpopo	3
Mpumalanga	4
Free State	5
Northern Cape	6
Eastern Cape	7
Western Cape	8
KwaZulu-Natal	9

5. What is your higher level of education?

Primary School	1
Grade 12	2
Undergraduate	3
Postgraduate	4
No formal education	5

6. What is your gross monthly income?

Less than R20 000	1
R20 0001.00 – R40 000	2
R40 001.00 – R60 000	3
Above R60 001	5

7. What is your employment status?

Permanently employed	1
Temporarily employed	2
Self employed	3
Unemployed	4

SECTION C: GENERAL BANKING INFORMATION

1. **Which bank do you currently use?**

FNB	1
NEDBANK	2
ABSA	3
STANDARD BANK	4
CAPITEC	5
Tyme Bank	6
Bitvest	7
Post Bank	8
Discovery	9

2. **If you have bank account to what extent do you use self-services technologies to do your banking? (Mark that apply to you)**

	Daily	More than once in a week	Weekly	More than once in a month	Once monthly	Never
Branch	6	5	4	3	2	1
ATM	6	5	4	3	2	1
Telephone	6	5	4	3	2	1
Internet	6	5	4	3	2	1
Cell phone	6	5	4	3	2	1
App Banking	6	5	4	3	2	1

3. **Do you have smartphone/tablets/feature phone/laptop?**

Yes	1
No	2

4. **If yes to question 2 above, which channels do you use to transact? (Mark that apply to you)**

Internet banking	1
Cell phone banking	2

Telephone banking	3
App Banking	4
Contactless banking	5

5. Do you use self-service channels to transact?

Using it	1
Used but stop	2
Never use	3

6. If you use self -service channels, which services do you use (Mark that apply to you)?

Checking balance	1
Transfer	2
Bill payment	3
Opening new account	4
Checking exchange rate	5
Purchase prepaid mobile	6

7. If you have never used banking self-services before, do you intend to use it in the future?

Yes	1
No	2
Using it	3

8. Does your bank offer free data/telephone cost to use their self-service platform?

Yes	1
No	2
Do not know	3

SECTION D: DIGITAL BANKING ADOPTION FACTOR

The Scale: 1 = Strongly Agree; 2 = Disagree; 3 = Unsure/ Not Decided; 4 = Agree; 5 = Strongly Disagree

Relative Advantage		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
RA1	Digital banking offers better capability than other banking channels	1	2	3	4	5
RA2	Adopting digital banking will allow me to conduct banking transactions more efficiently.	1	2	3	4	5
RA3	Digital banking save time when performing transactions	1	2	3	4	5
RA4	Adopting digital banking is useful for managing my finances.	1	2	3	4	5
Observability		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
OB1	Digital banking is convenient	1	2	3	4	5
OB2	Digital banking is cost effective	1	2	3	4	5
OB3	Digital banking is easy to use	1	2	3	4	5
Perceived usefulness (PU)		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
PU1	I believe using a digital banking would be useful to me	1	2	3	4	5
PU2	I believe using digital banking would enable me to accomplish transactions more quickly	1	2	3	4	5
PU3	PU3 - I believe using digital banking would make my banking easier	1	2	3	4	5
Perceived Ease of Use (PEOU)		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
PEOU 1	Learning to use digital banking is easy	1	2	3	4	5
PEOU 2	Using digital banking is clear and understandable	1	2	3	4	5
PEOU 3	It is easy to become skilful at using digital banking	1	2	3	4	5
Perceived Credibility (PCR)		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
PCR1	I believe digital bank channels are trustworthy.	1	2	3	4	5
PCR2	I believe digital banks keeps its promises and commitments	1	2	3	4	5

PCR3	I believe digital banks consider customers as top priority.	1	2	3	4	5
Structural assurance (SLA)		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
SLA1	I feel safe conducting digital banking transactions because of its cyber security mechanism	1	2	3	4	5
SLA2	I feel safe conducting digital banking transactions because of its data protection policy	1	2	3	4	5
SLA3	I feel safe conducting digital banking transactions because of its customer privacy policy	1	2	3	4	5

SECTION E: TECHNOLOGY READINESS OF DIGITAL BANKING

The Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Unsure/ Not Decided; 4 = Agree; 5 = Strongly Agree

Optimism		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
PGS1	Digital banking is compatible with my lifestyle.	1	2	3	4	5
PGS2	Using digital banking fits well with the way I like to manage my finances.	1	2	3	4	5
PGS3	Using digital banking to conduct banking transactions fits into my working style.	1	2	3	4	5
Innovativeness		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
INN1	I can keep up with the latest banking self-services technologies.	1	2	3	4	5
INN2	I have the necessary resources to use digital banking.	1	2	3	4	5
INN3	I have the necessary knowledge to use digital banking.	1	2	3	4	5
Discomfort		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
DIS1	Digital banking is complex to use	1	2	3	4	5
DIS2	Digital banking requires a lot of effort	1	2	3	4	5
DIS3	Digital banking requires complex setup process	1	2	3	4	5
Insecurity		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
INS1	I need training of guidance on the use of digital banking functions	1	2	3	4	5

INS2	I have received training or guidance on the use of digital banking functions.	1	2	3	4	5
INS3	I understand security and privacy use of digital banking.	1	2	3	4	5
Behavioural Intentions		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
BI1	I intend to use digital bank continuously in the future.	1	2	3	4	5
BI2	I will always try to use digital banking in my daily life.	1	2	3	4	5
BI3	I am planning to use digital banking in the future.	1	2	3	4	5
BI4	I predict, I would use digital banking in the future	1	2	3	4	5

Thank you for your important contribution to this research.

APPENDIX B: CONSENT LETTER

SCHOOL OF BUSINESS & FINANCE

Student Name: Ntswaki Matlala
Student No: 3985766

Thesis title: Digital readiness and adoption of self-service banking technologies in South Africa

CONSENT FORM

I hereby confirm that I have been adequately informed by the researcher about the nature, conduct, benefits, and risks of the study. I have also received, read, and understood the above written information. I am aware that the results of the study will be anonymously processed into a research report. I understand that my participation is voluntary and that I may, at any stage, without prejudice, withdraw my consent and participation in the study. I had sufficient opportunity to ask questions and of my own free will declare myself prepared to participate in the study.

1. I agree to answer the survey question ☐

2. A do not agree to answer the survey question ☐

Who can you contact for further information about the research:

Primary Researcher:	Research Supervisor:	HOD:
Ntswaki Matlala School of business and Finance, University of Western Cape. Email: 3985766@myuwc.ac.za +27 073 425 7915	Prof R. Shambare School of business and Finance, Faculty of Economic and Management Science, University of Western Cape. Email: rshambare@uwc.ac.za +27 21 959 3220	Prof R. Shambare School of business and Finance, Faculty of Economic and Management Science, University of Western Cape. Email: rshambare@uwc.ac.za +27 21 959 3220

Your participation in the study will be greatly appreciated.

Ntswaki Matlala

Private Bag X17, Bellville 7535, South Africa | O: +27 21 959 3225
F: +27 21 959 3242 | E: darendse@uwc.ac.za
W: http://www.uwc.ac.za/