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THE ACCEPTANCE AND USE OF MOBILE BANKING APPS AMONG MILLENNIALS IN GAUTENG, SOUTH AFRICA

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Dissertation

Submitted in fulfilment of the requirement for
the degree

MCom in Marketing Management in the

College of Business and Economics

at the

University of Johannesburg

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DECLARATION

I, Philile Thusi (Student number: 217038697), do hereby declare that this dissertation entitled, “*THE ACCEPTANCE AND USE OF MOBILE BANKING APPS AMONG MILLENNIALS IN GAUTENG, SOUTH AFRICA*”, submitted in fulfilment of the requirements for the degree Master of Commerce (Marketing Management) at the University of Johannesburg, is my own work, and that sources that I have used or cited have been indicated and appropriately acknowledged by means of references, and that this document has not been submitted before for any other degree at any other institution.

.....
PHILILE THUSI
NOVEMBER 2018



DEDICATION

I would like to dedicate this dissertation to my special grandmother (Ms Thokozile “Mbombo” Sindisiwe Thusi) for her unconditional love, prayers and support through it all. Thank you for supporting me in everything that I do. No matter what it is, you are always there. Thank you for being everything to me. I swear you are one of a kind and may God bless you abundantly!

To my late father Mr Muzi Isaac Thusi, “Daddy I know you are in a better place, you are an angel watching over me every day and I promise to always make you proud wherever you are, will always love you!” *your Princess.*



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ABSTRACT

Mobile banking apps are one of the recent improvements in the mobile banking innovation domain that retail banks are promoting to their customers. Research into mobile banking app user behaviour is important to promoting a rapid acceptance of this banking innovation. Despite this, only limited studies have addressed this issue, particularly from the standpoint of emerging nations such as South Africa. Using the Unified Acceptance and Use of Technology (UTAUT 2) model as its theoretical background, this research analysed the drivers of and barriers to mobile banking app acceptance and use among millennials in Gauteng, South Africa.

A survey strategy using a self-administered questionnaire was applied to obtain 352 usable responses from customers of the five major South African retail banks (Capitec, Absa, FNB, Nedbank, and Standard Bank). A partial least squares structural equation modelling technique using SmartPLS version 3 was used to assess the measurement model properties and to test the hypotheses proposed for the study.

The findings suggest that performance expectancy a, facilitating conditions are significant drivers of millennials' behavioural intention to use mobile banking apps. Furthermore, perceived risk was found to be a critical barrier to millennials' behavioural intention to accept mobile banking apps; but, surprisingly, the impact of perceived risk on the actual use of mobile banking apps was found to be insignificant, thus suggesting that perceived risk is not a deterrent to mobile banking app use among millennials who currently use the innovation. Moreover, the actual use of mobile banking apps was found be strongly and positively associated with behavioural intention and facilitating conditions.

The findings of this study contribute to the limited literature that currently exists on mobile banking apps acceptance in emerging countries such as South Africa. In addition, this study validates the UTAUT2 in a different country (South Africa), in a different age group (millennials), and in a different technology domain (mobile banking apps), and thus contributes towards cross-cultural validation of the UTAUT2 beyond its original setting.

Key words: Mobile banking apps, Performance expectancy, Effort expectancy, Social influence, Hedonic motivation, Habit, Price value, facilitating conditions, Behavioural intention, Perceived risk, UTAUT2



TABLE OF CONTENTS

DECLARATION.....	ii
ACKNOWLEDGMENT.....	iv
ABSTRACT.....	v
TABLE OF CONTENTS.....	vii
LIST OF FIGURES.....	xiii
LIST OF TABLES.....	xiv

CHAPTER ONE: INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION.....	1
1.2 PROBLEM STATEMENT.....	2
1.3 RESEARCH AIM AND OBJECTIVES.....	3
1.3.1 RESEARCH AIM.....	3
1.3.2 RESEARCH OBJECTIVES.....	3
1.4 RESEARCH METHODOLOGY.....	4
1.4.1 RESEARCH PHILOSOPHY.....	4
1.4.2 RESEARCH APPROACH TO THEORY DEVELOPMENT.....	4
1.4.3 POPULATION AND SAMPLING.....	5
1.4.4 MEASUREMENT.....	5
1.4.5 DATA ANALYSIS.....	6
1.5 SIGNIFICANCE OF THE STUDY.....	6
1.6 CLARIFICATION OF KEY TERMS.....	7
1.7 OUTLINE OF THE DISSERTATION.....	9

CHAPTER TWO: OVERVIEW OF THE SOUTH AFRICAN BANKING SECTOR, MOBILE BANKING AND TECHNOLOGY USE AMONG MILLENNIALS

2.1 INTRODUCTION.....	11
2.2 OVERVIEW OF THE SOUTH AFRICAN BANKING SECTOR.....	12
2.2.1 THE USE OF TECHNOLOGY IN RETAIL BANKING.....	14
2.3 OVERVIEW OF THE MOBILE DEVICE AND MOBILE BANKING.....	17
2.3.1 OVERVIEW OF THE MOBILE DEVICE.....	17
2.4 MOBILE BANKING IN THE RETAIL BANKING SECTOR.....	20

2.4.1	OVERVIEW OF MOBILE BANKING	20
2.4.2.	APPROACHES TO MOBILE BANKING	22
2.4.2.1.	Wireless Application Protocol (WAP) Banking	22
2.4.2.2.	SIM Application Toolkit (SAT) Banking	
2.4.2.3.	Unstructured supplementary service data (USSD)	
2.5	MOBILE APPS AND MOBILE BANKING APPS.....	23
2.6	BENEFITS OF MOBILE BANKING APPS.....	28
2.7	CUSTOMER ADOPTION OF MOBILE BANKING SERVICES	29
2.8	GENERATIONAL MARKETING AND MILLENNIALS' TECHNOLOGY USE	30
	BEHAVIOUR	
2.8.1	OVERVIEW OF GENERATIONAL MARKETING.....	30
2.8.2	MILLENNIALS AND TECHNOLOGY USE BEHAVIOUR	32
2.9	CHAPTER SUMMARY.....	33
CHAPTER THREE: OVERVIEW OF USER INNOVATION ACCEPTANCE THEORIES, PROPOSED CONCEPTUAL MODEL AND HYPOTHESES FORMULATION		
3.1	INTRODUCTION.....	34
3.2	OVERVIEW OF THEORIES USED TO EXPLAIN USER ACCEPTANCE OF TECHNOLOGY.....	34
3.2.1	THEORY OF REASONED ACTION (TRA).....	35
3.2.2	THE THEORY OF PLANNED BEHAVIOUR (TPB).....	37
3.2.3	THE DECOMPOSED THEORY OF PLANNED BEHAVIOUR.....	38
3.2.4	INNOVATION DIFFUSION THEORY.....	41
3.2.5	TECHNOLOGY ACCEPTANCE MODEL (TAM).....	42
3.2.6	EXTENDED TECHNOLOGY ACCEPTANCE MODEL (TAM2).....	42
3.2.7	UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY	46
3.2.8	UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY2	49
3.3	PROPOSED CONCEPTUAL MODEL TO UNDERSTAND MOBILE BANKING APPS ACCEPTANCE AMONG MILLENNIALS	
3.3.1	Theoretical background of the conceptual model – The UTAUT 2.....	51
3.4	RESEARCH HYPOTHESES FORMULATION.....	54
3.4.1	PERFORMANCE EXPECTANCY.....	54
3.4.2	EFFORT EXPECTANCY.....	54
3.4.3	SOCIAL INFLUENCE.....	55
3.4.4	FACILITATING CONDITIONS.....	55
3.4.5	HEDONIC MOTIVATION.....	56

3.4.6 PRICE VALUE.....	56
3.4.7 HABIT.....	57
3.4.8 BEHAVIOURAL INTENTION.....	57
3.4.9 PERCEIVED RISK.....	58
3.5 CHAPTER SUMMARY.....	59

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 INTRODUCTION.....	60
4.2 RESEARCH PHILOSOPHY.....	61
4.3 RESEARCH APPROACH.....	62
4.4 METHODOLOGICAL CHOICE.....	63
4.5 RESEARCH STRATEGY AND DESIGN.....	63
4.5.1 RESEARCH STRATEGY.....	63
4.5.2 RESEARCH DESIGN.....	64
4.5.3 POPULATION AND SAMPLING.....	67
4.6 MEASUREMENT.....	71
4.7 PILOT TESTING AND RELIABILITY OF THE MEASUREMENT INSTRUMENTS.....	76
4.8 DATA COLLECTION.....	79
4.9 DATA ANALYSIS.....	80
4.10 ETHICAL CONSIDERATIONS.....	83
4.11 CHAPTER SUMMARY.....	84

CHAPTER FIVE: DATA ANALYSES AND RESULTS

5.1 INTRODUCTION.....	85
5.2 DESCRIPTIVE STATISTICS OF SAMPLE CHARACTERISTICS AND MEASURES OF THE CONSTRUCTS	86
5.2.1 DESCRIPTIVE STATISTICS OF THE SAMPLE.....	86
5.2.2 MOBILE BANKING APP USE PATTERNS.....	90
5.3 DESCRIPTIVE ANALYSIS OF THE MEASURE OF CONSTRUCT.....	92
5.3.1 PERFORMANCE EXPECTANCY.....	92
5.3.2 EFFORT EXPECTANCY.....	94
5.3.3 SOCIAL INFLUENCE.....	95
5.3.4 HEDONIC MOTIVATION.....	96
5.3.5 PRICE VALUE.....	96

5.3.6	HABIT.....	97
5.3.7	FACILITATING CONDITIONS.....	98
5.3.8	BEHAVIOURAL INTENTION.....	99
5.3.9	ACTUAL USE.....	100
5.3.10	PERCEIVED RISK.....	101
5.4	RELIABILITY ANALYSIS.....	102
5.5	STRUCTURAL EQUATION MODELLING DATA ANALYSIS.....	103
5.5.1	MEASUREMENT MODEL ANALYSIS.....	104
5.5.2	STRUCTURAL MODEL ANALYSIS.....	111
5.2.3	HYPOTHESES TESTING.....	113
5.6	CHAPTER SUMMARY.....	121

CHAPTER SIX: RESULTS DISCUSSION

6.1	INTRODUCTION.....	122
6.2	DISCUSSION OF THE RESULTS ON THE SAMPLE CHARACTERISTICS CHAR: GENDER, AGE, INCOME LEVELS, RACE	122
6.3	DISCUSSION OF THE RESULTS ON MOBILE BANKING APP USE PATTERN	123
6.3.1	MOBILE BANKING APP INSTALLATION.....	123
6.3.2	MOBILE BANKING APP USAGE FREQUENCY.....	124
6.3.3	MOBILE BANKING APPS TRANSACTIONS PERFORMED.....	124
6.3.4	TIME SPENT ON MOBILE BANKING APPS.....	124
6.4	DESCRIPTIVE STATISTICS.....	125
6.4.1	PERFORMANCE EXPECTANCY.....	125
6.4.2	EFFORT EXPECTANCY.....	125
6.4.3	SOCIAL INFLUENCE.....	126
6.4.4	HEDONIC MOTIVATION.....	127
6.4.5	PRICE VALUE.....	127
6.4.6	HABIT	128
6.4.8	FACILITATING CONDITIONS	128
6.4.9	BEHAVIOURAL INTENTION.....	129
6.4.10	ACTUAL USE.....	129
6.4.9	PERCEIVED RISK.....	130

6.5	DISCUSSION OF THE RESULTS OF THE HYPOTHESIS TESTING	
6.5.1	PERFORMANCE EXPECTANCY AND INTENTION TO USE MOBILE BANKING APPS.....	131
6.5.2	EFFORT EXPECTANCY AND INTENTION TO USE MOBILE BANKING APPS.....	131
6.5.3	SOCIAL INFLUENCE AND INTENTION TO USE MOBILE BANKING APPS.....	132
6.5.4	FACILITATING CONDITIONS AND INTENTION TO USE MOBILE BANKING APPS.....	133
6.5.5	HEDONIC MOTIVATION AND INTENTION TO USE MOBILE BANKING APPS.....	134
6.5.6	PRICE VALUE AND INTENTION TO USE MOBILE BANKING APPS....	134
6.5.7	HABIT AND INTENTION TO USE MOBILE BANKING APPS.....	135
6.5.8	HABIT AND MOBILE BANKING APP USE BEHAVIOUR.....	135
6.5.9	BEHAVIOURAL INTENTION AND ACTUAL USE OF MOBILE BANKING APPS.....	136
6.5.10	PERCEIVED RISK AND BEHAVIOURAL INTENTION TO USE MOBILE BANKING APPS.....	136
6.5.11	PERCEIVED RISK AND USE BEHAVIOUR.....	137
6.6	CHAPTER SUMMARY.....	138
 UNIVERSITY OF WITWATERSRAND JOHANNESBURG 		
CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS		
7.1	INTRODUCTION.....	139
7.2	REVIEW OF RESEARCH OBJECTIVES, FINDINGS AND CONCLUSION	140
7.2.1	SUMMARY OF FINDINGS.....	140
7.3	IMPLICATIONS OF THE FINDINGS.....	144
7.3.1	MANAGERIAL IMPLICATIONS.....	143
7.3.2	THEORETICAL IMPLICATIONS.....	145
7.4	LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH.....	146
7.4.1	LIMITATIONS OF THE STUDY.....	146
7.5	DIRECTIONS FOR FUTURE RESEARCH.....	147
7.6	CONCLUDING REMARKS.....	149
	REFERENCE LIST.....	151
	APPENDICES.....	172

APPENDIX A: Cross Loading Technique to Confirm Discriminant Validity.....	173
APPENDIX B: QUESTIONNAIRE.....	174



LIST OF FIGURES

Figure 2.1: The tablet/iPad.....	18
Figure 2.2: Personal Digital Assistant.....	19
Figure 2.3: Smartphone/Cell phone.....	20
Figure 2.4: FNB Pay APP.....	25
Figure 2.5: Standard Bank App version	27
Figure 3.1: The Theory of Reasoned Action.....	35
Figure 3.2: The Theory of Planned Behaviour (TPB).....	38
Figure 3. 3: The decomposed Theory of Planned Behaviour.....	39
Figure 3.4: Technology Acceptance Model (TAM)	43
Figure 3.5: Extended Technology Acceptance Model (TAM2)	45
Figure.3.6: Unified Theory of Acceptance and Use of Technology (UTAUT).....	48
Figure 3.7: Extended Unified Theory of Acceptance and Use of Technology (UTAUT2).....	50
Figure 3.8: Conceptual Model.....	53
Figure 4.1: Research Onion.....	60
Figure 4.2: Research Design.....	66
Figure 4.3: Stages in selection of a sample.....	68
Figure 4.4: Sampling techniques.....	70
Figure 4.5: Stages in data analysis.....	80
Figure 5.1: Gender distribution of the sample.....	86
Figure 5.2: Age Distribution.....	87
Figure 5.3: Income Distribution.....	88
Figure 5.4: Racial distribution.....	89
Figure 5.5: Measurement model with standardised factor loading.....	106
Figure 5.6: Structural model analysis with path coefficients and R ² estimates.....	113
Figure 5.7: Structural model with path coefficients with p values.....	116

LIST OF TABLES

Table 2.1: The South African banking structure.....	13
Table 2.2: South African Retail Banks Customer Numbers.....	14
Table 4.1: Operationalisation of variables.....	74
Table 4.2: Scales of Cronbach's alpha.....	77
Table 4.3: Summary of Pilot Study Reliability Results.....	78
Table 4.4: Coding information.....	81
Table 5.1: Mobile banking app installation.....	89
Table 5.2: Frequency of mobile banking apps usage.....	90
Table 5.3: Time spent on mobile banking apps.....	91
Table 5.4: Descriptive statistics of measures of performance expectancy.....	92
Table 5.5: Descriptive statistics of measures of effort expectancy.....	93
Table 5.6: Descriptive statistics of measures of social Influence.....	94
Table 5.7: Descriptive statistics of measures of hedonic motivation.....	95
Table 5.8: Descriptive statistics of measures of price value.....	96
Table 5.9: Descriptive statistics of measures of Habit.....	97
Table 5.10: Descriptive statistics of measures of facilitating conditions.....	98
Table 5.11: Descriptive statistics of measures of Behavioural intention.....	99
Table 5.12: Descriptive statistics of measures of actual use.....	100
Table 5.13: Descriptive statistics of measures of perceived risk	101
Table 5.14: Internal reliability using Cronbach's alpha.....	103
Table 5.15: Convergent validity of the measurement model.....	105
Table 5.16: Discriminant validity using the Fornell-Larcker criterion.....	110
Table 5.17: Heterotrait-Monotrait Ratio (HTMT).....	110
Table 5.18: collinearity test: Inner VIF Values.....	112
Table 5.19: Summary of the results of the hypotheses testing.....	120

CHAPTER 1

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1. INTRODUCTION

South Africa has a technologically advanced and proactively structured banking system that compares well with those of technologically advanced countries (Power, 2013:6). This is evidenced in the annual World Economic Forum Global Competitive Survey, which consistently rates South Africa as one of the global leaders in financial sector innovation and competitiveness. Indeed, the 2015/2016 report rated South Africa eighth among 140 countries in financial-sector development (World Economic Forum, 2016). Therefore, the South African banking sector has received much attention worldwide, with a number of foreign banks launching offices in the country and others obtaining stakes in major South African banks (Olasina, 2015:61). This situation has contributed to the increasing competition among banks in the sector (George, 2016:60). Banks need, therefore, to have effective strategies to hold on to their key customers and to secure new ones if they are to survive in such a competitive environment (Power, 2013:6).

In an effort to remain competitive, South African banks continue to expand their products and to develop their services within the framework of international best practice by leveraging technology to develop their services and provide value to their customers (The Banking Association South Africa, 2016). One of the most recent technologies that banks are leveraging to streamline their operations and provide their customers with value-added services is the mobile device (Maduku, 2012:77). The provision of and access to banking services on mobile devices is commonly known as 'mobile banking' (Moser, 2015:167). A recent approach to the provision of mobile banking services by retail banks is through mobile banking applications ('mobile banking apps') (Moser, 2015:167). These apps allow the user to carry out tasks and functions such as making payments, checking balances or viewing account balances, paying pre-paid credits, and much more (Baptista & Oliveira, 2015:418; Shaik & Karjaluo, 2014:131).

The success of any technology such as the mobile banking app depends on its

massive adoption by retail banks (Shaik & Karjaluooto, 2014:130; Van Deventer, 2015:26; Moser, 2015:163). One way to achieve this is to increase the acceptance of the technology among different age cohorts (Koeng-Lewis, Palmer & Moll, 2012:411). The millennial age cohort is the most technologically savvy generation to date (Lewis, *et al.*, 2012:411). A Nielsen (2014) survey cited technology use as the most defining characteristic of that generation. Therefore, this age cohort represents an attractive and lucrative market segment in which to increase the acceptance of mobile banking apps (Van Deventer, 2015:28). Thus understanding the drivers of and barriers to mobile banking app acceptance and use among this age cohort will provide the impetus to accelerate the acceptance and use of the technology among millennials, who are widely predisposed to technology acceptance.

1.2. PROBLEM STATEMENT

Retail banking is a key area of the banking industry, which has increasingly embraced technology to provide services to customers (Laukkanen, 2016:5457). This is evidenced in the use of telephone banking, automated teller machines (ATMs), PC banking, Internet banking, and lately mobile banking (Maduku, 2014:59). The implementation of these retail banking technologies has enabled banks to eliminate the necessity for branch offices and staff, resulting in reduced costs, access to new segments of the population, improved productivity, improvement of the bank's image, and improved customer service and contentment (George, 2016:61; Tam & Oliveria, 2016:436). For customers, these developments in retail banking enable them to access banking services without the time and place constraints associated with branch banking (Sreejesh, Anusree & Amarnath, 2016:1094; Shaik & Kajaluoto, 2015:3; Tam & Oliveira, 2016:435).

The adoption and implementation of retail banking technologies to serve customers comes at a significant financial cost (Akuturan & Tezcan, 2014:441). The enormity of banks' spending on technology is highlighted by findings in the Accenture (2016) digital banking report. According to the report, in 2015 global investment in banking technology amounted to \$12.12 billion. Investment into the development of mobile banking apps is one of the recent contributors to the investments in retail banking

technology (Verissom, 2016:45). Rapid and widespread acceptance of retail banking technologies is thus important to recoup this investment. Research into retail banking technology user behaviour is important to promoting the acceptance of retail banking innovations (Safeena, Date, Kammani & Hundewale, 2012:1022).

Despite this, only limited studies have addressed this issue, particularly from the standpoint of developing countries such as South Africa (Audi, Wahda, Abdalla, Jaber & Kassem, 2016; Balabanoff, 2014; Kirk, 2015; Shirin & Vandana, 2016; Verissom, 2016). Most studies that have examined the topic were conducted in Asia (Shirin & Vandana, 2016), Europe (Verissimo, 2016; Levia, Climent & Cabanillas, 2016) and North America (Kirk, 2015). Furthermore, although research (Eyerman & Turner, 1998; Van Deventer, 2015) underscores the importance of understanding technology acceptance among different generational cohorts, studies of the generational acceptance of mobile banking apps are lacking (Tan & Lau, 2016, Strutton, Taylor & Thompson, 2011).

Given the importance of understanding mobile banking app acceptance in a given context among a generational cohort, this study aims to answer the research question: *What are the drivers of and barriers to mobile banking app acceptance and use among millennials in Gauteng, South Africa?*

1.3. RESEARCH AIM AND OBJECTIVES

1.3.1. RESEARCH AIM

The aim of this study is to analyse the drivers of and barriers to mobile banking app acceptance and use among millennials in Gauteng, South Africa.

1.3.2. RESEARCH OBJECTIVES

To achieve this aim, the following objectives were set:

- To identify the drivers associated with mobile banking app use among millennial retail banking customers in Gauteng, South Africa
- To identify the barriers to mobile banking app acceptance among millennial

retail banking customers in Gauteng, South Africa

- To understand the impact of perceived risk on millennials' intended and actual use of mobile banking apps
- To examine the validity of the extended UTAUT2 model in a South African millennial sample

1.4. RESEARCH METHODOLOGY

The research methodology and design followed in this study are discussed in the subsections below

1.4.1. RESEARCH PHILOSOPHY

This study follows positivism as its research philosophy. The positivist research philosophy is an approach to research in which data is collected through observable reality. It examines consistencies and causal relationships in data to generate law-like generalities (Saunders *et al.*, 2015:128). For that reason, positivism relies on scientific methods of enquiry (Bryman & Bell, 2015:28). This study followed this philosophy because its aim was to obtain quantifiable information from a sample to test the robustness of an existing theory (UTAUT2) in studying mobile banking app acceptance among South African millennials in Gauteng. This research philosophy mostly uses surveys and experiments to test hypotheses (Babbie, 2013:60) and statistics and mathematical computations are central to the positivist research philosophy (Saunders *et al.*, 2015:129). Hence, this study uses a survey strategy for data collection, and statistical tools – including the Statistical Package for Social Sciences (SPSS) – and structural equation modelling to analyse data.

1.4.2. RESEARCH APPROACH TO THEORY DEVELOPMENT

Given the positivist philosophical stance of this study, a deductive research approach to theory development was adopted. This approach is mostly associated with quantitative studies (Saunders *et al.*, 2012:162). In following this approach, a

comprehensive review of the literature was conducted to explore existing theories (see Chapter 4), build hypotheses (see Chapter 5), and obtain quantitative data that was used to test the hypotheses proposed for this study and to check the falsification or verification of the theory through accepting or rejecting the hypotheses. A survey research strategy in the form of a self-administered questionnaire was used to obtain the data needed for the analysis. This was in line with the positivist philosophy, which mainly uses surveys and experiments to test hypotheses. The study, therefore, was descriptive and cross-sectional.

1.4.3. POPULATION AND SAMPLING

Data was obtained from customers of the five largest retail banks in South Africa who live in Gauteng, South Africa. The selection of these banks for this research was centered on the high usage of these banks by clients, and on the fact that they provide mobile banking services to their clients (BusinessTech, 2017). The province of Gauteng was selected because it is the most diverse province in South Africa, with population characteristics that mirror those of the entire country.

Because the sample frame was not available, this study uses a non-probability sampling method in the form of quota and convenience sampling techniques to decide on a sample. Quota sampling was applied first to select the sample from demographic (gender and race) quotas. This guaranteed that these demographics were equally represented in the sample. A convenience sampling technique was then used to select participants from these predefined quotas. The use of the convenience sampling technique permitted the researcher to get responses from the participants who were easily accessible to contribute in the study. Home, church, and campus visits were used to identify respondents, and deliberate efforts were taken to make certain that the target population was equally represented in terms of its racial, gender, and age segments.

1.1.4. MEASUREMENT

A self-administered questionnaire comprising four main areas was used to obtain data. The first section consisted of the screening questions. Second, the questionnaire had questions relating to customers' perceptions of mobile banking app use. This section had the items measuring the various constructs in the proposed conceptual framework. The third section consisted of the questions related to the perception of perceived risk towards mobile banking app use. The last section focused on mobile banking app use and the background information of the respondents. An introductory letter was attached to the survey: its motivation was to clarify the research purpose, provide guidelines on the most efficient method to complete the survey, and to assure the respondents of the protection of their identity.

1.4.5. DATA ANALYSIS

The data obtained was analysed by means of the Statistical Package for Social Sciences version 24. The Cronbach's alphas of the constructs were analysed to ascertain the internal reliability of the items measuring the constructs. Furthermore, a partial least squares structural equation modelling technique using SmartPLS version 3.6 software was applied to analyse the data further.

1.5. SIGNIFICANCE OF THE STUDY

The findings of this study present numerous practical and theoretical points of significance to both practitioners and researchers.

1.5.1. PRACTICAL IMPLICATIONS

Millennials are often cited as the heaviest users of technology (Williams & Page, 2016:2, Lewis *et al.*, 2012:411; Van Deventer, 2015:28, Ellis-Christensen, 2013:45). Therefore, any strategy meant to increase the acceptance and use of mobile banking will arguably be contingent on how well banks and financial institutions tap into this market segment. For practitioners, understanding the influences on the acceptance

and usage of mobile banking apps among millennials provides levers to accelerate the diffusion of this innovation in this important market segment. This understanding will enhance the development of effective strategies to promote a more rapid uptake of this banking innovation among non-users.

Moreover, promoting customer loyalty through continuous use of this innovation is key to recouping the investment in implementing the innovation (Van Deventer, 2015:23; Maduku, 2014:194; Verissimo, 2016:545). The results of this study underscore the drivers of millennials' intentions to continue using the innovation. This will permit banks and other financial service providers to come up with marketing strategies that develop customer loyalty towards mobile banking app use through nurturing its continued use among millennials.

The study further sheds light on the influence of perceived risk on the acceptance of the mobile app innovation. The findings in this regard provide guidelines to banks on strategies to mitigate the effects of the risks of adopting mobile banking apps by millennials, and thus promote its uptake and use within this segment.

1.5.2. THEORETICAL CONTRIBUTION

Theoretically, the outcomes of this study present an empirical validation of the UTAUT2 model in a South African millennial sample. The findings also extend the generalisability of the UTAUT2 to a developing country context and the mobile banking app technology domain. Venkatesh *et al.* (2003:173) recommend integrating other relevant factors into the UTAUT2 to help increase its applicability to a broad array of consumer innovation-use contexts. Given that risk perception has been highlighted as an indispensable factor explaining consumer online behaviour, the integration of perceived risk into the UTAUT2 improves its comprehensiveness in explaining mobile banking app acceptance behaviour among South Africa millennials.

1.6. CLARIFICATION OF KEY TERMS

Mobile banking – Mobile banking enables clients to perform financial transactions remotely using a mobile device, particularly cellphones, smartphones, tablets, or personal digital assistants (PDAs) (Hanafizadeh et al., 2012; Verissimo, 2016).

Mobile banking app – These are the apps that are downloaded and installed on a mobile device that allow consumers to manage their finances and use a range of services (Fenu & Pau, 2015:31).

Adoption – This is the process of acceptance, approval, and use of something new or different (Liu, 2012:251).

Generational cohort – This term is used to describe the generation born within the same span of years, sharing the same experiences, lifestyles, and adaptabilities (Jones *et al.* 2012:1).

Generational marketing – Generational marketing is defined as an approach to marketing that uses different strategies to appeal to the specific needs of each generational cohort (Soulez, 2012:40).

Millennials – This term refers to the generational cohort born between 1986 and 2002 (Eastman & Liu, 2012:94).

Perceived risk – Cocosila & Trabelsi (2016:160) state that *perceived risk* is the user's fear of losing when purchasing certain items in online environments.

Performance expectancy – This is the level at which individuals trust that using a specific innovation will assist them to advance their job presentation (Venkatesh *et al.*, 2003:426).

Effort expectancy – This is known as the level of simplicity related to the use of a particular innovation (Venkatesh *et al.*, 2003:426).

Social influence – This is defined as the point at which a person believes that 'significant others', specifically friends and family, think that he or she must accept a particular innovation (Venkatesh *et al.*, 2003:425).

Facilitating conditions – This is the level at which people believe that infrastructural and technical support exists to support their use of an innovation (Venkatesh *et al.*, 2003:426).

Hedonic motivation – This is described as the level of fun, joy, or liking associated with the use of an innovation (Baptista & Oliveira, 2015:421).

Price value – This is the consumer's trade-off between the advantages of using a particular technology and the financial cost of its use (Venkatesh *et al.*, 2012:161).

Habit – This refers the level at which people tend to engage in behaviours spontaneously due to learning (Venkatesh *et al.*, 2012:163).

1.7. OUTLINE OF THE DISSERTATION

This dissertation is divided into seven chapters.

Chapter 1: Introduction and background to the study

This chapter highlights the information related to the background of the study, the problem statement, and the significance of the study. Additionally, it gives a summary of the research methodology, and the meanings of key terms used in the study are explained.

Chapter 2: Literature review

This chapter gives an analysis of the literature on the mobile banking technology, its adoption, and its use rates in different contexts.

Chapter 3: Conceptual model and research hypotheses

Chapter 3 identifies and give an outline of theoretical models applied in the literature to understand the acceptance and use of technology. This part of the study examines models such as the Technology Acceptance Model, the Theory of Reasoned Action, the Extended Technology Acceptance Model, the Theory of Planned Behaviour, the Innovation Diffusion Theory, the Unified Theory of Acceptance and Use of Technology, and the Extended Unified Theory of Acceptance and Use of Technology model. It further discusses the theoretical model used in this

study, which is the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2). It concludes by outlining the research hypotheses proposed in the study.

Chapter 4: Research methodology

The fourth chapter reviews and clarifies the research methods used in the study, including issues such as the research philosophy, research approach, research strategy, population, sampling, data collection, ethical considerations, and questionnaire design and administration. Finally, it explains the methods used to analyse the data.

Chapter 5: Data analysis and results

In Chapter 5 the data analyses are presented. The first section of the chapter begins by discussing the demographic data of the respondents. The second part of the chapter presents the descriptive statistics on mobile banking app. The last section emphasises the results of hypothesis testing, and summarises the key findings.

Chapter 6: Results discussion

In Chapter 6 the results of the study are analysed. This chapter aims to highlight the key concerns identified, to understand the results, and to link them to the literature review discussed in Chapters 2 and 3.

Chapter 7: Conclusions, recommendations, and suggestions for future research

This chapter provides conclusions drawn from the key findings of the study, explores the practical and theoretical effects of the findings, and makes recommendations on the strategies to escalate the acceptance and use of mobile banking apps. Lastly, the restrictions of the study and directions for future studies are presented.

CHAPTER 2

OVERVIEW OF THE SOUTH AFRICAN BANKING SECTOR, MOBILE BANKING, AND TECHNOLOGY USE AMONG MILLENNIALS

2.1. INTRODUCTION

Banking significantly stimulates the economic growth and social development of both developing and developed countries. As a result, interest in its development remains central to the development agenda of most countries. As with any business, the acquisition and retention of customers remains key to the sustainability and growth of the banking sector, particularly retail banking. Hence, the banking sector has exploited the use of innovations to offer more improved services to its clients in an effort to attract and maintain customers, particularly convenience-seeking technology-savvy customers. One of the most recent technologies that has gained widespread acceptance by consumers is the mobile device. The banking industry has, therefore, exploited the opportunities provided by the mobile medium through the introduction of banking services accessible on a mobile device.

This chapter aims to give a general review of the acceptance and use of these banking services that are easily accessed using a mobile device. In particular, the discussion focuses on mobile banking apps. This chapter has two main divisions. The first section provides an outline of the South African banking environment and the use of innovation in the offering of banking services. The chapter develops further with a review of the mobile device and how it being exploited to provide banking services to consumers by specifically looking at existing approaches to mobile banking, with an emphasis on mobile banking apps.

Studies have shown that millennials are the most technology-savvy generation in comparison with those preceding them. Hence, this segment presents a good chance for banks to drive the acceptance of their banking innovations. Thus the second part of this chapter discusses generational marketing with a particular focus on technology-acceptance behaviour among the millennial age cohort.

2.2. OVERVIEW OF THE SOUTH AFRICAN BANKING SECTOR

South Africa has a banking structure that is well-established and compares well with banking structures in several industrialised nations such as the USA, the United Kingdom, and Switzerland. Furthermore, South Africa's banking structure differentiates South Africa from emergent market economies such as Brazil (Redlinghuis & Rensleigh, 2012:1) and is widely recognised as the best banking system in Africa (Van Deventer, 2015:55).

The global attractiveness of the South African banking industry is attributed to robust private sector participation and a first-class regulatory system, which presents many national and foreign organisations with a large variety of services (Redlinghuis & Rensleigh, 2012:2). As a result, the SA banking system is managed properly, and it operates using advanced risk-management systems and public and corporate government structures (Van Deventer, 2015:58). Moreover, South African bank regulations are in accordance with the standards set by the Basel Committee on Banking Supervision Act; hence, its operations are in line with international best practices.

The SA banking system offers a number of services, including investment banking, insurance, and commercial, retail, and merchant banking (Van Deventer, 2015:56). These services are offered by 38 South African banks; 24 of them are controlled in South Africa; seven are controlled in foreign nations; 14 are domestic branches of external banks; and two are shared banks. Furthermore, the SA Financial Sector Forum (2012) states that 44 foreign banks have established local offices to represent them in South Africa. Table 2.1 presents the structure of the SA banking system as of October, 2017.

Table 2.1: The South African banking structure

Locally controlled banks	Foreign controlled banks	Branches of foreign banks	Mutual banks	Other banks
"Nedbank Group; Nedbank Old Mutual Bank; Peoples Bank Go Banking; Rand Merchant Bank Regal Treasury; Private Bank Rennies Bank; RMB Private Bank Sasfin Bank; Standard Bank TEBA Bank; Wesbank Absa Bank; African Bank BoE Private Clients Bidvest Bank Capitec Bank Fairbairn Private Bank FirstRand Bank First National Bank Imperial Bank Investec Bank Marriott Corporate Property Bank MEEG Bank"	"Absa Bank Albaraka Bank Habib Overseas Bank HBZ Bank Islamic Bank Mercantile Bank South African Bank of Athens"	"ABN AMRO Bank Bank of Baroda Bank of China Bank of Taiwan Barclays Bank Calyon Corporate and Investment Bank China Construction Bank Citibank Commerzbank Aktiengesellschaft HSBC Bank JPMorgan Chase Bank Société Générale Standard Chartered Bank State Bank of China"	"GBS Mutual Bank VBC Mutual Bank"	"Development Bank of Southern Africa Land and Agricultural Bank of South Africa Postbank"

Source: SA Financial Sector Forum, 2012

In the retail banking sector, five major banks dominate. These are the South African banks, Absa, Standard Bank, Nedbank, First National Bank (FNB), and Capitec. A BusinessTech (2017) research survey finding indicates that Standard Bank is the largest bank, with 10.6-million South Africans owning Standard Bank accounts. Following Standard Bank is Capitec with 9.0-million retail bank accounts. A three-year analysis of the customer base of the major retail banks is presented in Table 2.2.

Table 2.2: South African retail banks' customer numbers

Bank	June 2016	December 2016	June 2017
Standard Bank (Accounts)*	10.9-million	10.7-million	10.6-million
Capitec	7.9-million	8.3-million	9.0-million
Absa Bank	8.9-million	8.8-million	8.65-million
FNB	7.4-million	7.7-million	7.8-million
Nedbank	7.7-million	7.4-million	7.8-million

Source: BusinessTech, 2017

Due to the stiff competition in the banking sector, South Africa banks are always at the forefront of using technology to streamline their operations, cut down costs, and provide improved services to their customers (BusinessTech, 2017).

2.2.1. THE USE OF TECHNOLOGY IN RETAIL BANKING

The South African banking system is internationally acknowledged for its use of technology to streamline its banking activities. Recently, the banking industry has acknowledged the introduction of block chain technology, which is proving to be an innovative technology in the banking and financial sector, offering significant benefits via the automation of processes, resulting in savings due to reductions in disputes, fraud, faster reconciliations, and lower infrastructure costs (The Banking Association South Africa, 2017:35).

The retail banking sector is a major user of innovation, and is identified as a leading and dominant industry that quickly adopts and use innovations in its retail marketplaces. Furthermore, the offering of banking services has undergone exceptional reforms over time. The use of technology over the years has dramatically revolutionised retail banking as retail banks have adopted digital banking solutions to complement in-branch banking (Maduku, 2013:77). Retail banks have embraced the technology revolution

through the introduction of various digital banking solutions, which include Internet banking, telephone banking, PC banking, ATMs, and – most recently – mobile banking (Van Deventer, 2015:45).

Developments in Internet-related technology have resulted in the formation of various products and services, such as Internet banking (Van Deventer, 2015:22). The use of the Internet as a business tool has improved tremendously around the world, with the banking sector considered one of the early adopters of the Internet (Maduku, 2013:78). As a result, retail banks have completely restructured their retail banking channels.

Internet banking refers to a banking offering that permits clients to have access and complete numerous financial transactions using their own computers through the bank's website; this can be done via web browser software, such as Microsoft Internet Explorer (Van Deventer, 2015:22). Internet banking presents a wide range of benefits for both retail banks and customers. It allows customers to view balances and access statements online, make online payments to beneficiaries, notify them about payments made to their accounts or to a recipient via SMS, and to stop cheques and debit orders online without the need to visit a branch (Yahiya, 2012:14). On the other hand, retail banks are also benefiting from using Internet banking through its cost-effectiveness and its ability to remove the traditional geographic barriers, as retail banks can reach out to clients in different geographical areas (Redda, 2015:20).

Telephone banking refers to a method of performing banking transactions from home instead of visiting branch locations (Redlinghuis & Rensleigh, 2012:2). This form of electronic banking allows customers to acquire their banking information via a phone call (Yahiya, 2012:16). Telephone banking relies on the availability and accessibility of a telephone line, a client's passwords, and a personal code that gives access to data. With this form of banking, customers can consult the bank and enquire about their account balances, perform inter-account transfers, and conduct other banking activities. Using this banking service enables retail banking clients to get information concerning active and inactive banking products and services (Redda, 2015:20). One benefit of this service is that it does not require any additional technical equipment apart from a

telephone. Moreover, it is possible to use bank services from any place at any time, as the bank telephone centre (call centre) operates 24 hours a day (Redlinghuis & Rensleigh, 2012:2).

PC banking is the type of electronic banking that supports banking using a personal computer via a modem (Yahiya, 2012:16). The customer connects to the bank using a modem, transfers information, and performs programs that are resident on the client's personal computer (Federal Trade Commission, 2012:1). Currently, several banks have PC banking systems that enable clients to access their bank balances and credit card information, pay account and bills, and do inter-account transfers. PC banking offers clients the convenience of performing numerous banking transactions electronically through the use of a personal computer (Van Deventer, 2015:44).

Automated teller machines (ATMs) are electronic terminals that allow clients to perform banking transactions anytime and at any place where there is an ATM (Federal Trade Commission, 2012:1). ATMs are usually found outside bank branches, but are also found in places such as malls, airports, universities, and shopping centres. These machines allow customers to do cash withdrawals, deposit cash, print statements, or transfer funds between accounts (Federal Trade Commission, 2012:1). Garg *et al.* (2013:40) state that the ATM usage percentage has decreased significantly from 24.4% to 14.2% since 2005; however, in the ATM Benchmarking Study conducted by Accenture (2016), the increased diffusion of ATMs was noted. ATM diffusion increased worldwide to 43.97 ATMs per 100 000 in 2014, a 52.1% increase from the 28.90 ATMs per 100 000 recorded in 2010 (Accenture, 2016:12). The improved functionality of ATMs, referred to as *value added services*, is the main reason for this increase in diffusion (Accenture, 2016:20). ATMs help to increase productivity during banking hours, if the banking service is available via the ATM. They are cheaper, and they provide convenient and faster customer service.

The *mobile device* is the latest device that is being used by banks to provide services to their customers, through mobile banking services (Hanafizadeh, Behboudi & Khoshksaray, 2012:33). Verissimo (2016) and Shaik and Karjaluo (2015) define

mobile banking as a banking service that enables bank clients to perform a number of financial and banking transactions via a mobile device, including a cell phone, smartphone, tablet, or PDA, anytime and anywhere. Mobile banking depends on wireless application protocol (WAP) technologies, since a mobile device needs to have a WAP browser installed in order for it to access data (Hanafizadeh, Behboudi & Khoshksaray, 2012:33). With the introduction of mobile banking, banks have been able to enhance customer services and enjoy operational efficiencies while saving the time and effort of retail banking clients through this fast and convenient banking service (Yu, 2012:105).

2.3. OVERVIEW OF THE MOBILE DEVICE AND MOBILE BANKING

2.3.1. OVERVIEW OF THE MOBILE DEVICE

A *mobile device* refers to a small computing device, intended to be portable and functioning as a personal computer (Lenhart, Duggan, Perrin, Stepler, Rainie & Parker, 2015:5). This device has functionalities similar to a personal computer, and thus allows users to execute similar activities as when using a desktop or laptop (Chatrand, 2016:1). Furthermore, mobile devices have a display touchscreen input and a mini-keyboard, as well as an operating system that is capable of running different types of application software programs, commonly known as *applications* or '*apps*' (Van Deventer, 2015:29). Many mobile devices have functions such as Wi-Fi, Bluetooth and Internet connections (Goodwill Community Foundation, 2015). These devices include, among others, "mobile phones, personal digital assistants (PDAs), tablet computers or iPads, smart watches, handheld game consoles, digital video cameras and portable media players" (Cruz, Salo, Muñoz-Gallego & Luukkanen, 2010:343). For the purpose of this research, and taking into consideration the importance of mobile banking apps, the focus is on the tablet computer or iPad, the personal digital assistant (PDA), and the cell phone or smartphone.

The tablet computer is a mobile device with a touchscreen display that permits users to access the Internet (Lenhart *et al.*, 2015:6). The tablet or iPad has a Wi-Fi, third generation (3G) or fourth generation (4G) mobile device that enables users to enjoy a variety of functions including browsing the web, playing games, watching videos, and reading electronic books (Van Deventer, 2015:29).

Figure 2.1: The tablet



Source: Lenovo, 2017

A personal digital assistant (PDA), which is usually smaller than the tablet, is a user-friendly hand-held mobile device having both a keyboard and a touchscreen, and also wireless Internet and network access (Chartrand, 2016:2). PDAs come with software for organising personal data and managing personal information, such as saving contact information, managing calendars, communicating through email, and managing documents and spreadsheets. An illustration of a PDA is given in Figure 2.

Figure 2.2: Personal digital assistant



Source: Search Mobile, 2016

A cell phone is a mobile electric telecommunications device that links to a telecommunication network to send and receive data. In general, most mobile phones offer services such as SMSs, MMSs, and voice communications (Chartrand, 2016:2). Smartphones are improved versions of the cell phone, and are capable of running a wide range of applications that are usually similar to a tablet or PDA (Lenhart *et al.*, 2015:6).

Figure 2.3: Smartphone or cell phone



Source: Apple, 2017

The inherent characteristics of these mobile devices have enabled banks to provide banking services on the mobile platforms of their clients (Verissimo, 2016:545).

2.4 MOBILE BANKING IN THE RETAIL BANKING SECTOR

2.4.1 OVERVIEW OF MOBILE BANKING

Mobile banking is widely known as a service offered by banks that enables customers to execute financial transactions anytime and everywhere using a mobile device such as smartphones, tablets, or PDAs (Hanafizadeh, Behboudi & Khoshksaray, 2012; Verissimo, 2016; Laukaneen, 2016; Shaik & Karjaluto, 2015; Yu, 2012). Mobile

banking is also described as the channel used to deliver banking and financial services, including bank and stock market activities, access to personalised financial data, and financial account management, through mobile telecommunication devices (Faria, 2012:3).

Yu (2012:104) contended that mobile banking is an advancement of a bank's current payment structure that makes use of mobile devices as a main channel to deliver banking services. Mobile banking is therefore widely regarded as an extension of Internet banking (Laukkanen & Pasanen, 2008; Yu, 2012; Zhou, 2012). Researchers use diverse terms to describe mobile banking. These include "m-banking" (Liu, 2012), "branchless banking" (Ivatury & Mass, 2008), and "M-payments", "M-transfers", and "M-finance" (Donner & Tellez, 2008). A host of financial transactions such as checking balances, making transfers, buying online, and paying accounts can be performed over the mobile banking interface. As result, Faria (2012:3) classified mobile banking services into various groups, such as:

Mobile accounting: It includes services such as cheque book entries, reporting and blocking lost cards, transfers, and new insurance subscriptions.

Mobile brokerage: This involves the activities of selling and buying financial services.

Mobile financial information: Entails activities such as balance enquiries, statement requests, credit card information, and ATM locations.

Chandran (2014:2) observed that mobile banking transactions can be categorised into two kinds: push and pull methods. A push method is a one-way communication method whereby the bank sends information via an SMS to the customer about their bank accounts. A pull method, in contrast, is a two-way transaction whereby customers send requests about their accounts and the bank replies (Chandran, 2014:2).

Banks use different mobile banking approaches. The commonly used forms of mobile banking include Java 2 micro-edition banking, Wireless Application Protocol (WAP) banking, mobile banking with SIM-Toolkit, unstructured supplementary service data (USSD), and, more recently, mobile banking apps. Mobile banking apps are the central interest of this study.

2.4.2 APPROACHES TO MOBILE BANKING

2.4.2.1. Wireless Application Protocol (WAP) banking

WAP is described as the Internet on a mobile device. The WAP-Forum, an association of leading producers of mobile phones, among which are Ericsson, Motorola, and Nokia, established WAP (Van Deventer, 2015:54). The main objective of this innovation was to deliver a broad design in the industry that works on mobile telecommunications networks and conveys Internet data on mobile devices, irrespective of the communication system used by network carriers (Van Deventer, 2015:54). Tarawneh *et al.* (2012:52) posited that WAP is an application that is in line with global standards for wireless communication. Moreover, the primary application of WAP is to allow users to gain access to the Internet using a mobile device – specifically, a mobile phone and/or PDA. Additionally, a WAP allows uncomplicated services that are offered by a computer-based web browser; however, it is streamlined to work within the restrictions of a mobile device.

2.4.2.2. SIM Application Toolkit (SAT) banking

The Sim-Toolkit, also referred to as the SIM Application Toolkit (SAT), forms a part of the GSM standard that allows for the Subscriber Identity Module (SIM) to start actions to use SMSes further by offering valued services including mobile banking. The SIM-Toolkit consists of a set of guidelines programmed into a SIM that are used to explain how the SIM functions directly, and initiates guidelines independently of the handset and the network (Nyaketcho *et al.*, 2012:1). The authors observe that numerous mobile users globally have exploited the SAT for many systems, in which a menu-based method is a requirement, comprising mobile banking and content browsing. On the other hand, the overall challenge encountered by the SAT, like all SIM-based applications, is to activate the application on a SIM card that exists in the marketplace (Tarawneh *et al.*, 2012:51).

2.4.2.3. Unstructured supplementary service data (USSD)

Krugel (2007:17) notes that USSD is an SMS in the form of a menu through which a user gets a message on their mobile device. Several banking processes, such as airtime purchases, money transmissions, bill payments, and checking balances through the mobile phone can be carried out via this communication method. Furthermore, USSD is analogous to SMS technology because it also has data payload restrictions ranging from 160 to 182 alphanumeric characters in one message. USSD, as shown by Krugel (2007:17), is a data-bearing channel in the GSM network. In contrast with the SMS, Van Deventer (2015:37) has stated that USSD conveys shorter messages, fitting in no more than 160 characters between the mobile device and the network.

A recent addition to these approaches to banking is banking through a mobile app. The sections below explain mobile apps, and how they are being used by banks to provide financial services to their retail clients.

2.5. MOBILE APPS AND MOBILE BANKING APPS

Mobile apps refer to end-user software applications made for mobile device operating systems that strengthen the competencies of the device to carry out a wide array of services, such as financial services, gaming, and web browsing (Kit *et al.*, 2014:1). A mobile app is usually a software program that is downloaded and installed on either a smartphone or a tablet (Balabanoff, 2014:249). Apps enable consumers to perform a number of tasks and functions and to access different types of information easily (Balabanoff, 2014:249).

Kit *et al.* (2014:39) identified six categories of mobile app. These are:

- **Communication app**, which refers to a software program that can be copied and installed on a smartphone or any other communication device; this app allows for

users to send and receive messages, exchange audio, videos and photos, access social media, and do business (Islam & Mazumder, 2012:1)

- **Emergency mobile app** is defined as the app downloaded to a smartphone to get the assistance needed in emergency situations; these apps include a setting that can track the person if they are driving or jogging; and if a person does not reach his or her destination, the app will alert the emergency contacts (Ventola, 2014:359).
- **Entertainment apps** are interactive and intended to entertain and update the user; these apps offer audio, visual, and other information such as ticketing services, theatre, voice manipulation, and movies (Localytics, 2015:7).
- **Content delivery apps** provide information about current events, current news in politics, economics, business, and science and technology (Islam & Mazumder, 2012:1).
- **Location apps** provide information that will help the user to get to a physical location; these apps offer services such as driving support, walking support, maritime, pilot logs, road atlases, and public-transit maps (Islam & Mazumder, 2012:1).
- **Finance apps** execute financial transactions and support the customers with business or personal financial matters; these apps perform a wide range of transactions including personal financial management, mobile banking, investments, tax, budgets, and debt management (Kit *et al.*, 2014:39). Mobile banking apps belong to this category of apps.

From a banking viewpoint, apps that are downloaded and installed on a mobile device, and that allow consumers to manage their finances and conduct a range of services, are referred to as 'mobile banking apps' (Fenu & Pau, 2015:31). These apps are convenient and user friendly, and enable banks to personalise and brand their pages the way they like. This method is widely viewed as the future of mobile banking (The Banking Association, 2017). Mobile banking apps allow customers to perform a broad range of banking services, such as checking bank account balances, paying accounts, doing inter-account transfers, managing credit cards, buying and selling shares, and

obtaining information about investment portfolios and fees (Audi, Wahda, Abdalla, Jaber & Kassem, 2016:3).

Most South African retail banks have embraced the use of mobile apps to provide services to their customers. Moreover, the retail banks are diversifying their offerings by constantly incorporating new and convenient features into their banking apps (Meyer, 2015). In October 2016, FNB presented the newest version of its app, which has a wide array of digital solutions that are the first to be introduced in Africa, such as the FNB Pay app. This app is an internationally recognised contactless payment service that enables consumers to buy goods by tapping their mobile devices on contactless-enabled point-of-sale terminals. FNB Pay works through the FNB banking app, and it requires users to download the latest version of the FNB banking app and register their qualifying card. Users can tap their Android smartphones on a supported card machine to make payments when they see the 'contactless' logo. The service allows users to make payments of up to R200 without having to enter a Personal Identification Number (The Banking Association, 2017).

Figure 2.4: FNB Pay app



Source: First National Bank, 2017

In July 2016, Absa improved its app by launching a revamped version with additional convenient features such as a “Manage beneficiaries function” on the app menu. This feature allows users to see payments made to saved beneficiaries over the previous year, which is advantageous when customers want to double-check the payments that have been made without the need to log into online banking (Fitch Africa, 2017). The app also allows users to open bank accounts without the need for paperwork or a visit to a branch (IT Web, 2018).

In March 2015, Standard Bank introduced an improved version of its mobile banking app to incorporate fingerprint biometric security as a sign-in mechanism for iPhone users to access the app. The app also now features ‘balance peek’, which allows customers to check balances without signing in. They can also link the app to their Apple Watch to check balances, activate cards for international travel, check UCount balances, and even search for nearby ATMs, as well as branches and Caltex outlets (Business Tech, 2017). This was the first of its kind in South Africa, and this technology will be rolled out to all Android phones (Business Tech, 2017).

Figure 2.5: Standard Bank app version 2.5.8.



Source: Standard Bank, 2017

In July 2014, Nedbank launched features such as Nedbank App Suite, which allows customers to play Lotto, buy pre-paid airtime, electricity and data, and to send money through the SendiMali feature. NedTreasury enables users to make global payments and transfers in multiple currencies, all accessible online. Users can also receive and process incoming transfers electronically in real time (Nedbank, 2017).

Capitec was rated the world's best digital bank in the 2016 Lafferty Bank Ratings (Capitec, 2017). Capitec has incorporated new features into its latest version of the app, which includes the capability to stop and block debit orders; purchase airtime in large amounts; pay a Capitec Bank client using their Capitec-registered cell phone number; and request e-stamped statements (BusinessTech, 2017).

The introduction of these mobile banking apps presents a range of benefits to retail banks and their banking customers.

2.6. BENEFITS OF MOBILE BANKING APPS

Using mobile banking apps offers benefits to both banking institutions and users. With the introduction of mobile banking apps, banks have been able to enhance customer services and enjoy operational efficiencies by shifting the focus from transactions to more advisory-related services within retail bank branches, leading to increased sales and high cross-selling rates (Chandaran, 2014:2). The deployment of banking services on mobile apps has enabled some banks to increase market share and grow their client bases (Deloitte, 2013). Moreover, this innovation has enabled banks to reduce their expenditure on hiring staff and purchasing office furniture, fittings, and stationery (Deloitte, 2013; Mashagba & Nassar, 2012:84). Mobile banking apps allow banks to expand geographically and to reach larger markets; they also allow for cross-selling and up-selling to bank customers (Deloitte, 2013).

For customers, the use of mobile banking apps enables them to enjoy a number of benefits, including these:

- Mobile banking apps allow customers to manage their funds ‘on the go’, irrespective of time and place (Chandaran, 2014:3).
- With mobile banking apps, customers can access their financial records easily and securely (Maduku, 2013:70).
- Mobile banking apps allow customers to interact with their banks without having to visit the branch (Yu, 2012:106).
- Banking apps enable consumers to perform banking transactions without having to travel to a physical bank branch; this helps them save on bank charges (Banking Association of South Africa, 2017).
- Banking apps have zero data charges, and are convenient, fast, efficient, and simple to operate. In addition, mobile banking apps reduce the risk of bank accounts shutting down due to idleness, allowing customers who do not earn

regular income to do banking and to access the latest borrowing and saving rates (Chandran, 2014:2).

2.7. CUSTOMER ADOPTION OF MOBILE BANKING SERVICES

The mobile banking market is recognised as the fastest developing market globally; and it is growing at a very fast pace (Balabanoff, 2014, 249). Mobile banking is already the major banking medium for many banks worldwide. The growth in the number of worldwide mobile banking customers is in an extraordinarily speedy phase (KPMG, 2015:3). It is predicted that, in the next five to 10 years, mobile banking will experience successfully exponential growth before ubiquity levels the growth curve (KPMG, 2015:3). Adoption rates are high in non-industrialised countries, reaching 60% to 70% in China and India in comparison with established countries such as the US, Canada, and the UK (KPMG, 2015:3). Adoption growth rates within countries show wide differences, even across economies that are similar; and the global user base of mobile banking is anticipated to rise from 0.8-billion in 2014 to 1.8-billion in 2019 (CapeGemini Consulting, 2016:12). Asia-Pacific countries exceed the global average when it comes to participation in mobile banking activities, with Japan being recognised as the most established mobile banking market, where the usage rates of mobile banking apps are significantly high; while response rates are lower in Europe, Africa and the Middle East, North America, and Latin America (KPMG, 2015:4).

Standard Bank (2015) estimates that most banking activities in Africa will be executed through smart mobile devices in the next three to five years. Conservative estimates show that more than 100-million retail banking customers across the African continent rely on mobile banking apps to access and conduct banking services (Standard Bank, 2015). A Nielsen mobile shopping survey (2016) reported that 67% of South African respondents said that they had accessed accounts, checked account balances, or performed other banking transactions on their smartphones in the previous six months, and that 50% said that they had paid a bill online via mobile banking apps (BusinessBrief, 2016). Maduku (2014:38) highlights that customers' need for prompt

access to financial records, along with the spread of mobile devices, will result in growth in the use of mobile devices to perform banking activities.

2.8. GENERATIONAL MARKETING AND MILLENNIALS' TECHNOLOGY USE BEHAVIOUR

2.8.1. OVERVIEW OF GENERATIONAL MARKETING

A *generation* refers to a group of people born within a specific time span (Jones, Jo & Martin, 2012:1). Generations are classified into *generational cohorts* (Eastman & Liu, 2012:93). This term is used to describe the generation born within the same span of years and who share the same experiences and lifestyles, and whose members are known to have the same attitudes towards certain things (Jones *et al.*, 2012:1). Eastman and Liu (2012:94) argued that generational cohorts are significantly influenced by external events, and are associated with unique morals and priorities that can endure over their lifetimes.

Demographers have widely classified the generational cohorts into baby boomers, Generation X, and millennials (also called Generation Y).

- Baby boomers: Williams and Page (2013:3) define baby boomers as individuals who were born between the years 1946 and 1964 – that is, after World War II. This generation is classified as independent, individualistic, and strongly interested in their personal growth (Market, 2004; Eastman & Liu, 2012:94). Furthermore, baby boomers do not like bureaucracy. However, a unique characteristic that drives this age cohort is their noticeable inclination to perform a given behaviour (Williams & Page, 2013:3). In terms of their consumption, baby boomers are noted for their emphasis on value, and they are generally not concerned about cost if they believe that the product or service is superior and provides good value (Eastman & Liu, 2012:93).
- Generation X: People who were born between 1965 and 1985 are known as Generation X (Eastman & Liu, 2012:94). This generational cohort group grew up

during difficult economic times such as the recession that took place in the 1980s. Furthermore, they had to deal with family and social issues such as divorced parents. This cohort is known to be self-starters who are a realistic and highly educated generation (Williams & Page, 2013:3). Generation X are individualists, sceptical, and do not like labels. They are self-sufficient, and do not easily trust people and situations. They show a strong entrepreneurial spirit, and prefer a lifestyle that provides freedom and flexibility.

- Millennials: People born between 1986 and 2002 are known as millennials (Eastman & Liu, 2012:94). Authors have labelled this generation with a variety of terms, including Generation Y, Net Generation, and Echo Boomers (Cudmore Patton & McClure, 2010; Schiffman, Kanuk & Wisenblit, 2010; Schlitzkus, Schenarts & Schenarts, 2010). This generation comprises more than more than 50% of the world's population (Harrington, Ottenbacher, Staggs & Powel, 2011:436), making it the largest generation worldwide. Soares, Zhang, Proença and Kandampully (2017:521) distinguished millennials from previous generations as the cohort that is education-directed, confident, passionate, strong-minded, enthusiastic, flexible to change, challenging, having a high anticipation level, and usually expressing their opinions. This cohort is also known to be consumption-oriented, stylish, to love shopping, and to have a high level of spending power. Like the baby boomers, Generation Y is very socially alert, but they are comfortable with multiculturalism. They are the most secure and most spoiled generation (Eastman, 2012:95). The millennials are widely regarded as the most technologically savvy generation, as they are comfortable and confident with all forms of technology, from computers to mobile devices (Stein, 2013:2).

Owing to the shared behaviour among members of a certain generational cohort, and observable differences in the behaviour of one generational cohort from another, marketers have emphasised the need to treat each generational cohort differently, leading to the term *generational marketing* (Fernandez-Duran, 2016:435). Generational marketing is seen, therefore, as an approach to marketing that uses different strategies to appeal to the specific needs of each generational group (Soulez, 2012:40).

Successful generational marketing requires a good understanding of their consumption behaviour (Fernandez-Duran, 2016:435).

2.8.2 MILLENNIALS AND TECHNOLOGY-USE BEHAVIOUR

The millennial generational cohort is characterised as the first high-tech generation, because they regard technology as an essential part of their daily lives. In fact, Williams and Page (2016:2) emphasised that millennials have a greater responsiveness and proximity to technological devices than previous generations. Williams and Page (2016:2) pointed out that millennials were the first age group to have access to the Internet, mobile devices, convergent technologies, and a number of multimedia platforms such as social media networks, including Facebook, Twitter, and YouTube. This generation watches films on their smartphones and tablets while surfing the web on their laptops; and they depend on social media, direct messaging, and online services to support their decisions. Thus millennials see technology as an essential part of their daily lives (Paradiso, 2015:20). This is evidenced by their confidence and comfort with any new technologies that are introduced.

Jordaan, Ehlers and Grové (2011:3) noted that the South African millennial cohort follows trends similar to those of international millennial consumers in terms of the usage of smartphones and other technological gadgets. This generation is convenience-seeking and prefers to be in control. Therefore, they are comfortable with self-service technologies and digital channels (Wijiland, 2015:52). Consequently, research suggests that South African millennials have the potential actively to drive the diffusion of digital finance services (IT News Africa, 2015).

This generational cohort, therefore, presents a good opportunity for South African retail banks that are interested in promoting the rapid adoption of mobile banking apps among their clients. However, the behaviour of millennial users is different from that of earlier generations, and marketers need to know how to target these younger customers correctly (Hershatter & Epstein, 2010). Therefore, attaining a widespread acceptance of

technology acceptance within this generational cohort requires a good understanding of their technology-use behaviour (Wijiland, 2015:52).

2.9. CHAPTER SUMMARY

This chapter aimed to study the development and acceptance of the mobile banking app innovation. Published articles, theses, and journals were used to gather the literature that provided the foundation for the examination of this technology.

This chapter had two parts; the first part reviewed the South African banking industry and the use of technology within this industry, and assessed the mobile device as a banking tool by specifically considering existing approaches to mobile banking, with an emphasis on mobile banking apps. Lastly, this section outlined the mobile banking apps' benefits from both the banks' and the customers' point of view. It then looked at the acceptance and usage rates of mobile banking apps globally and in the national context. The second section of this chapter discussed generational marketing, with a particular focus on technology acceptance behaviour in the millennial age cohort.

The next chapter will examine numerous theories and models used in the literature to understand a user's intention to adopt technological innovations. These theories include the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Decomposed Theory of Planned Behaviour, the Innovation Diffusion Theory (DTPB), the Technology Acceptance Model (TAM), the Extended Technology Acceptance Model (TAM2), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2). In addition, the conceptual model, together with the proposed hypotheses that influence intentions towards the use behaviour of mobile banking apps, will be evaluated.

CHAPTER 3

OVERVIEW OF USER INNOVATION ACCEPTANCE THEORIES PROPOSED CONCEPTUAL MODEL, AND HYPOTHESES FORMULATION

3.1. INTRODUCTION

The literature review in the previous chapter provided a review of mobile banking app technology and its adoption. The purpose of this chapter is to review the existing theories and models used to understand and predict user behaviour towards technology innovation, develop a conceptual modelling underpinning the current research, and subsequently formulate hypotheses to be empirically tested. This chapter is therefore structured into three main divisions. First, the chapter provides a review of the literature on the prominent user innovation acceptance theories, including the Theory of Reasoned Action, the Decomposed Theory of Planned Behaviour, the Theory of Planned Behaviour, the Innovation Diffusion Theory, the Technology Acceptance Model, the Extended Technology Acceptance, the Unified Theory of Acceptance and Use of Technology, and the Extended Unified Theory of Acceptance and Use of Technology. Following this is Section 2, which argues for and proposes an integrated conceptual model of the factors that influence the acceptance and use of mobile banking apps among South African millennials. The last section of this chapter discusses the literature on the relationships posited in the conceptual model, along with the respective hypotheses.

3.2. OVERVIEW OF THEORIES USED TO EXPLAIN USER ACCEPTANCE OF TECHNOLOGY

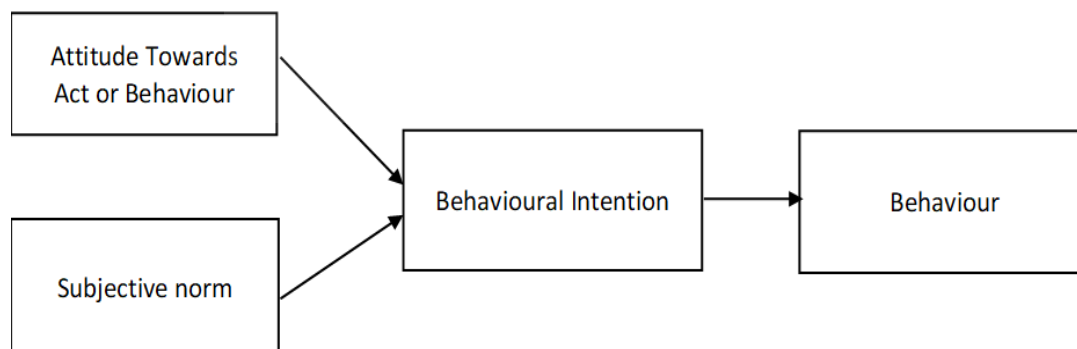
Over the years, researchers have applied numerous theoretical models in their attempts to understand consumers' acceptance of technological innovations. The most widely

used models are the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), the Theory of Planned Behaviour (TPB) (Ajzen, 1991), the Decomposed Theory of Planned Behaviour, the Innovation Diffusion Theory (DTPB) (Rogers, 1983), the Technology Acceptance Model (TAM) (Davis, 1989), the Extended Technology Acceptance Model (TAM2) (Venkatesh & Davis, 2000), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.*, 2003), and the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) (Venkatesh *et al.*, 2012). A discussion of these theories is presented in the next subsection.

3.2.1. THEORY OF REASONED ACTION

The Theory of Reasoned Action (TRA) was proposed by Fishbein and Ajzen in 1975. It is a behavioural theory that explains the attitude-behaviour relationship (Van Deventer, 2015:82). According to the Theory of Reasoned Action (Fishbein & Ajzen, 1975), behaviour is determined by the behavioural intention (BI) to behave a certain way; the attitude towards the 'behaviour' and the 'subjective norm' influence behavioural intention (Fishbein & Ajzen, 1975). Figure 3.1 shows the interactions between the variables in the TRA.

Figure 3.1: The Theory of Reasoned Action



Source: Fishbein & Ajzen, 1975:138

The attitude towards the behaviour is described as “a person’s overall feeling towards the behaviour, and is a result of one’s evaluative belief that behaving in a particular way will have certain consequences” (Fishbein & Ajzen, 1975:140). These consequences could be positive or negative. Thus, if a person evaluates the performance of the behaviour, it will produce positive outcomes; positive attitudes about the behaviour are likely to be developed and so lead to the performance of that behaviour. On the other hand, if the performance of a given behaviour is associated with negative evaluations, a negative attitude is developed towards performing that behaviour, and that leads a person to not performing that behaviour.

According to the summative model of attitude (Fishbein & Ajzen, 1967), the attitude towards performing a particular behaviour is mathematically expressed by the following:

$$A_b = \sum b_i e_i$$

A_b is ‘the attitude towards the object’

B_i is ‘the belief about the object’

E_i is ‘the evaluation of the attitude associated to the conviction about the item’

In the TRA, *subjective norm* refers to an individual’s opinion of what the people who are significant to him or her think about executing the behaviour in question (Fishbein & Ajzen, 1975:140). The subjective norm is therefore known as a product of the person’s normative belief (NB), which denotes his or her belief about whether main referents think he or she must (or must not) execute a given behaviour and his or her motivation to comply (MC) with that social group (Ajzen & Fishbein, 1980:5). This function is mathematically represented as:

$$SN = NB_i MC_i$$

Where: NB_i represents the ‘normative belief’

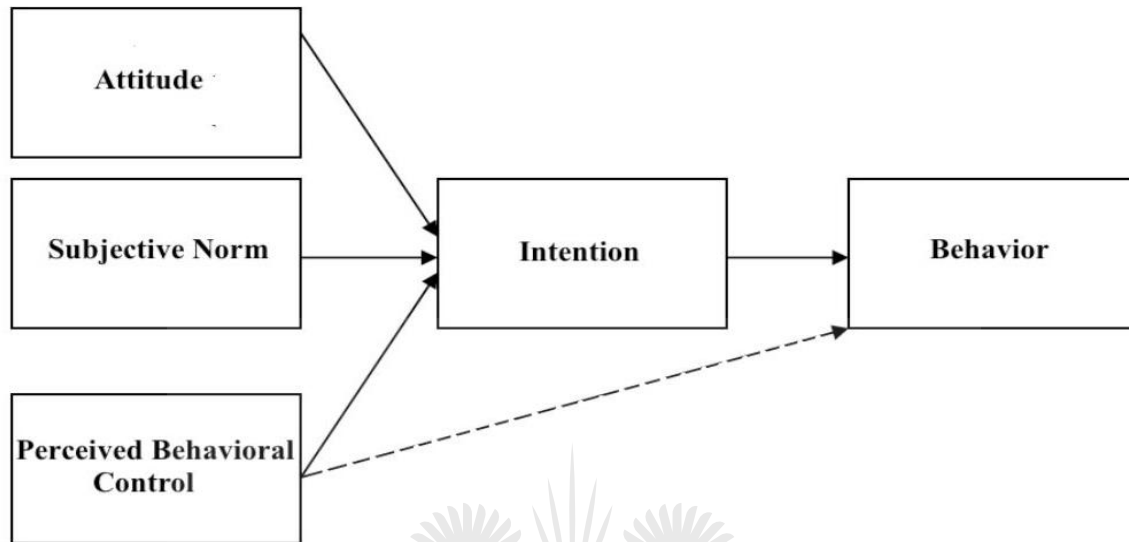
MC1 is the 'motivation to comply with referent'

Since its introduction, several studies have applied the TRA to examine the acceptance of various innovations in different contexts, including the acceptance of Wireless Application Protocol (WAP) services in Malaysia (Suki, Ramaya, Yi & Amin, 2011). In a study by Mishra and Akman (2014) to evaluate green information technology acceptance (GIT), it was found that individual beliefs have a major influence on attitude, intention, and actual use of GIT. Khanna *et al.* (2009:33) applied the Theory of Reasoned Action in evaluating the factors that impact physicians' use of a recommended child obesity tool, and observed that attitude and subjective norm have a substantial effect on the intention to assess the body mass index in children and adolescents.

3.2.2. THE THEORY OF PLANNED BEHAVIOUR

The Theory of Planned Behaviour (TPB) was introduced by Ajzen (1991) as a follow-up to the TRA. The TPB introduced a third external variable, perceived behavioural control (PBC), to overcome the limitations of the TRA by accounting for control issues that include both internal and external aspects of the behaviour (Schiffman *et al.*, 2010:254). The TPB states that a behaviour is a result of behavioural intention and perceived behavioural control. Furthermore, it is noted that intention to use is shaped by a person's attitude, subjective norms, and perceived behavioural control. These relationships are presented in Figure 3.2.

Figure 3.2: The Theory of Planned Behaviour (TPB)



Source: Ajzen, 1991:146

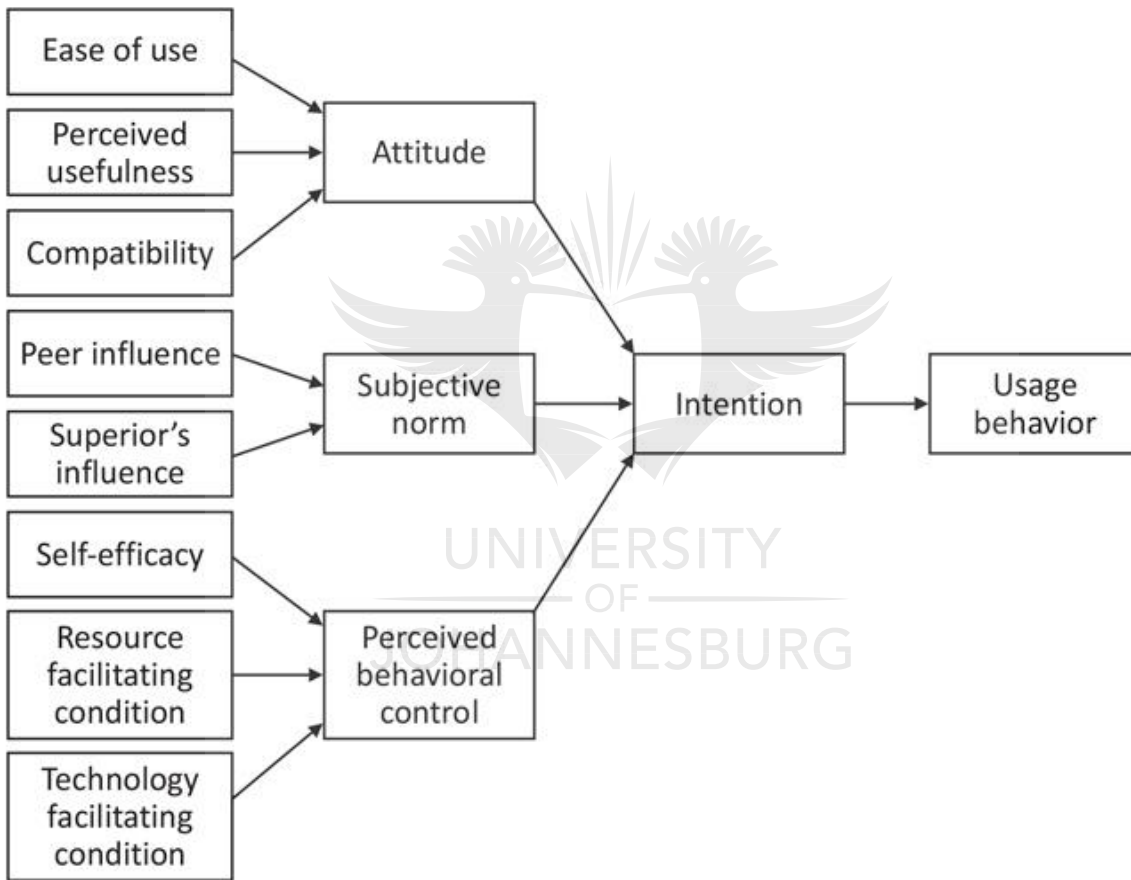
Perceived behavioural control refers to internal (skills, capabilities, knowledge, and emotions) and external (situational or environmental) factors available to a person to execute a certain behaviour. Accordingly, Ajzen (1991:147) defined PBC as an individual's opinion of whether they have control over the behaviour or not Taylor and Todd (1995a:139) note that perceived behavioural control consists of two components: self-efficacy and facilitating condition. *Self-efficacy* denotes a person's confidence in their competence to execute a behaviour, and *facilitating condition* denotes the present means that are essential to performing a behaviour.

The TPB has been used in a broad range of innovation studies (Aboelmaged & Gebba, 2013; Lee, 2009; Sripalawat, Thongamark & Ngramyam, 2011; Moqbel, Charoensukmongkol & Bakay, 2013; Mohd, Abdul & Syuhada, 2014). In research by Syuhada (2014) to understand the determinants of Wireless Application Protocol (WAP) services usage, it was found that, during the early stages of information technology implementation, the factor 'subjective norm' is significant to users with partial direct experience.

3.2.3. THE DECOMPOSED THEORY OF PLANNED BEHAVIOUR

Taylor and Todd (1995) adapted the TPB to present the decomposed TPB (DTPB) model. The model is represented in Figure 3.3.

Figure 3.3: The Decomposed Theory of Planned Behaviour



Source: Taylor & Todd, 1995:58

This theory posits that behavioural intention has the greatest effect on the actual use of technology, and that the key antecedents of behavioural intention to perform a given behaviour include attitude, subjective norms, and perceived behavioural control. In the DTPB, Taylor and Todd (1995a) broke down “attitudinal, normative and perceived

behavioural control beliefs” into multifaceted constructs in order to increase the analytical power and give a more comprehensive knowledge of the antecedents of behaviour. Thus, Taylor and Todd (1995a:141) decomposed attitude into ‘relative advantage’, ‘complexity’, and ‘compatibility’. These are all the characteristics of an innovation obtained from the Innovation Diffusion Theory (see Section 3.2.4). These three characteristics appear to be constantly connected to innovation acceptance and use decisions (Al-Lozi & Papazafeiropoulou, 2012, Gangwal & Bansal, 2016). Similarly, Taylor and Todd (1995b:152) broke down subjective norms into two groups, ‘peer influence’ and ‘superiors’ influence’, to accommodate the multiple reference groups that are expected to have an impact on potential users’ acceptance and use of technological innovations in an organisational environment. In a study of consumer acceptance of technology innovation, Nor and Pearson (2008) divided subjective norms into three categories: friends, family, and peers. The authors have identified these factors as key components of ‘subjective norm’ that affect an individual’s approval of new information technology innovations. Lastly, Taylor and Todd (1995a:141) separated perceived behavioural control into two categories: ‘self-efficacy’ and ‘facilitating condition’.

A literature review identified a number of studies on innovation acceptance that have used the DTPB to understand user behaviour (Nor & Pearson, 2008; Al-Lozi & Papazafeiropoulou, 2012; Moons & Pelsmacker, 2015; Gangwal & Bansal, 2016). In a study to assess mobile-commerce acceptance in India, Gangwal and Bansal (2016:365) identified attitude, subjective norm, and perceived behavioural control as significant factors influencing intention to accept m-commerce. Among these three major antecedents of behavioural intentions to accept mobile-commerce, attitude came out as a significant factor that influences behavioural intention. Authors such as Taylor and Todd (1995) emphasised the fact that attitudes within an innovation context encompass five elements: ‘relative advantage’, ‘complexity’, ‘compatibility’, ‘observability’, and ‘trialability’. In another study to assess mobile banking app adoption in Lebanon, Audi *et al.* (2016) found ‘compatibility’ and ‘trialability’ to be statistically significant factors influencing mobile banking app adoption. ‘Relative advantage’, ‘compatibility’, ‘complexity’, ‘trialability’, and ‘observability’ were identified as the five key attributes that influence attitudes towards technology acceptance (Rogers, 1995; Rogers, 2003).

Perceived behavioural control is influenced by two factors: 'facilitating conditions' and 'self-efficacy'. Facilitating conditions are defined as the level to which resources are easily accessible to support the use of an innovation. In a study to evaluate mobile banking adoption in India, Joshua and Koshy (2011:10) found that the more consumers believe in their ability to execute banking transactions via mobile banking, and the more that support services are provided, the higher their use of the mobile banking innovation. *Self-efficacy* refers to "one's capability to organise and execute a course of action required to produce a given attainment" (Bandura, 1997). In a study conducted by Nel and Raleting (2012), it was concluded that self-efficacy has the most influence on the perceived ease of use of the mobile banking innovation. This study further shows that people who perceive themselves to have high confidence (self-efficacy) in using mobile banking also believe in their abilities to use mobile banking (perceived behavioural control). Subjective norms are mostly influenced by the peer pressure of social groups – that is, friends, family, and individuals in the same social realm (Balabanoff, 2014:253). In a study to evaluate the factors influencing the acceptance of mobile banking apps in South Africa, Balabanoff (2014:255) indicated that subjective norms do influence the acceptance of mobile banking apps.

3.2.4. INNOVATION DIFFUSION THEORY

Innovation Diffusion Theory (IDT) was propounded by Rogers in 2003 to understand the spread of an innovation in a given society. Rogers (2003:12) states that an *innovation* is "an idea, practice, or project that is perceived as new by an individual or other unit of adoption". Rogers (2003:323) defines *innovation diffusion* as "the process by which innovation is introduced through certain channels over time among members of a social system so as to spread the innovation from its source to the end user".

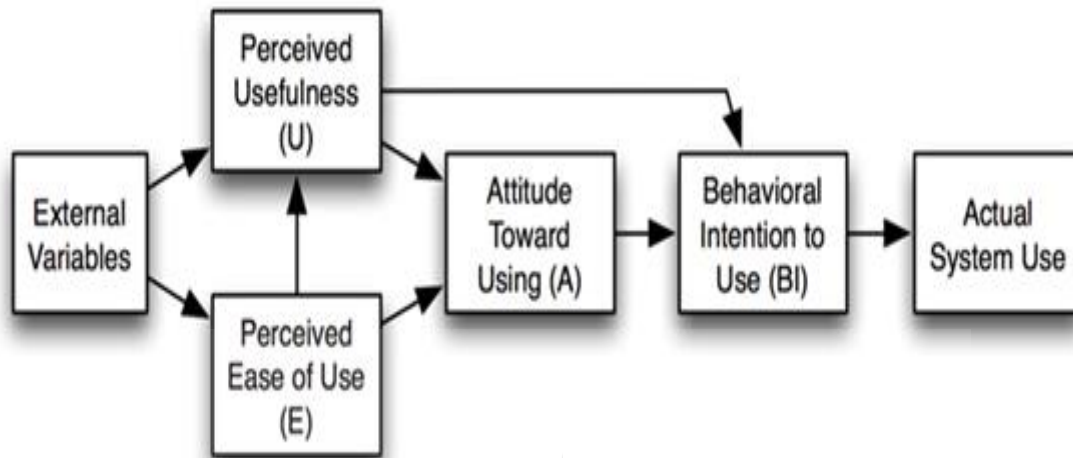
Rogers (2003:232) identifies five characteristics of innovations that affect their adoption: 'relative advantage', 'compatibility', 'complexity', 'trialability', and 'observability'. *Relative advantage* denotes the level at which a person trusts that technological innovations offer benefits that are more advantageous than the innovations they succeed (Rogers, 2003:229). An innovation that is associated with a higher relative advantage is more

likely to diffuse faster than one that is not (Van Deventer, 2015:102). *Compatibility* is described as the level at which an innovation is observed as being in line with present values, previous practices, and the desires of prospective adopters (Roger, 2003:15). According to the IDT, an innovation that is well-matched with the existing circumstances of the potential adopters is likely to diffuse faster than one that is not (Audi *et al.*, 2016). *Complexity* denotes the level at which a system is regarded as challenging or not user friendly (Rogers, 2003:15). *Complexity* here refers to the level of physical or mental effort that an individual need when using the system. *Trialability* denotes the extent to which people would have the chance to try the innovation before adopting it (Rogers, 2003:15). Innovations that offer opportunities for trials are more likely to diffuse faster than those that do not. Rogers (2003:16) defines *observability* as the level at which the outcomes of a technology are visible. If individuals can easily observe the results of an innovation, it is more likely that they will accept that technology. From the analysis of the literature it is concluded that, between these system characteristics, various authors frequently regard *relative advantage*, *complexity* or *ease of use*, and *compatibility* to be statistically significant factors for technology acceptance (Nor & Pearson, 2008; Papiés & Clement, 2008; Raynard, 2016; Batyashe & Tiko, 2017; Ma, Lee, Goh & Hoe-Lian, 2014).

3.2.5. TECHNOLOGY ACCEPTANCE MODEL

The Technology Acceptance Model (TAM) of Davis (1989) is the mostly widely used information system model to study user adoption and use of innovations. The TAM is an adaptation of the Theory of Reasoned Action to explain user adoption of innovations (Davis, 1989:983). The TAM posits that behavioural intention to adopt an innovation is explained by two main variables: 'perceived usefulness' and 'perceived ease of use', which are the key antecedents of attitude. Consistent with the TRA, the TAM further suggests attitude as a determining factor of behavioural intention and finally, behavioural intention as a determining factor of use behaviour. These associations are represented in Figure 3.4.

Figure 3.4: Technology Acceptance Model (TAM)



Source: Davis, 1989:985

Perceived usefulness denotes a person's opinion that adopting an innovation will advance their job performance (Davis, 1989:985). A *system* is a set of interconnected mechanisms that convert, store, transport, or control materials and information for a specific purpose. *Ease of use* is defined as "the degree to which the user expects the system to be free of effort" (Davis, 1989:985). A technology that is seen to be easier to use than other technologies is most likely to be adopted by technology users (Davis, 1989:985). This also increases the level of usefulness of the innovation; therefore, perceived ease of use has a positive effect on perceived usefulness (Davis, 1989:985).

The TAM posits that perceived ease of use influences usefulness (Davis, 1989). Perceived ease of use and usefulness both influence attitude (A). Attitude is explained as "a person's overall feeling towards the behaviour" (Davis, 1989:985). Attitude towards use and usefulness both influence a user's intention to accept and use the innovation (BI). Ajzen (2002:663) defines 'behavioural intention' as a person's enthusiasm to execute a certain behaviour. Lastly, the TAM posits that behavioural intention (BI) has a strong influence on the actual use of the technology (Davis, 1989:986). Various authors have used the TAM in information technology innovation

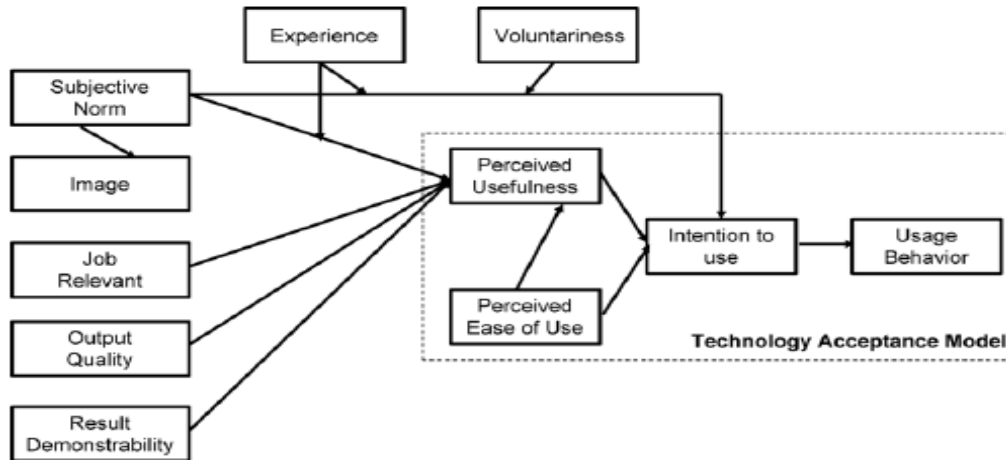
acceptance research, and have validated it as a robust theory explaining user acceptance of technology innovations (Audi, Wahda, Abdalla & Kassem, 2016; Khasawneh, 2015; Koeng-Lewis, Palmer & Moll, 2010; Maduku & Mpinganjira, 2012; Maduku, 2013). For example, Khasawneh (2015) applied the TAM to examine mobile banking adoption among customers in Jordan. The results of the study suggested that perceived usefulness and perceived ease of using mobile banking positively influence the attitude towards mobile banking. Moreover, the study found behavioural intention to be a substantial factor that influences the actual use of mobile banking.

3.2.6. EXTENDED TECHNOLOGY ACCEPTANCE MODEL

The TAM2 was proposed by Venkatesh and Davis (2000) to expand the scope of the TAM in explaining technology innovation acceptance by integrating additional factors that enhance its explanatory power. These added elements that extend the TAM comprise “social influence processes (subjective norm, image and voluntarism) and cognitive instrumental processes (quality of output, job relevance and result demonstrability)” (Venkatesh & Davis, 2000:187). These social and cognitive processes are all – except for subjective norm – assumed directly to influence perceived usefulness. Subjective norm is the only social process that is hypothesised to have a direct and indirect influence on perceived usefulness and intention through perceived usefulness (Ismail & Masinge, 2012:108).

Moreover, in the TAM2, experience is posited as a factor that moderates the link between subjective norm and perceived usefulness, and between subjective norm and behavioural intention. Finally, voluntariness of use controls the link between subjective norm and behavioural intention. The diagrammatic representation of TAM2 is shown in Figure 3.5.

Figure 3.5: Extended Technology Acceptance Model (TAM2)



Source: Venkatesh & Davis, 2000

In terms of the cognitive instrumental, Venkatesh and Davis (2000:180) define *job relevance* as the level at which an individual perceives an innovation to be relevant to his or her job. In the TAM2, this construct is hypothesised to positively influence *perceived usefulness* (Venkatesh & Davis, 2000:191). This explains that a person's assessment of a system's usefulness is influenced by his or her performance expectations of the system (*job relevance*). *Output quality*, which is described as the effectiveness of a system in producing quality output, is directly related to the *perceived usefulness* of the system (Venkatesh & Davis, 2000:191-192). According to the TAM2, output quality has a major influence on perceived usefulness, in that, if the output of a technology innovation is good, users will perceive the innovation as useful. *Result demonstrability* denotes the physicality of the results of using a particular system and it is found to be an important and constant predictor of perceived usefulness (Venkatesh & Davis, 2000:192; Venkatesh & Bala, 2008:275). This implies that users will perceive an innovation as useful if the results of its output are readily observable (Riad, Jaradat, Khaled & Faqih, 2014:151). Consequently, result demonstrability is posited as a direct antecedent of perceived usefulness (Venkatesh & Davis, 2000:192).

Regarding the influence of social processes on consumers' adoption and use of innovations, the TAM2 emphasises that, if people who are significant to the prospective adopter believe that a particular technology innovation is useful and helpful, he or she may conclude that it is actually beneficial, and may result in a positive intention to use it. Therefore, the theory also suggests that *subjective norms* will positively and directly influence perceived usefulness (Venkatesh & Davis, 2000:189). Moreover, subjective norm is posited to have a strong influence on the *image*. The reason for this is that, if a person's referent group thinks that a specific behaviour must be undertaken, then executing it will be likely to promote his or her image within the referent group (Venkatesh & Davis, 2000:189). Venkatesh and Davis (2000:189) defined *image* as the level at which using a certain technology will be observed as progress in a person's social status; therefore, the influence of image on perceived usefulness becomes stronger if the referent group believes that an individual should perform a behaviour. Thus the TAM2 suggests that the extra aspects expanding the TAM impact the customer's adoption and perceived usefulness. Furthermore, Wu & Wang (2005:721) state that *perceived ease of use* ultimately influences the actual use through behavioural intention.

A number of authors (Ismail & Masinge, 2012; Lee, 2009; Riad *et al.*, 2014; Wu & Wang, 2005) have used the TAM2 to explain the technology innovation acceptance research domain. In a study conducted to determine Web 2.0 website user behaviour, Wu *et al.* (2011:145) found that users' acceptance of Web 2.0 websites was mainly influenced by their beliefs of 'important others' (subjective norm). In a study by Ismail and Masinge (2012) to examine the aspects that have an impact on the acceptance of m-banking services at the bottom of the pyramid in South Africa, it was found that customers will take on this innovation if they believe it is useful and easy to use.

3.2.7. UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY

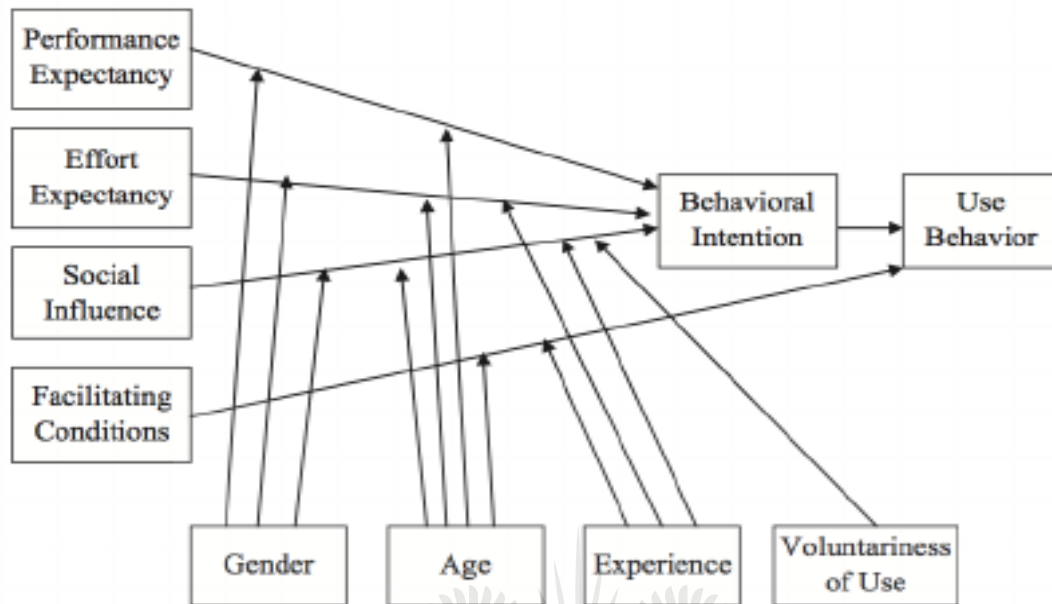
Venkatesh *et al.* (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) to explain the antecedents of technology adoption and use among users. The UTAUT is an amalgamation of eight existing information system research

theories: the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), the Motivational Model, the Innovation Diffusion Theory, the Social Cognitive Theory, the PC Utilisation Model (PCUM), and the Extended Technology Acceptance Model (TAM2).

Venkatesh *et al.* (2003:446) state that the “UTAUT comprise[s] four key determinants of the acceptance and use of technology innovations: performance expectancy, effort expectancy, social influence, and facilitating conditions”. The UTAUT also explains the importance of four moderating factors – gender, age, experience, and voluntariness of use – that influence the independent factors of innovation, adoption, and use (Venkatesh *et al.*, 2012:162).

Venkatesh *et al.* (2003:467) stated that *performance expectancy* mostly appears to be a determining factor of intention. The reason for this is the differences in the strength of the relationship between gender and age. Furthermore, gender and age moderate the influence of *effort expectancy* on behavioural intention, with the influence diminishing with experience. Also, the influence of *social influence* on behavioural intention rests on all four moderators. Additionally, the influence of *facilitating conditions* on use behaviour is stronger if examined in combination with the moderating effects of age and experience. Moreover, Venkatesh *et al.* (2003:450) postulated that effort expectancy from the UTAUT, perceived ease of use obtained from the TAM, and complexity from the IDT are similar.

Figure 3.6: Unified Theory of Acceptance and Use of Technology (UTAUT)



Source: Venkatesh *et al.*, 2003:430

Venkatesh *et al.* (2003:447) described *performance expectancy* (PE) as the level at which customers believe that adopting an innovation will increase their job performance. The UTAUT posits PE as a significant determinant of behavioural intention to use technology. Furthermore, the effect of performance expectancy on behavioural intention is shaped by gender and age.

Effort expectancy (EE) refers to the level of ease related to the use of a particular technology. An innovation that is generally perceived as easy to use is most likely to be approved by users (Yu, 2012:106). Hence, EE is hypothesised as a direct factor in users' behavioural intention. Experience and age are the moderating influences on effort expectancy.

Social influence (SI) refers to the degree to which users recognise that the people who are important to him or her believe they should use the innovation. According to the UTAUT, users are expected to accept a technology innovation to meet the expectation of people whose opinion about the innovation's use is important to the adopters. The influence of social influence on intention is moderated by age, gender, experience, and voluntariness.

Facilitating conditions (FC) is the level at which a customer believes that technical infrastructure and support is accessible to assist them with using the system. The availability of facilitating conditions provides the impetus for innovation use. Hence, in the UTAUT, facilitating conditions is presented as a direct influence of innovation use. Moreover, in the UTAUT, the relationship between facilitation conditions and innovation use is moderated by age and experience.

The UTAUT has been applied in most research studies that evaluate technology acceptance and use behaviour (Yu, 2012; Baptista & Oliveira, 2015; Wang *et al.*, 2010; Zhou *et al.*, 2010; Tan *et al.*, 2010). In a study conducted to understand mobile banking acceptance in Mozambique, Baptista and Oliveira (2015:426) found performance expectancy and effort expectancy to be the most significant antecedents of behavioural intention.

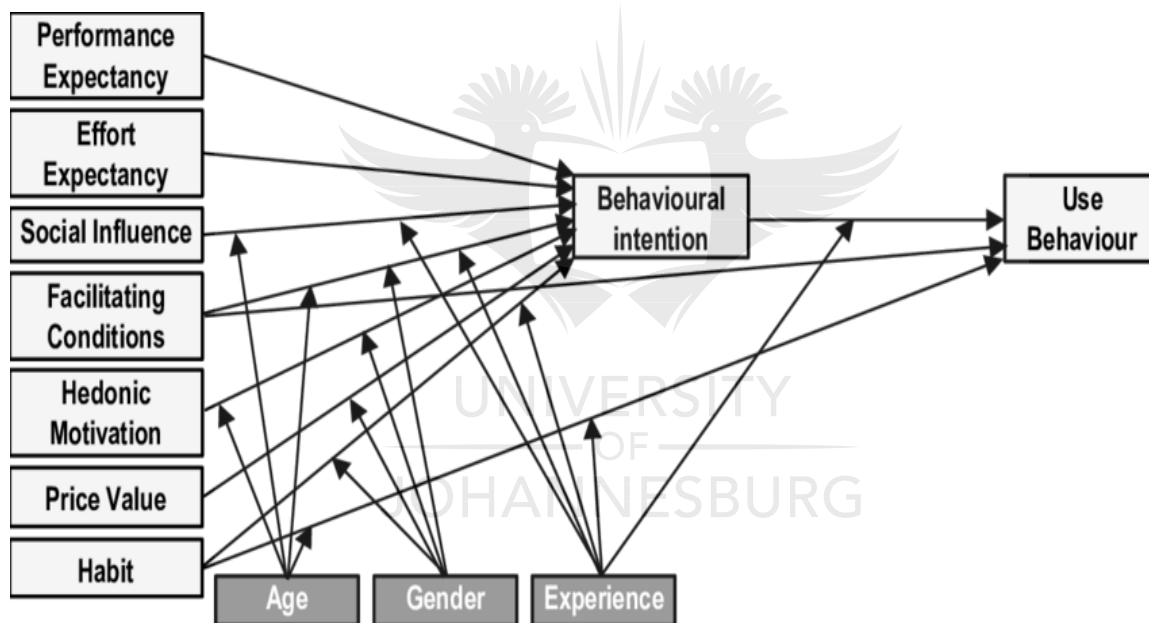
3.2.8. EXTENDED UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY

Venkatesh *et al.* (2012) developed the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) as an extension of the original UTAUT to explain the adoption and use of information technologies for personal use. The UTAUT2 extends the UTAUT by integrating hedonic motivation, price value, and habit into the original UTAUT. Venkatesh *et al.* (2012:160) state that *hedonic motivation* is regarded as the key predictor in much consumer behaviour research. Furthermore, *price value* was identified as an imperative factor in a consumer technology use context, as customers need to tolerate the charges linked with buying a device and other services. Also, *habit* was identified as a major factor influencing technology adoption and use. Based on the gaps identified by Venkatesh *et al.* (2012) and the associated theoretical explanation provided above, hedonic motivation, habit, and price value were integrated into the UTAUT.

UTAUT identifies performance expectancy, effort expectancy, social influence, and facilitating conditions as the key antecedents of information system acceptance and use

(Venkatesh *et al.*, 2012:161). In the UTAUT2, “performance expectancy, effort expectancy, social influences, hedonic motivation, price value, and habit have a significant impact on behavioural intention to adopt a particular technology, and behavioural intention, habit, and facilitating conditions directly influence technology use. In addition, user variables—age, gender, and experience—are theorised to moderate various UTAUT2 relationships” (Venkatesh *et al.*, 2012:157). Figure 3.7 represents the relationships in the UTAUT2 model.

Figure 3.7: Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)



Source: Venkatesh *et al.*, 2012:160

Hedonic motivation denotes the level of fun or enjoyment that users gain from using an innovation; *price value* refers to the charges and pricing arrangements related to a technology; and *habit* is the level at which individuals automatically execute behaviours.

This theory has played a vital role in understanding technology acceptance. As a result, various studies have applied this model (Alalwan *et al.*, 2017; Riffai *et al.*, 2012; Ullah &

Zahid, 2017; Herrero, Martín, Garcia-De & Salmones, 2017; Huang & Kao, 2016). In a study to understand the acceptance of social networks sites to share user-generated content, Herrero *et al.* (2017:214) found three main significant factors driving users' intentions to adopt and use social network sites to publish content about their experiences: performance expectancy, hedonic motivation, and habit. In a study by Kit *et al.* (2014:54) to assess the effect of behavioural intention to adopt mobile apps, it was noted that the influence of performance expectancy is resilient compared with that of effort expectancy on the adoption intention; and price value was perceived to have no major influence on the adoption intention. These results support those of Chong (2013) and Toh *et al.* (2009). Furthermore, this study reveals that social influence is not a major factor influencing the intention to use mobile banking. This is consistent with the results of Yang (2013) and Lu *et al.* (2005), whose studies concluded that customers do not rely on their referent groups beliefs, recommendations, and approvals to adopt mobile apps. In a study to explore factors affecting users to accept mobile banking in Taiwan, Yu (2012:110) found that effort expectancy does not have a significant influence on a user's intention to adopt mobile banking. Yu (2012:116) further indicated the influence of the moderating factors on intention to accept mobile banking. The moderating factor of age was found to be an insignificant factor on performance expectancy. Meanwhile, age significantly moderated the effect of effort expectancy, social influence, and perceived financial cost. This study further showed that gender did not greatly moderate the effect of effort expectancy, social influence, and perceived credibility on behavioural intention.

3.3. PROPOSED CONCEPTUAL MODEL TO UNDERSTAND MOBILE BANKING APPS ACCEPTANCE AMONG MILLENNIALS

3.3.1. Theoretical background of the conceptual model

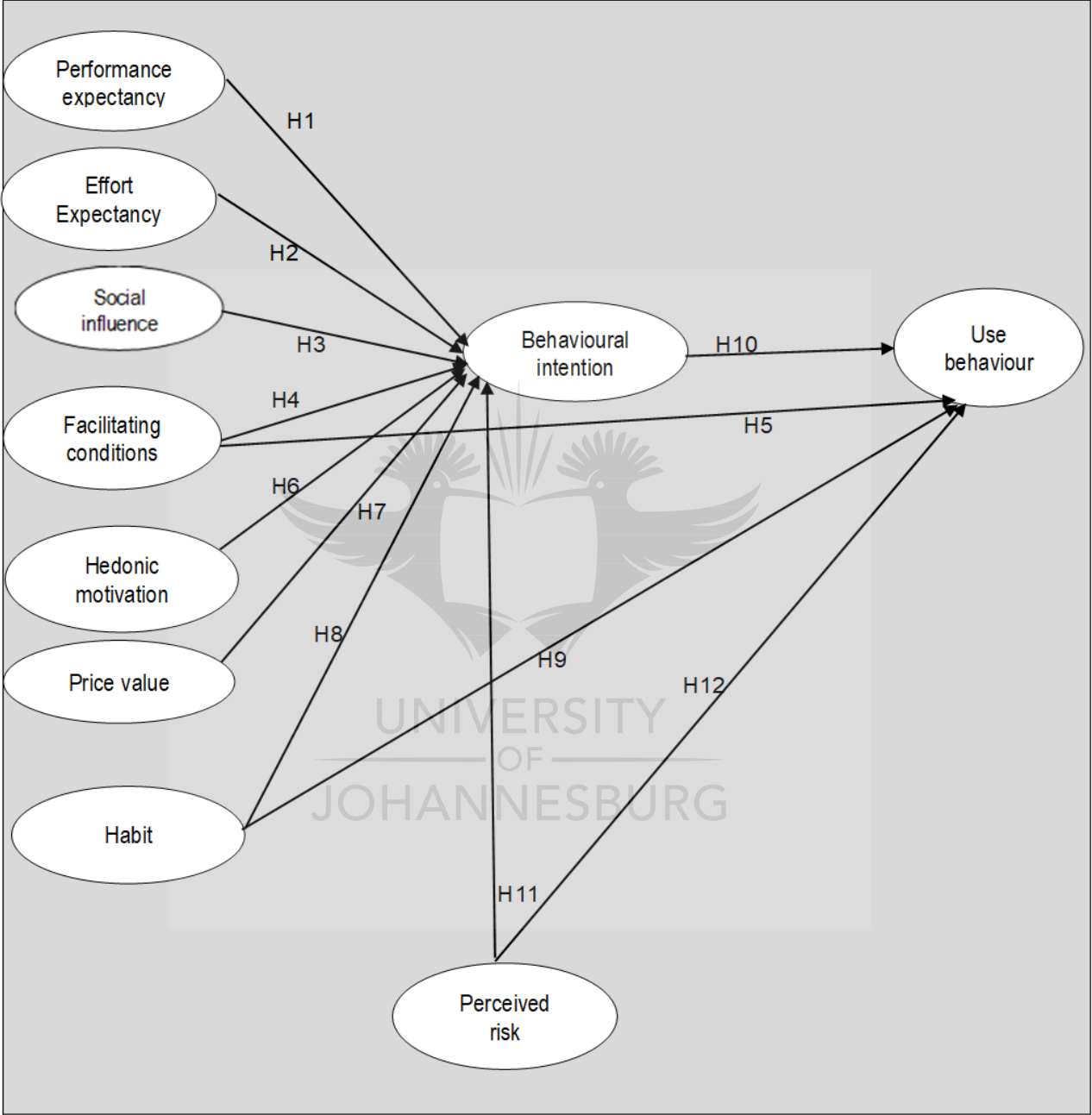
The overarching theoretical basis for this study is the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2). Several authors (Mashagba & Mohammad, 2012:83; Baptista & Oliveira, 2015; Chong, 2013; and Kit *et al.*, 2014)

identified the UTAUT2 as a powerful model in explaining the factors that affect technology acceptance decisions, including mobile banking. However, researchers (Kit *et al.*, 2014; Baptista *et al.*, 2016; Riffai *et al.*, 2012) note that, despite its robustness in explaining innovation acceptance, only a few studies in the literature have applied this theory.

Venkatesh *et al.* (2012:173) have emphasised the need for the theory to be tested in different innovation user groups. They also recommend integrating other relevant factors into the UTAUT2 to help increase its applicability to a broad range of user innovation-use contexts. *Risk* has widely been identified as a critical factor influencing consumers' acceptance of online banking innovations (Hanafizadeh *et al.*, 2014; Yadav, 2016; Cocosila & Trabelsi, 2016; Khasawneh, 2015; Zhang, Zhu & Liu, 2012). For this reason, the study integrated risk into the UTAUT2 to ascertain the drivers of and barriers to mobile banking apps acceptance among South African millennials in Gauteng.

Accordingly, the conceptual model proposed for this study (Figure 3.8) posits performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, social influence, price value, habit, and perceived risk as direct influencers of behavioural intention to use mobile banking apps. Moreover, behavioural intention, hedonic motivation, perceived risk, and habit are hypothesised to be directly associated with mobile banking app actual use behaviour. The interactions between the constructs in the conceptual model are discussed below.

Figure 3.8: Conceptual model



Source: Author's compilation

3.4. RESEARCH HYPOTHESES FORMULATION

3.4.1. PERFORMANCE EXPECTANCY

Performance expectancy denotes the extent to which a person trusts that adopting a particular innovation will assist them to improve their job performance (Venkatesh *et al.*, 2003:426). In terms of mobile banking app use, performance expectancy can be explained as the level at which users trust that adopting mobile banking apps will be beneficial to their banking transactions. Empirical research has widely underscored the importance of performance expectancy in innovation adoption behaviour (Alalwan *et al.*, 2017; Zhou, 2010; Yang, 2009; Lou, Zang & Sham, 2010). In a study to determine mobile banking use behaviour among Jordanian consumers, Alalwan *et al.* (2017:106) identified performance expectancy as a major factor determining customers' behavioural intention to use the service. Similarly, in study to investigate predictors of online insurance service intentions among young consumers in Finland, Mari (2018) found that performance expectancy is a significant determinant of behavioural intention. On the basis of these findings, this study proposes the following hypothesis:

H1: *Performance expectancy will have a significant positive influence on millennials' behavioural intention to adopt mobile banking apps.*

3.4.2. EFFORT EXPECTANCY

Effort expectancy represents the level of perceived ease or difficulty linked with the acceptance and use of technology (Venkatesh *et al.*, 2003:426). In terms of mobile banking apps, effort expectancy refers to the level at which consumers have confidence that the mobile banking app requires less effort and fewer skills to use mobile banking apps (Tarawneh, 2016:203). Mobile banking apps need a certain level of understanding, knowledge, and skills; therefore, effort expectancy could be a significant factor determining users' intentions to use mobile banking apps. Prior research has confirmed the significance of effort expectancy for a client's intention to use mobile banking services (Alalwan *et al.*, 2017; Riffai, 2012; Martins *et al.*, 2014; Lin, 2011). In a study to explain the adoption of mobile banking in Thailand, Bhatiasevi

(2015:801) identified effort expectancy as a positive determinant of behavioural intention to accept and use mobile banking apps. Similarly, in a study of mobile banking among young users in Ghana, Kwateng and Appiah (2018) found a significant relationship between effort expectancy and behavioural intention. Based on this argument, this study proposes the following hypothesis:

H2: Effort expectancy will have a significant positive impact on millennials' behavioural intention to adopt mobile banking apps.

3.4.3. SOCIAL INFLUENCE

Social influence denotes the extent to which a person believes that significant others, specifically friends and family, think that an individual should adopt an innovation (Venkatesh *et al.*, 2003:425). With mobile banking apps, social influence can be explained as the power of important people to influence the target user's decision to use mobile banking apps. Prior mobile banking studies have confirmed a major positive connection between social influence and behavioural intention (Martins *et al.*, 2014; Yu, 2012; Hernan & Rios, 2010; Zhou *et al.*, 2010). In a study of Taiwanese consumers to understand elements that influence individuals' adoption of mobile banking, Yu (2012:105) observed that a customer's intention to adopt and use mobile banking is strongly influenced by social influence. Correspondingly, a study to investigate the determinants affecting mobile banking adoption by Generation Y in Thailand, Boonsiritomachai and Pitchayadejanant (2017) found that users' intentions to adopt mobile banking are influenced by their peers. Based on the foregoing argument, the effect of social influence on intention to adopt mobile banking is hypothesised below:

H3: Social influence will significantly and positively influence millennials' behavioural intention to adopt mobile banking apps.

3.4.4. FACILITATING CONDITIONS

Facilitating conditions refers to the level at which people believe that technical support exists to back up their use of an innovation (Venkatesh *et al.*, 2003:426). Using mobile banking apps requires a set of skills and technical structures (Alalwan *et al.* 2017; Rana, Lal & Williams, 2015; Zhou *et al.*, 2010). Consumers might thus be more inclined to use mobile banking apps if they have the skills, resources, and an assured level of support services. Numerous previous online banking research papers (Zhou *et al.*, 2010; Yu, 2012; Rana *et al.*, 2015; Joshua & Koshy, 2011) have confirmed the effect of facilitating conditions on behavioural intention and use of mobile banking. In a study to evaluate mobile banking adoption in India, Joshua and Koshy (2011:10) found that the more consumers believe in their capability to use mobile banking, and the more that support services are provided, the higher their use of the mobile banking innovation. For this reason, this study suggests the following hypothesis:

H4: *Facilitating conditions will have a significant positive influence on millennials' behavioural intention to adopt mobile banking apps.*

In the UTAUT2, Venkatesh *et al.* (2003) established the positive influence of facilitating conditions on innovation use behaviour. Recent studies (Mashagba & Nassar, 2012; Yu, 2012; Joshua & Koshy, 2011) have also confirmed this relationship. In a study to evaluate the influences on mobile banking acceptance among Jordanian customers, Mashagba and Nassar (2012:90) noted a significant influence of facilitating conditions on the actual use of mobile banking. Similarly, in a study to investigate the determinants affecting mobile banking adoption by Generation Y in Thailand, Boonsiritomachai and Pitchayadejanant (2017) found that facilitating conditions have a significant positive influence on the actual use of mobile banking apps. On the basis of the foregoing, this study proposes that:

H5: *Facilitating conditions will have a significant positive effect on mobile banking app use behaviour among millennials.*

3.4.5. HEDONIC MOTIVATION

Hedonic motivation can be described as the level of entertainment, joy, or pleasure associated with the use of an innovation (Venkatesh *et al.*, 2012). Hedonic motivation has been identified as an important factor influencing consumers generally, and especially their use of technology innovations. In the UTAUT2, Venkatesh *et al.* (2012:170) proposed and confirmed a direct relationship between hedonic motivation and behavioural intention to use a given innovation. Follow-up studies (Alalwan, Rana & Williams, 2014; Alalwan *et al.*, 2017) have validated this relationship. In a study to evaluate behavioural intentions to adopt tele-banking among Jordanian customers, Alalwan *et al.* (2015) found that hedonic motivation significantly influences users' intention to use tele-banking. Furthermore, Boonsiritomachai and Pitchayadejanant (2018) investigated the determinants affecting mobile banking adoption by Generation Y, and found that hedonic motivation is the most important factor motivating Generation Y to adopt mobile banking. On the basis of this argument, this study suggests the following hypothesis:

H6: *Hedonic motivation will have a positive influence on millennials' behavioural intention to adopt mobile banking apps.*

3.4.6. PRICE VALUE

Price value is the customer's trade-off between the advantages of adopting a specific technology and the charges linked with its use (Venkatesh *et al.*, 2012:161). To use mobile banking apps, customers will need to download and install the app using an internet data bundle, and will then need to buy data bundles for their mobile devices in order to use the innovation. Given that mobile data costs are high in South Africa, customers are likely to engage in conscious decision-making to assess the benefits of using the mobile banking app innovation against its costs – for example, the cost of a mobile data bundle (SearchMobile, 2014). As a result, it is projected that price value will play a crucial role in consumers' acceptance of mobile banking apps. Correspondingly,

Yu (2012:105) found that customers' budget plans have a significant impact on users' behavioural intention to accept mobile banking. Earlier research studies have recognised that price value was found to be a factor that has the greatest influence on behavioural intention to adopt mobile banking (Hernan & Rios, 2010; Alalwan *et al.*, 2017; Baptista & Oliveira, 2017). In a study by Yu (2012) to identify the factors influencing mobile banking adoption in Taiwan, price value was identified as a significant factor influencing behavioural intention. A study of mobile banking adoption among South African university students also found a significant relationship between price value and behavioural intention (Govender & Sihlali, 2014). On the basis of this argument, this study proposes the following hypothesis:

H7: *Price Value will have a positive impact on millennials' behavioural intention to adopt mobile banking apps.*

3.4.7. HABIT

Habit denotes the level at which individuals tend to engage in behaviours spontaneously (Venkatesh *et al.*, 2012:163). The formation of habit is influenced by previous learned experience. The frequency with which past behaviour is repeated is crucial to the creation of habit, and plays an important role in determining future behaviour (Baptista & Oliveira, 2015:422). Empirical research (Baptista & Oliveira, 2015; Baptista & Oliveira, 2017; Kit, Ni, Badri & Yee, 2014) has confirmed that habit plays a significant role in explaining technology innovation use behaviour. In a study to observe the influence of gamification on the acceptance of mobile banking services in Portugal, Baptista and Oliveira (2017:129) found that habit significantly and positively influenced behavioural intention and use behaviour. Boonsiritomachai and Pitchayadejanant (2018) examined the factors affecting mobile banking adoption by Generation Y, and found that habit is a strong determinant of mobile banking acceptance among these users. Accordingly, the following hypotheses are proposed:

H8: *Habit will have a significant positive influence on millennials' behavioural intention to adopt mobile banking apps.*

H9: *Habit will have a significant positive influence on millennials' mobile banking app use behaviour.*

3.4.8. BEHAVIOURAL INTENTION

Most models drawing on psychological theories have unequivocally identified behavioural intention as a direct determinant of people's behaviour (Yu, 2012:105; Gupta and Dogra; 2017:151). Being a theory rooted in psychology, the UTAUT2 postulated and confirmed behavioural intention as a significant and positive predictor of users' technology innovation use behaviour (Venkatesh *et al.*, 2012:166). In the area of mobile banking, previous studies have underscored the influence of behavioural intention on consumers' actual use behaviour (Martins *et al.*, 2014; Baptista & Oliveira, 2017; Sriwpalawat, Thongamark & Ngramyarn, 2011; Yu, 2012). In a study to examine factors that influence mobile banking adoption in Portugal, Faria (2012:28) suggested that behavioural intention is the most significant factor to explain the adoption of mobile banking. In a study of online shopping through social media sites (Facebook) among young Australian consumers, Nadeem, Cripps and Salo (2017) found that the behavioural intention to use Facebook in online shopping was determined to be the most significant and positive relationship in the study. On the basis of this argument, the following hypothesis is put forward:

H10: *The impact of behavioural intention on millennials' use behaviour of mobile banking apps will be positive.*

3.4.9. PERCEIVED RISK

In online banking, risk has gained much attention within the literature. *Risk* denotes the level of a consumer's perception of expected loss and uncertainty associated with conducting banking services online (Cocosila & Trabelsi, 2016:160). With mobile banking apps, risk is seen as a customer's anticipation of suffering a loss when using mobile banking apps to perform banking transactions. Research has revealed that

customers often feel reluctant to involve themselves in online banking transactions because of perceived risk concerns (Marriot & Williams, 2016:264). Perceived risk is thus likely to be a major barrier to mobile banking app acceptance. Perceived risk has been identified as a multidimensional construct entailing (1) performance, (2) financial, (3) device, (4) privacy, and (5) psychological risks (Khasawneh, 2015:5). All of these have been consistently associated with risk in online environments (Cocosila & Trabelsi, 2016; Featherman & Pavlou, 2003; Park & Tussyadiah, 2016; Yang *et al.*, 2016). In a study to examine the impact of perceived risk on online shopping among Generation Y consumers in South Africa, Swiegers (2018) observed that risk significantly affects both experienced and inexperienced online Generation Y consumers' intention to buy books and clothes online. As a result, the following hypotheses are proposed:

H11: *Perceived overall risk will have a significant negative impact on millennials' behavioural intention*

H12: *Perceived overall risk will have a significant negative impact on millennials' actual use of mobile banking apps*

3.5. CHAPTER SUMMARY

Firstly, this chapter examined the existing models used to understand the acceptance of technology innovations. The models clarified in this chapter were the Theory of Reasoned Action, the Decomposed Theory of Planned Behaviour, the Innovation Diffusion Theory, the Technology Acceptance Model, the Extended Technology Acceptance Theory, the Theory of Planned Behaviour, the Unified Theory of Acceptance and Use of Technology, and the Extended Unified Theory of Acceptance and Use of Technology. The chapter also presented the conceptual model that was formulated from the original UTAUT2 of Venkatesh *et al.* (2012), and the research hypotheses were presented.

The research methodology and design applied in this study are explained in the next chapter. The research methodology comprises the research approach, research design, research strategy, and sampling techniques. The questionnaire used in the study, as

well as the data collection method and the techniques used for data analysis, are discussed. The required ethical considerations for this study are also explained in detail in the next chapter.



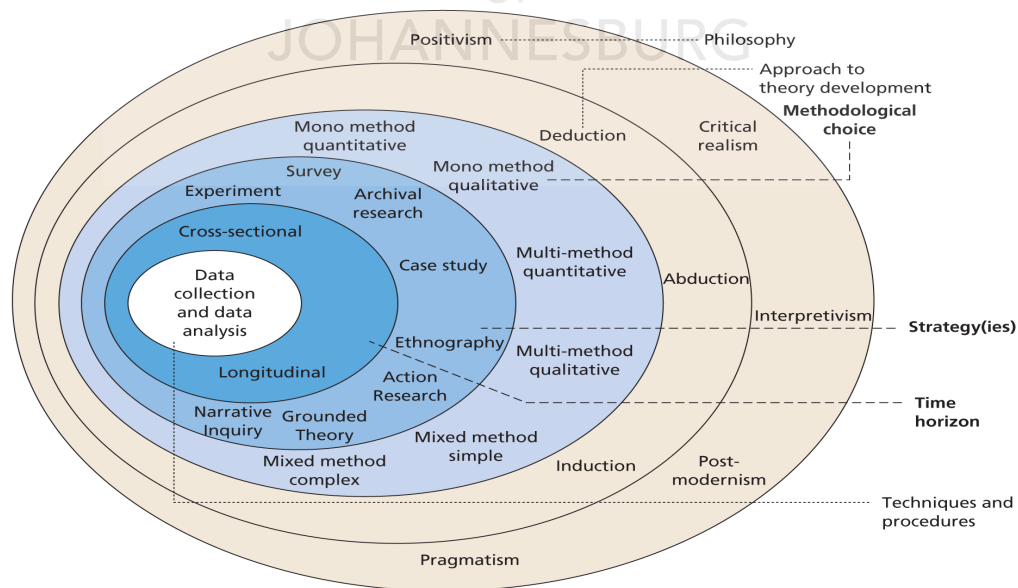
CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter discusses the research methods, particularly the methods used for gathering and analysing data, and the reasons for choosing the research methods that were applied. *Research methodology* refers to the “systematic, theoretical analysis of the methods applied to a field of study, or the theoretical analysis of the body of methods and principles associated with a branch of knowledge” (Saunders, Lewis & Thornhill, 2015:160). In social science research (which covers marketing), a methodology entails philosophical assumptions underpinning a study (Ekka, 2014:97). The methodology for this study adapts the steps outlined in the ‘research onion’ of Saunders *et al.* (2012:160). Thus, for this study, the methodology is approached from its philosophical stance, its approach to theory development, its methodological choice, its design and strategy, its population and sampling strategy, its data collection procedure, and the methods used to analyse the data.

Figure 4.1: Research onion



Source: Saunders *et al.*, 2016:160

4.2. RESEARCH PHILOSOPHY

Research philosophy refers to the “over-arching term relating to the development of knowledge and the nature of that knowledge” (Saunders *et al.*, 2015:127). The philosophy of any given research provides the justification for the assumptions made in the research process and for how those assumptions suit the methodology being implemented (Bryman, 2014:253).

Although there are a number of research philosophies, Bryman and Bell (2015:29) highlight positivism and interpretivism as the two overriding research philosophies. The positivist research philosophy is an approach to research in which data is collected through observable reality. It searches for consistencies and causal interactions in data to generate law-like generalities (Saunders *et al.*, 2015:128). Therefore, positivism relies on scientific methods of enquiry (Bryman & Bell, 2015:28). Interpretivism, by contrast, holds that people are complicated and different, understand the same ‘objective reality’ in very diverse ways, and have their own different explanations for their actions (Saunders *et al.*, 2015:129). Interpretivist research, therefore, aims to understand and interpret human behaviour rather than to generalise and predict causes and effects (Cooper & Schindler, 2011:144).

This study uses positivism as its research philosophy. The reason for this is that the study aims to gather quantifiable data from a sample to test the robustness of an existing theory (UTAUT2) to explain mobile banking app acceptance among South African millennials residing in Gauteng. A survey strategy is applied to obtain the data needed for the analysis. This is in line with the positivist philosophy, which mainly uses surveys and experiments to test hypotheses (Babbie, 2013:60). Statistics and mathematical computations are central to the positivist research philosophy (Saunders *et al.*, 2015:129). Hence, statistical tools such as the Statistical Package for Social Sciences (SPSS) and structural equation modelling are used to examine key statistics, such as descriptive statistics, internal consistency, and validity, to conduct confirmatory factor analysis of the measurement model, and to test the hypotheses proposed for the

study.

4.3. RESEARCH APPROACH

Research approach describes the in-depth methods of data collection, analysis, and interpretation (Malhotra, 2012:104). It specifies the tactics that researchers apply to collect the evidence essential for constructing and testing theories (Beri, 2013:74). Saunders *et al.* (2015:164) identified 'deductive' and 'inductive' as the two main research approaches to theory development in research. A deductive approach is defined as a form of reasoning concerned with hypothesising conclusions from evidence or propositions, meaning that the conclusion must follow from the given reasons (Zikmund *et al.*, 2010:44). A deductive approach therefore develops hypotheses from an existing theory, and tests those hypotheses to determine the validity of the theory. With an inductive approach, a researcher gathers data relevant to the study with the aim of creating meaning from the data to establish patterns and relationships in order to build a theory (Zikmund & Babi, 2013:49). In this approach, researchers can use the methods of realistic interpretation, results, and theory origination, as findings are integrated into existing data to develop theories. This approach does not entail the development and testing of research hypotheses (Zikmund *et al.*, 2010 44).

This study follows a deductive approach to theory development. This approach is consistent with the positivist research paradigm, which underlies the epistemological philosophy of this study. Moreover, the deductive approach to theory development in research is mostly associated with quantitative studies (Saunders *et al.*, 2015:162). In following the deductive approach to theory development for this study, a comprehensive review of the literature was carried out to explore existing theories (refer to Chapters 2 and 3). A conceptual model was then developed with its theoretical background in the UTAUT2. From this conceptual model, hypotheses were formed, and quantitative data were obtained to test those hypotheses with a view to validating or falsifying the theory through accepting or rejecting the hypotheses proposed for the study. These approaches therefore reinforce support for the deductive approach to theory development followed in this study.

4.4. METHODOLOGICAL CHOICE

Researchers need to make a choice about using either a mono-method (a single data collection technique) or a multi-method (using more than one data collection technique) (Saunders *et al.*, 2012:151). “Quantitative methods are defined as research methods that generate numerical and statistical data, while qualitative methods are synonymous with data collection methods and analysis techniques that use and generate non-numerical data” (Saunders *et al.*, 2012:151). This study followed a mono-method. The study used quantitative techniques and procedures, and obtained data using a survey in the form of a structured questionnaire. The quantitative method was selected because this study aimed to perform a statistical analysis of a vast number of representative cases.

4.5. RESEARCH STRATEGY AND DESIGN

4.5.1. RESEARCH STRATEGY

A research strategy is broadly seen as the methodological connection between the research philosophy and the data collection methods (Babbie, 2013:229). Saunders *et al.* (2015:173) identified a number of different research strategies, including the following:

- a) Experiments, which are described as measuring causes and effects by manipulating one variable to ascertain its effect on another variable (Pelto, 2017:40);
- b) Surveys, which involve collection of information in standardised form from a group of people (Chilisa & Kawulich, 2012:6);
- c) Archival research, which uses records and documentation as the primary sources of data, and enables the use of research questions focused on the past (Van Deventer, 2015:255);
- d) Case studies refer to the formation of a thorough knowledge about a particular ‘case’, or of a small number of related ‘cases’ (Creswell, 2014:112).

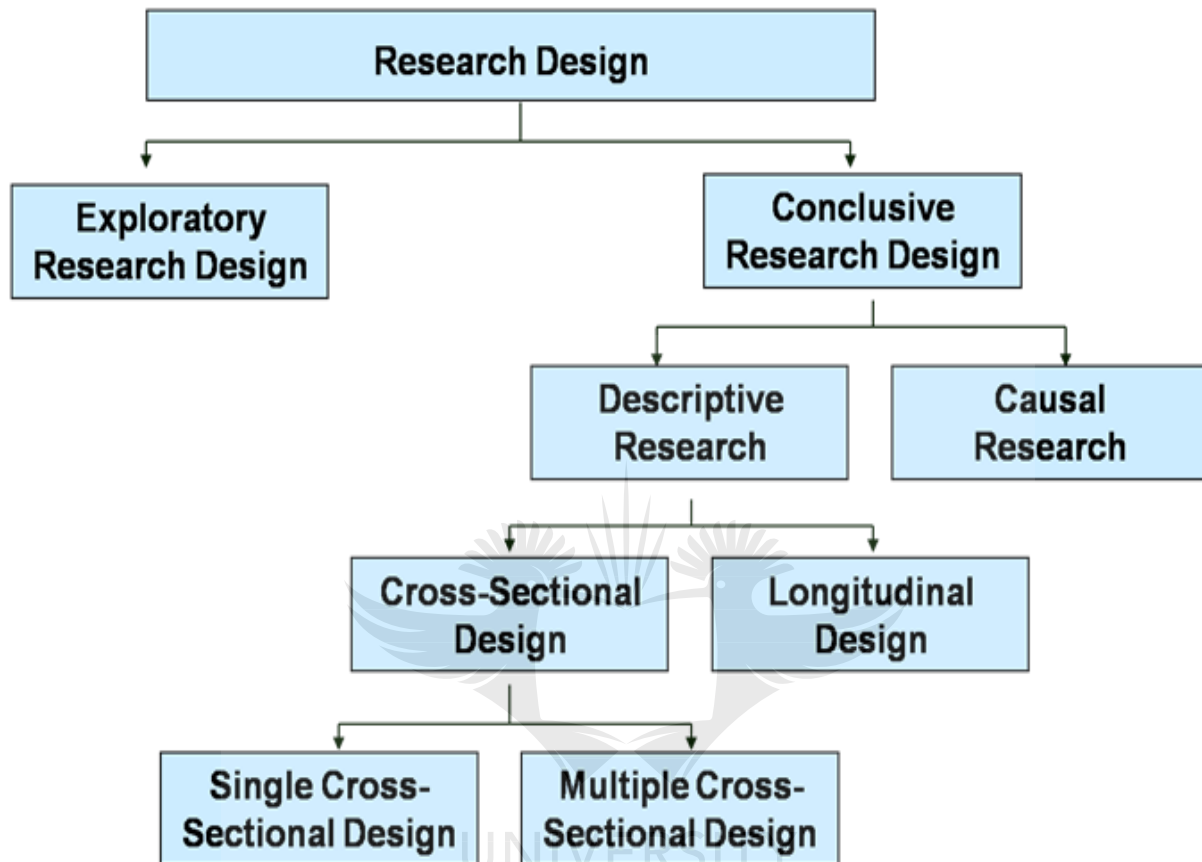
- e) Ethnography, which comes from the field of anthropology. It is used to study groups with a view to understanding the social world the research subject occupies, and the manner in which it is understood. It happens over an extended period and in the natural environment of the research subjects (Pelto, 2017:40).
- f) Action research is an emergent process of enquiry that is aimed at coming up with solutions to real organisational problems through a participative and collaborative approach (Creswell, 2014:112).
- g) Grounded theory refers to the collection of data that starts without the development of an original theoretic framework. Theory is established from data through a sequence of observations and narrative enquiry (Creswell, 2014:112).

For this study, a survey strategy using a questionnaire was applied. This form of research strategy is often related to the positivist epistemological philosophy, a deductive research approach to theory development and a quantitative methodological approach to research (Zikmund & Babin, 2013:100). Using this strategy permits researchers to obtain information from a huge sample to analyse and test the research hypotheses. Creswell (2014:13) stated that a survey method is one of the popular marketing research strategies used by marketing researchers, and is mostly used for descriptive research purposes. Given that this study adopted positivism as its research philosophy, positivism typically applies the scientific method to the study of research phenomena. The methodologies used in this type of research include surveys, structured observations, and experiments (Chilisa & Kawulich, 2012:50). Therefore, the survey strategy adopted is appropriate for this study.

4.5.2. RESEARCH DESIGN

Cooper and Schindler (2011:139) stated that a research design is “the blueprint for achieving objectives and answering the research questions”. Malhotra (2012:106) classified research designs into exploratory, descriptive, or causal. This categorisation is shown in Figure 4.2.

Figure 4.2: Research design



Source: Malhotra, 2012:100

An exploratory research design aims to clarify unclear situations (and involves obtaining insights into and ideas on research problems) (Zikmund & Babin, 2013:48). According to Wilson and MacLean (2011:259), exploratory research designs are “valuable means of finding out what is happening to seek new insights; to ask questions and to assess phenomena in a new light”. Therefore, this design is appropriate in cases where the research problem is not clear, where there is a need to identify relevant variables, or where hypothesis testing will be done (Saunders *et al.*, 2015:163). Furthermore, this study enabled the design of questions and projected hypotheses for more definite examination (Kotler & Armstrong, 2012:127). Additionally, Malhotra (2012:103) posited

that the results arising from exploratory research must be reflected as unconfirmed or as input to additional research, resulting in conclusive research such as descriptive research and causal research designs.

This study therefore used the conclusive research approach following a descriptive research design. Bradley (2010:510) states that this research design is used to explain market situations, attitudes, perceptions, beliefs, or opinions. Malhotra (2010:106) describes descriptive research design as the type that is used to describe the attributes of objects, groups, people, or environments, and that answers questions about who, what, when, where, and how. The current study sought to address the research question: What are the drivers of and barriers to mobile banking app acceptance and use among millennials? Hence a descriptive research design was proposed. Moreover, this study aimed to use a reasonably large sample size, surveys and questionnaire methods to collect the necessary data, and statistical methods to describe the attributes of the sample (Kotler & Armstrong, 2012:127).

Further categories of descriptive research include longitudinal and cross-sectional research designs (Malhotra, 2012:222). Longitudinal research designs are studies of a similar fixed sample of respondents that are studied repetitively over a stated period (Berndt & Petzer, 2011:133). Conversely, cross-sectional research designs collect data from a specified sample of a population only on one occasion (Silver *et al.*, 2013:74). This design type is made up of single and multiple cross-sectional designs (Malhotra, 2012:102). A single cross-sectional design includes the assembling of information from one sample of respondents only once, while in a multiple cross-sectional design, information is obtained from more than two samples of participants on one occasion (Malhotra, 2012:108).

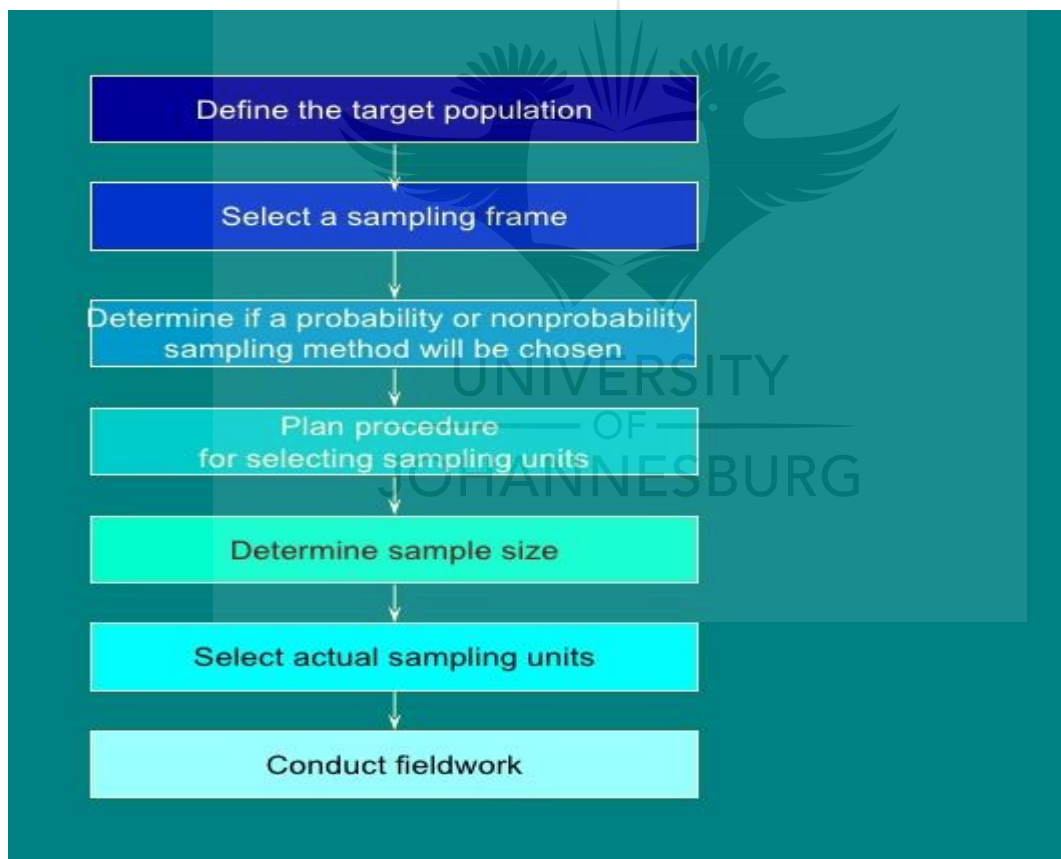
The current study followed a single cross-sectional descriptive research design, because a questionnaire was used to obtain information from the target population (millennials residing in Gauteng who are clients of the five major retail banks) through a survey research strategy on only one occasion. Cross-sectional studies are inexpensive and allow researchers to collect information quickly. With this research design, data is frequently attained using self-report surveys, and researchers can obtain a large

amount of data from a large group of participants. Furthermore, cross-sectional studies allow researcher to collect data on diverse variables to see how differences in gender, age, education levels, and income levels might connect with the critical variable of interest.

4.5.3. POPULATION AND SAMPLING

The population and sampling of this study evolved in stages, as illustrated in Figure 4.3.

Figure 4.3: Stages in selection of a sample



Source: Zikmund *et al.*, 2010:391

(a) Population

Saunders *et al.* (2015:260) define 'population' as a "whole unit of elements or entities

that have the data and information needed by the researcher to investigate the particular research problem and make crucial decisions”. Similarly, Zikmund and Babin (2013:313) define population as the group of elements or entities that have the data needed by the researcher for his or her study. Burns and Bush (2014:364) argue that the intentions of the study and the population decide which components should be included in the sample. Therefore, it is important that the population is accurately defined to make sure that consistent and usable results are achieved (Cant *et al.*, 2008:164). In defining the population, Malhotra (2012:372) recommends taking into consideration the elements in the survey (participants), sampling units, and the geographical limitations, as well as the time horizon. Using these parameters, therefore, the sample of this survey is defined as follows:

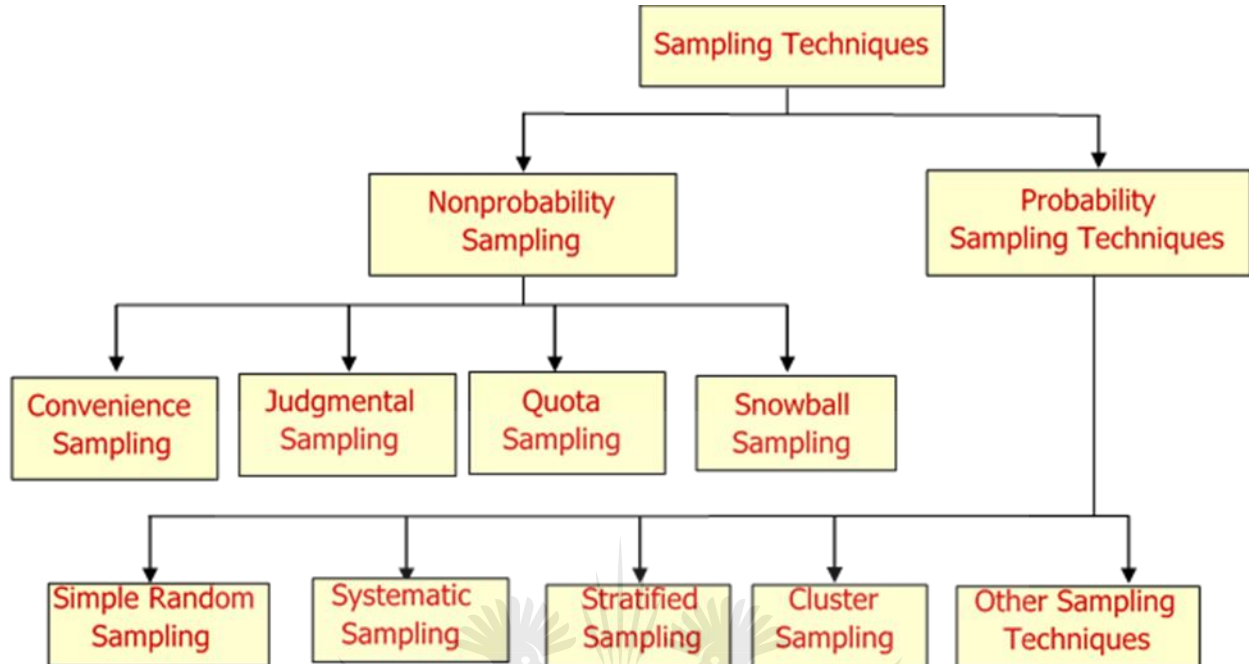
Millennials residing in Gauteng at the time of the survey, who are current customers of the five major South African retail banks (Absa, Standard Bank, First National Bank, Nedbank, and Capitec).

These banks were selected for this study because they are leading South African retail banks that provide banking services through a mobile app to their clients (BusinessTech, 2017). The province of Gauteng was chosen as the location of the study because it is considered the most cosmopolitan province in South Africa, with population characteristics that mirror those of the entire country (Maduku, 2016:189).

(b) Sampling

A sample is a sub-division comprising the characteristics of a larger population (Zikmund & Babin, 2013:317). It is applied in statistical testing when population sizes are too big for the test to represent all possible members (Cooper & Schindler, 2011:367). The two sampling techniques are probability and non-probability sampling (Zikmund *et al.*, 2010:387). The main sampling methods within these broad techniques are outlined in Figure 4.4

Figure 4.4: Sampling techniques



Source: Malhotra, 2012:370

When using probability sampling, every participant or unit of the population has an equal opportunity of being chosen; thus a sampling frame is a prerequisite for using probability sampling (Burns & Bush, 2014:242; Malhotra, 2012:371). When done accurately, probability sampling methods guarantee that the sample represents the whole population (Zikmund *et al.*, 2010:395; Cooper & Schindler, 2011:368;). As shown in Figure 4.4, illustrations of probability sampling techniques consist of simple random, systematic, stratified, cluster, and multistage sampling methods. In non-probability sampling, sampled components do not get an equal chance to be selected, and it does not statistically signify the entire population (Creswell, 2012:248). The researcher applied techniques such as personal knowledge, convenience, and expert judgement to choose the sample (Cooper & Schindler, 2011:384). As a result, there was a challenge to become certain whether the population component involved in the sample represented the entirety (Feinberg *et al.*, 2013:304). As depicted in Figure 4.4, examples of non-probability sampling methods are “convenience, judgemental, quota and snowball sampling methods” (Berndt & Petzer, 2011:175). As a result of the unavailability of a sample frame, this study used non-probability sampling techniques,

through the use of a quota and convenience sampling techniques, to choose the sample. First of all, quota sampling was applied to select the sample from demographic (gender and race) quotas. The use of quota sampling in this study was to ensure that the demographics of gender and race in the sample fairly represented and mirrored the distribution in the South African general population. After defining the quotas, a convenience sampling method was applied to select the participants from these predefined quotas. Convenience sampling is defined as a technique that selects sample elements based on convenience and availability (Salkind, 2012:103; Struwig & Stead, 2010:111). The use of the convenience sampling method enabled the researcher to select the final participants who were available and willing to take part in the study during the data collection period. Household visits, office visits, parking lots, and recreational park intercepts were used to identify respondents. This sampling method allowed for the researcher to have access to readily available participants; as such, it was a suitable, cheap, and time-efficient means of selecting the respondents (Burns & Bush, 2010:383; Maree *et al.*, 2011:177).

(c). Sample size determination

Sample size refers to the number of units to be involved in a survey sample to conclude from or draw, by means of analysis (Malhotra, 2010:374; Berndt & Petzer, 2011:182). The sample size relies on a number of factors, such as basic features found in the studied population, statistical requirements, sample sizes in previous research studies, the changes included, and the expected reliability and precision of the results (McDaniel & Gates, 2013:301).

The sample size realised for this study was 400. In arriving at this sample size, two key factors were taken into consideration. The first was the method that would be used to analyse the data. Structural equation modelling (SEM) was used in this study. This is a large data technique (Babin & Savensson, 2012:329; Kline, 2011:11). It is widely recommended that a sample size larger than 200 is adequate for the SEM technique. Moreover, a review of the literature on related studies shows that sample sizes used in mobile banking studies have ranged between 300 and 600 (Baptista & Oliveira, 2015; Verissimo & Manuel, 2016; Koenig *et al.*, 2010; Khasawneh, 2015). Consistent with

the foregoing, this study obtained 352 usable responses for analysis. This sample size meets the requirements for the statistical analysis, and is also comparable to the sample sizes used in prior related mobile banking studies (Zulfauzy & Rachmawati, 2016; Assensoh-Kodua, Migiro & Mutambara, 2016).

4.6. MEASUREMENT

Survey research mostly uses a questionnaire as the primary data collection technique (Cooper & Schindler, 2011:389). Consequently, this research used the questionnaire as the main data-collection instrument. A questionnaire, also known as an *interview form schedule* or a *measuring instrument* (Cant *et al.*, 2008:147), enabled the researcher to collect data from respondents by giving specific questions with the aim of accomplishing the research objectives of the study and answering the research questions (Babbie, 2011:255 & Brace, 2008:4).

Matthews and Ross (2010:206) emphasised the need for good questionnaire design, as a poorly designed questionnaire results in inaccurate data collection. Hence, in line with widely recommended practice, the paper-based questionnaire design is participant-friendly, by ensuring that questions are direct, short, and easy to comprehend (Berndt & Petzer, 2011:186; Struwig & Stead, 2010:91; Bryman & Bell, 2015:240).

Moreover, Zikmund and Babin (2013:64) stated that an effective questionnaire needs a professional physical appearance, and expedient and summarising guidelines on how to complete the survey properly, as well as an introductory letter to enable the researcher to obtain the maximum possible response rate. In line with this, the questionnaire designed for this study had a cover letter that specified significant information, such as an outline of the research study, ethical adherence, and appropriate contact information. This was also used as an effective tool to motivate participants to take part in the study.

Questionnaire formats are also important considerations in questionnaire design. Pallant (2010:7) stated that there are two categories of questionnaire design: unstructured (open-ended) and structured (closed-ended) questionnaires. With regard to open-ended questions, which are used in unstructured questionnaires, the

respondents are given a space to reply to the questions using their own words, expressions, or notes (Maree *et al.*, 2011:161), and this is usually applied in exploratory research (Bryman & Bell, 2015:240; Malhotra & Birks, 2007:381). Structured questionnaires, in contrast, have closed-ended questions that require structured fixed responses from which the participants may choose (Van Deventer, 2005:151; Matthews & Ross, 2010:201).

The questions fielded in the questionnaire of this survey were closed-ended questions, which required respondents to choose from alternatives that best described their perception or circumstances. The final questionnaire of this study had three sections. First, the questionnaire fielded statements (items) measuring the perception of the use of mobile banking apps. The statements in this section measured the constructs of the UTAUT2 (performance expectancy, effort expectancy, social influence, hedonic motivation, price value, habit, facilitating conditions, behavioural intention, and use behaviour). The items used to measure these constructs were taken from the original study of the UTAUT2 by Venkatesh *et al.* (2012). The items used for measuring the constructs in this section can be found in Table 4.1.

The second section measured respondents' risk perception of mobile banking apps. Items were used to measure various dimensions of risk, including device risk, psychological risk, financial risk, privacy risk, and performance risk. These items were selected and adapted from prior studies. The dimensions of risk measured, with their items and the sources from which those items were selected and adapted, are presented in Table 4.1.

All the measurement items in sections A and B of the questionnaire were measured on a Likert-type response scale with anchors from '1' (strongly disagree) to '7' (strongly agree). The Likert scale, named after its designer, Rensis Likert, is normally used in itemised ranking scales, and is commonly used to evaluate respondents' perceptions (Schiffman *et al.*, 2010:61; Maree *et al.*, 2011:167). The use of the Likert response format scale for this study is considered adequate because it is highly reliable and enables effective data collection (Malhotra, 2012:309). Moreover, this scale is the easiest to use and understand, and participants find it simple to use. It is the most

widely used scale in quantitative studies (Schiffman *et al.*, 2010:61).

The third section had questions measuring the sample’s characteristics and their use of mobile banking apps. Typical questions included in this section asked about the respondent’s gender, age, race, monthly income, and their frequency of using mobile banking apps. These questions were mainly measured on nominal and interval scales.

Before designing the measurement instruments, all the constructs included in this study were operationalised. *Operationalisation* refers to “the process whereby the selected constructs are turned into measurable phenomena (Amy and Charvat, 2008:173). Zikmund and Babin (2013:235) explained *constructs* as items that are measured with compound variables. Table 4.1 indicates the operational definitions for each construct used in this study, the measurement items used, and the sources from which the measurement items were drawn and adapted.

Table 4.1. Operationalisation of variables

Construct	Operational definition	Measurement items	Source of items
Performance expectancy	“Performance Expectancy is the extent to which customers trust that using mobile banking apps will be beneficial to their banking transactions” (Tarawneh, 2016).	<ul style="list-style-type: none"> • “I find mobile banking app useful in my daily banking transactions” • “Using mobile banking apps increases my chances of achieving things that are important to me” • “Using mobile banking apps helps me accomplish things more quickly” • “Using mobile banking apps increases my productivity” 	Venkatesh <i>et al.</i> (2012)
Effort expectancy	“Effort Expectancy is the extent to which consumers believe that using [a] mobile banking app is less complex and effortless” (Tarawneh, 2016:1233)	<ul style="list-style-type: none"> • “I find mobile banking app useful in my daily life” • “Learning how to use mobile banking apps is easy for me” • “My interaction with mobile banking apps is clear and understandable” • “I find mobile banking apps easy to use” • “It is easy for me to become skilful at using mobile banking apps” • “ 	Venkatesh <i>et al.</i> (2012)

Construct	Operational definition	Measurement items	Source of items
Social influence	“Social Influence refers to the influence of significant people on the target user’s decision to adopt mobile banking apps” (Tarawneh, 2016:255)	<ul style="list-style-type: none"> •“People who are important to me think that I should use mobile banking apps” •“People who influence my behaviour think that I should use mobile banking apps” •“People whose opinion I value prefer that I use mobile banking apps” 	Venkatesh. <i>et al.</i> (2012)
Hedonic motivation	<i>Hedonic motivation</i> refers to the “perceived level of fun and enjoyment associated with using the mobile banking apps” (Baptista & Oliveira, 2015:421).	<ul style="list-style-type: none"> •“Using mobile banking apps is fun” •“Using mobile banking apps is enjoyable” •“Using mobile banking apps is very entertaining” 	Venkatesh <i>et al.</i> (2012)
Price value	In mobile banking, <i>price value</i> defines the the cost linked with the downloading, installation and the use of the app using internet data bundles (Baptista & Oliveira, 2017)	<ul style="list-style-type: none"> •“Banking transactions conducted on mobile banking apps are reasonably priced” •“Mobile banking app is good value for money” •“At the current price, mobile banking apps provide good value” 	Venkatesh <i>et al.</i> (2012)
Habit	<i>Habit</i> refers to the level at which individuals use mobile banking spontaneously due to learning (Baptista & Oliveira, 2015:422).	<ul style="list-style-type: none"> •“The use of mobile banking apps has become a habit for me” •“I am addicted to using mobile banking apps” •“I must use mobile banking apps” 	Venkatesh <i>et al.</i> (2012)
Facilitating condition	<i>Facilitating conditions</i> in mobile banking app use denotes the availability of support services and technical infrastructure to help mobile banking app users.	<ul style="list-style-type: none"> •“I have the resources necessary to use mobile banking apps” •“I have the knowledge necessary to use mobile internet” •“Mobile banking apps are compatible with other technologies I use” •“I can get help from others when I have difficulties using mobile banking apps” 	Venkatesh <i>et al.</i> (2012)
Behavioural intention	<i>Behavioural intention</i> discusses clients’ eagerness to adopt the mobile banking apps (Alalwan <i>et al.</i> , 2017:102).	<ul style="list-style-type: none"> •“I intend to continue using mobile banking apps in the future” •“I always try to use mobile banking apps in my daily life” •“I plan to continue to use mobile banking apps frequently” •“I intend to continue using mobile banking apps in the future” •“I always try to use mobile banking app in my daily life” 	Venkatesh <i>et al.</i> (2012)

Construct	Operational definition	Measurement items	Source of items
Perceived risk	In mobile banking apps, <i>perceived risk</i> refers to customers' expectation of suffering a loss when using mobile banking apps to perform banking transactions (Tarawneh, 2016).	<ul style="list-style-type: none"> •“Others may know information about my online transactions if I use this app” •“There is a significant risk when making my queries and/or my banking transactions through the mobile app” •“I believe that making queries and/or banking transactions with this app is a risky choice” •“Conducting banking transactions on mobile phones is risky because one can easily lose or misplace the mobile phone” •“Others may know information about my online transactions if I use this app” 	Muñoz-Leivaa, Climent-Climent & Liébana-Cabanillasa (2017)

4.7. PILOT TESTING AND RELIABILITY OF THE MEASUREMENT INSTRUMENTS

Zikmund and Babin (2013:391) argue that a successful questionnaire must first be tested on a small number of participants, who are selected using a convenience sampling technique. This assists with identifying any difficulties that respondents may encounter while completing the survey, and whether there are any unclear or biased questions.

In line with the above recommendation, the questionnaire for this study was pre-tested on a sample of 30 millennials residing in Gauteng who are the clients of the five major South African retail banks. The purpose of the pilot survey was to identify the feasibility of the implemented research instrument, and to assess its reliability and validity. Two separate pilots were conducted with the research instrument.

The first draft of the research instrument was given to 30 conveniently selected millennials of the five main banks. The findings from the pilot broadly indicated that the questionnaire did not contain any confusing questions and that the respondents found it easy to complete. All the sections in the questionnaire were duly completed by the pilot sample; but they complained about the length of the questionnaire, and suggested that the researcher reduce the total number of questions in the form, as it took them more than 15 minutes to complete the questionnaire. Furthermore, a few typographical errors were brought to the attention of the researcher during this process.

Reliability analysis using Cronbach's alpha was done to ascertain the level at which items evaluated a single, unidimensional latent variable. Cronbach's alpha estimates range between 0, meaning no consistency, to 1, meaning that there is full consistency (Zikmund *et al.*, 2010:306). The interpretation of the Cronbach's alpha threshold is shown in Table 4.2.

Table 4.2: Scales of Cronbach's alpha

Cronbach's alpha of scale	Interpretation
Between 0.80 and 0.95	very good reliability
Between 0.70 and 0.79	good reliability
Between 0.60 and 0.69	fair reliability
Below 0.60	poor reliability

Source: Zikmund *et al.*, 2010:306

Although the majority of the items displayed a high internal consistency (Cronbach's alpha values greater than 0.7) in measuring their respective constructs, a few of them, including that of device risk, had a low internal consistency with a Cronbach's alpha below 0.6. The weak items were rephrased or replaced. All the typographical errors in the instruments were also corrected. With these corrections effected, a second pilot test was conducted with another sample of 30 respondents.

The feedback on the second pilot generally showed that the questionnaire was simple to understand and that the participants were comfortable completing the study. On average, the questionnaire took 20 minutes to be completed. However, the respondents again complained that the questionnaire was too long. The second set of pilot data was again analysed to determine the reliability of the scales in measuring their respective constructs. The summary of the reliability analysis of the second pilot study is shown in Table 4.3.

Table 4.3: Summary of pilot study reliability results

Constructs	Cronbach's alpha
Performance expectancy	0.680
Effort expectancy	0.898
Social influence	0.754
Hedonic motivation	0.893
Price value	0.663
Habit	0.682
Facilitating conditions	0.606
Behavioural intention	0.812
Perceived risk	0.854
Mobile banking app use	0.777

The Cronbach's alpha values are generally higher. This indicates that the constructs used in this study were consistent. The shortcomings identified during piloting were rectified before distributing the questionnaire for the final survey.

4.8 DATA COLLECTION

McDaniel and Gates (2013:281) underscored the significance of choosing suitable data collection techniques, as this is regarded as the foundation for all research undertakings within research studies, and could have major results for the sampling procedure. The survey strategy uses self-administered or fieldworker-administered surveys to allow for an orderly and structured questioning method of data collection (Kent, 2007:182; McDaniel & Gates, 2013:116). In this study, a self-managed survey was used. This technique enabled the participants involved in the research study to complete the questionnaire with little or no involvement of the researcher.

“The administration of a survey could be done using a number of methods, including online survey, mail survey, telephone survey, face-to-face survey or mixed-mode survey” (Malhotra, 2012:374). For this study, a face-to-face traditional survey strategy was applied to obtain the data required for the study. The selected participants who

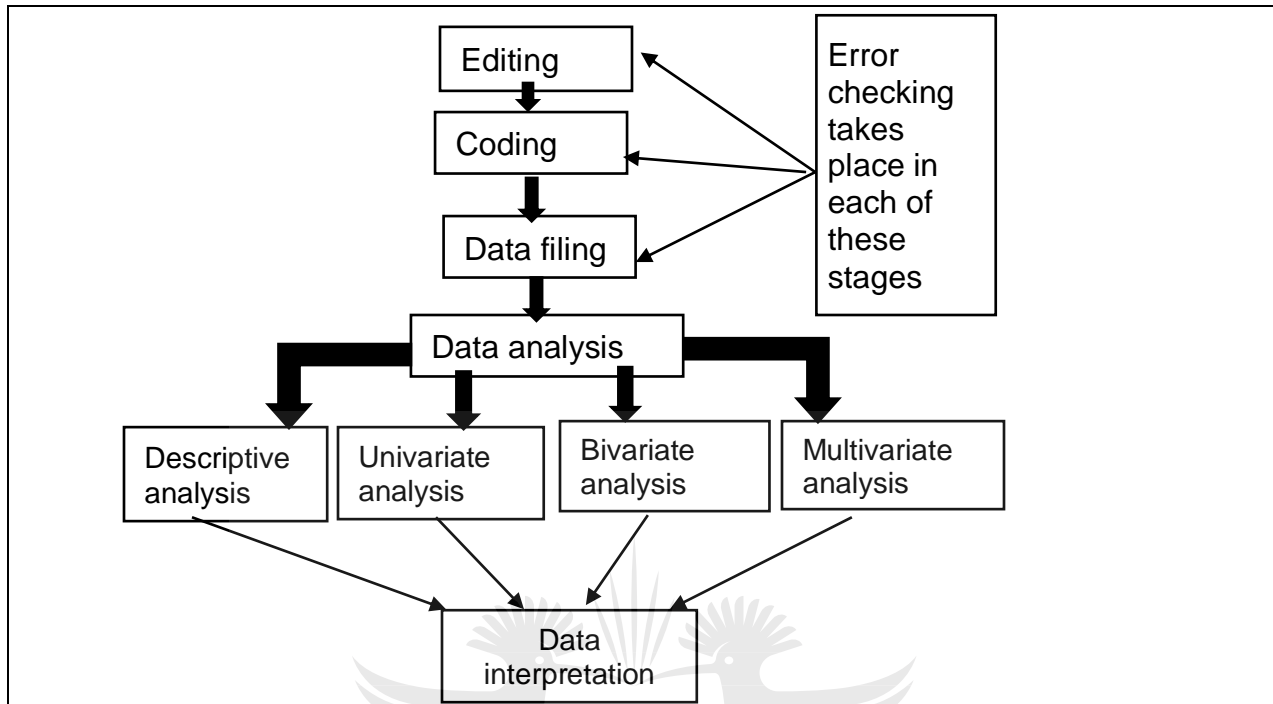
decided to take part in the survey had the choice to complete a copy of the paper-based questionnaire on their feet, or the questionnaires were dropped off at their location and times for collecting the complete questionnaires were agreed upon.

The researcher visited the respondents in various places around the Johannesburg metro, Ekurhuleni, and the city of Tshwane. The researcher visited different households located in these municipalities in order to obtain responses from millennials of different income, gender, and racial groups. Office parks around the Gauteng province were also visited in order to target young users of mobile banking who are working and cannot be found at home or in parks during the day. Lastly, recreational parks located close to universities and colleges were used to identify respondents and to solicit their participation in gathering the data. These parks were identified as the best to sample an average Gauteng millennial, since the universities and colleges have a larger number of millennials. Questionnaires were only handed out to respondents who fitted the criteria for the study (i.e., South Africans and millennials). In approaching the respondents, the researcher introduced herself, clarified the intentions of the research, and asked them to participate voluntarily in the research. The data collection was done over two months, in May and June 2018.

4.9. DATA ANALYSIS

As soon as the required fieldwork had been finalised, the data was administered and transformed for analysis (McDaniel & Gates, 2013:326; Zikmund & Babin, 2013:64). Data analysis is described as a method of reducing collected data to an appropriate amount, summarising the data, studying patterns, and carrying out statistical analysis (Blumberg, Cooper & Schindler, 2014:120). In analysing the data, Iacobucci and Churchill (2010:350) advised that the following steps be taken: data editing, data coding, data filing, and data analysis. Consistent with this recommendation, the phases followed in the data analysis for this study are summarised in Figure 4.5.

Figure 4.5: Stages in data analysis



Source: Zikmund *et al.*, 2010:462

Step 1: Data editing

To begin with, an exercise of data editing is carried out: the questionnaire is examined, and it is determined that it does not contain any uncertainties, response errors, or discrepancies (Zikmund & Babin, 2013:64). As a result, data editing ensures that the collected data is correct (Malhotra, 2012:453), that it has been recorded consistently, that it follows the research aims, and that it is organised in a manner that streamlines the coding and tabulation processes (Shukla, 2008:95). Questionnaires that were less than 90% complete were rejected, as were questionnaires that were completed by people who did not fall into the specified age bracket (18-32).

Step 2: Data coding

After the process of data editing, coding of the data was performed. The coding entailed allocating statistical codes for each response to a specific question in the questionnaire. The statistical process allowed for the conversion of primary data into numeric symbols. This was done with the purpose of allocating the responses of the respondents into different groups (Remler & Van Ryzin, 2011:76). The codes assigned to the specific statements or questions in the questionnaire are shown in Table 4.4.

Table 4.4 Coding information

Data Type	Code
Performance expectancy	PE1-PE5
Effort expectancy	E1-E4
Social influence	SI1-SI3
Hedonic motivation	HM1-HM3
Price value	PV1-PV3
Habit	HT1-HT4
Facilitating conditions	FC1-FC4
Behavioural intention	BI1-BI3
Perceived risk	PR1-PR5
Mobile banking app use	C1-C6

Step 3: Data filing

Zikmund *et al.* (2011:471) describe data filing as the method of logically arranging collected data in an efficient manner in a number of grouping systems. This is done by computing the number of responses assigned to each of the questions. Data is generally stored in a matrix that resembles a common spreadsheet file. In this study, data was stored in a SPSS data file known as SPSS statistics (*.sav, *.zsav).

Statistical data analysis was then completed. The statistical techniques used on the empirical data set evolved in stages, as described below.

Step 4: Data analysis

The characteristics of the sample were analysed using descriptive statistics. Descriptive data analysis is associated with frequency analysis, and is usually applied to summarise and to study patterns in collected information (Malhotra, 2010:486). Furthermore, these statistical techniques are used to transform enormous amounts of information into the simplest characteristics for easier data analysis (Zikmund & Babin, 2013:364). The Statistical Package for Social Sciences (SPSS) version 25 was applied to analyse descriptive statistics for this study. This analysis sought to provide descriptive statistics such as frequencies and percentages. Participants' gender, age, and current bank were analysed with frequencies and percentages. For the various constructs, means and standard deviation were computed to ascertain the patterns of responses and the distribution.

After these processes, a partial least squares structural equation modelling technique, using SmartPLS version 3.6 software, was applied to analyse the data further. Structural equation modelling (SEM) is defined as a multivariate data analysis technique (Hair *et al.*, 2010:99), applied when defining compound interactions between seen and unseen variables along with connections among two or more unobserved variables (Anglim, 2007:1). Partial least squares SEM (PLS-SEM) is regularly used across different management disciplines, including organisational research and strategic management (Hair *et al.*, 2012:76). PLS-SEM allows researchers to evaluate complex cause-effect relationship models with both latent and observed variables.

The partial least squares (PLS) approach to SEM is an alternative to a covariance-based SEM, which is most appropriate for circumstances when data is not ordinarily scattered. PLS path modelling is particularly useful because it has minimum requirements in terms of measurement scales and sample sizes. The partial least squares SEM software packages, which are still being developed, are WarpPLS and SmartPLS. Bowen and Guo (2011:7) describe the primary aim of SEM as being to

confirm research hypotheses with reference to means, variances, and covariances of the constructs.

In conducting the SEM, the two-step process endorsed by Anderson and Gerbing (1991) was followed. First, a measurement model analysis using confirmatory factor analysis was executed to determine the accuracy of the measurement model. Estimates such as standardised factor loadings, composite reliability, and average variance extracted were applied to evaluate the convergent validity of the measurement model. The discriminant validity of the measurement model was also ascertained using the Fornell-Larcker method (1981). On confirming the strength of the measurement model, the structural model was then studied to identify the significance of the hypotheses, and the variance explained in the outcome variables (R^2) by independent variables.

4.10. ETHICAL CONSIDERATIONS

Research with human subjects or participants raises various complicated ethical, legal, social, and political issues (Kamat, 2018:5). Research ethics is therefore an important part of the research process to ensure that all ethical concerns about the design implementation and reporting of the research findings are addressed (Kamat, 2018:5). The ethical considerations implemented in the planning and execution of the study are as follows:

- The questionnaire designed for this research study contained an introductory letter clarifying the aim of the study and reassuring potential participants of the confidentiality of their responses.
- Respondents were amply informed that involvement in the research was entirely voluntary, and that they were welcome to withdraw from participation in the study at any stage of the process.
- The particulars of both the student and the supervisor were disclosed to the participants to enable them to ask questions and get clarity on any issue, or to

raise any ethical concerns.

- The participants in this study were assured that personal information would be kept confidential, that their identity would not be revealed, and that the data-collection, handling, and storage processes of this study would protect their privacy.
- The respondents were assured that no inaccurate reporting of missing data points would be done during the data analysis.
- Ethical clearance for this study was obtained from the University of Johannesburg College of Business and Economics Research Ethics Committee.

4.11. CHAPTER SUMMARY

This chapter outlines the research design and methodology applied in this study. In doing so, the research philosophy, research approach, research choice, research strategies, design, population and sampling, and data collection methods and analysis were explained. In this chapter, the details concerning the development and pre-testing of the construct confirming the reliability and validity of the data collection instrument were discussed. It further discussed the statistical tools that were used in the data analysis. Lastly, the issues related to ethical considerations were discussed in more detail.

The next chapter presents the data analysis, the results of the analysis of the demographic information of the respondents and of the descriptive data, and the structural equation modelling results.

CHAPTER 5

DATA ANALYSES AND RESULTS

5.1. INTRODUCTION

This chapter gives an overview of the procedures for the data analyses and the results of the analyses. The data collected was analysed using SPSS software for descriptive statistics and a partial least squares structural equation modelling for the measurement model and the structural model analyses.

This chapter has four sections. First, the findings of the descriptive data analyses of the demographic profiles of the respondents are presented. The main results presented in this section include the results of the age, gender, income levels, and ethnicity of the sample. The first section also presents findings about the frequency of mobile banking app use, the frequency of the time spent on mobile banking apps, and the installation of mobile banking apps on mobile devices. Frequencies and percentages are used to present these in tables, pie charts, and bar graphs.

Second, the chapter presents the descriptive analysis of the research constructs of the study, which were performance expectancy, effort expectancy, price value, hedonic motivation, habit, facilitating conditions, behavioural intention, and perceived risk. The percentages and the measures of central tendency (mean) and variability (standard deviation) are used to analyse the distribution of the responses on the measurement scales assessing the instruments.

The third and fourth sections of this chapter present the analyses and the results of the structural equation modelling. These sections present the results of the psychometric properties of the scales in terms of convergent and discriminant validities. Finally, the results of the structural model testing to assess the hypotheses are presented. The structural equation modelling was based on the partial least squares technique, making use of SmartPLS version 3.6.

5.2. DESCRIPTIVE STATISTICS OF SAMPLE CHARACTERISTICS AND MEASURES OF THE CONSTRUCTS

The sections below outline the descriptive statistics of the sample and the measures of the constructs employed in the study.

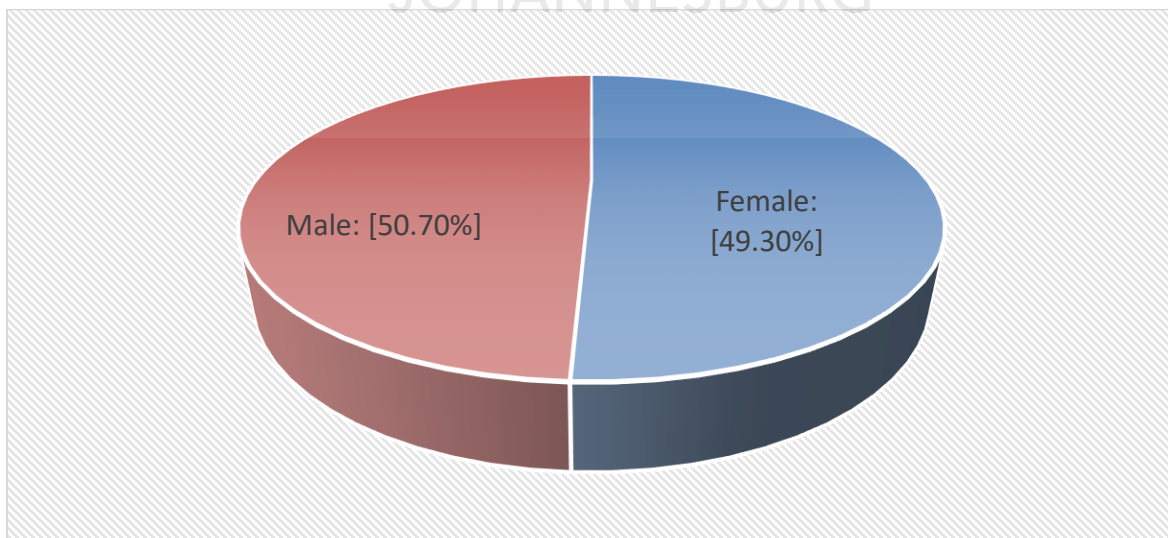
5.2.1. DESCRIPTIVE STATISTICS OF THE SAMPLE

The descriptive statistics of the sample are presented using pie charts, bar graphs, and histograms. The results are presented in the sections that follow for gender, age group, income levels, and ethnicity.

i. Gender

The gender distribution of the sample is illustrated in Figure 5.1. The results indicate that, of 352 respondents, 178 (50.70%) were females and 173 (49.30%) were males. These results therefore show that the percentage of female respondents who took part in this survey was slightly higher than that of male respondents.

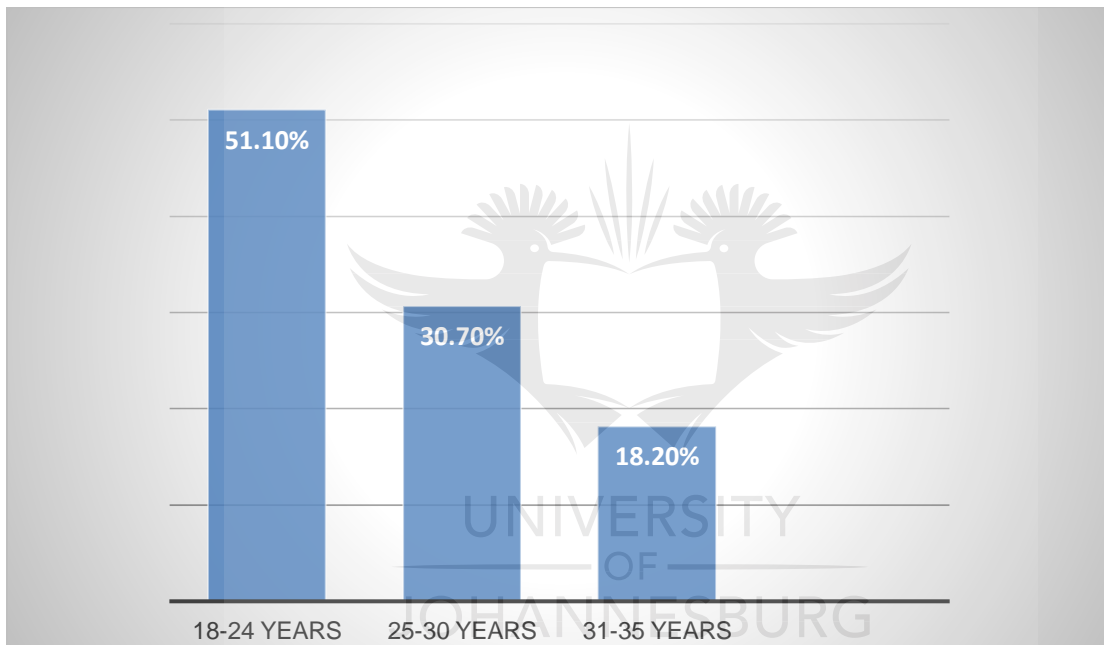
Figure 5.1: Gender distribution of the sample



ii. Age distribution

The age distribution of the participants is illustrated in Figure 5.2. According to the results, 180 (51.1%) of the participants are aged between of 18 and 24 years. The results also show that 108 (30.7%) of the participants are between the ages of 25 and 30 years, and 64 (18.2%) are between the ages of 31 and 35 years.

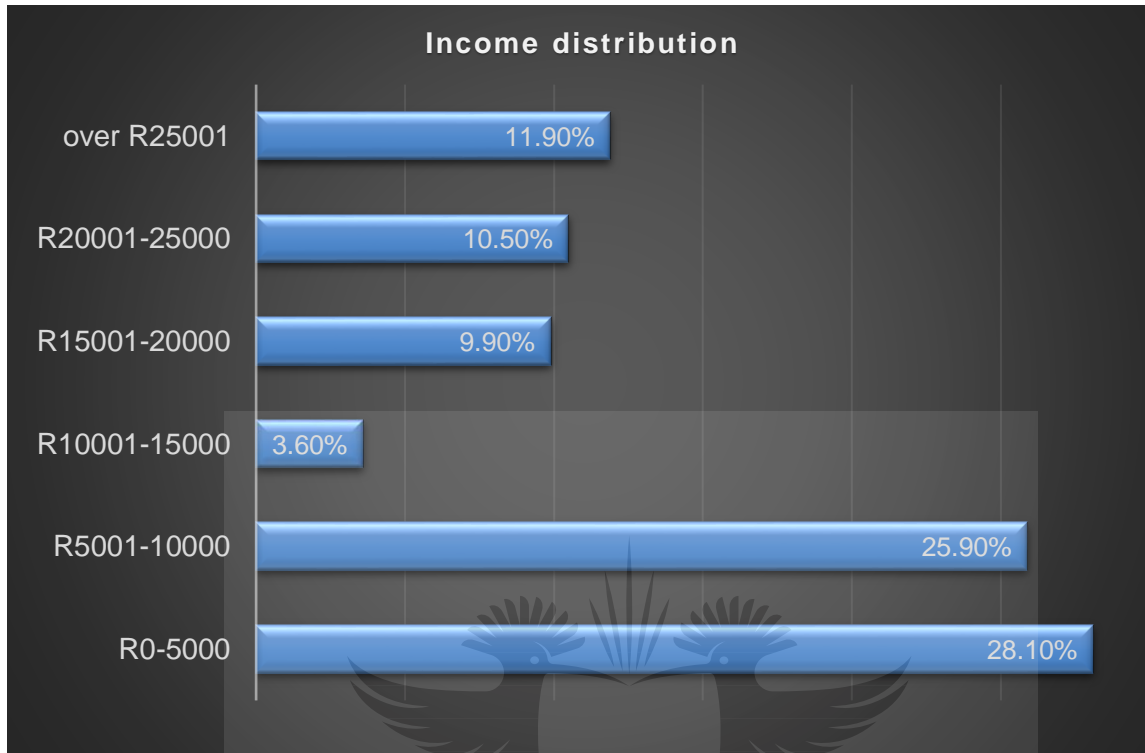
Figure 5.2: Age distribution



iii. Monthly income distribution

The income distribution of the participants is presented in Figure 5.3. It shows that most of the participants, 99 (28.10%), reported earning an income of R0-5 000. The results also show that 91 participants (25.9%) reported earning an income of R5 001-R10 000, while a further 48 (13.6%) respondents reported earning R10 001-R15 000, 35 (9.9%) reported earning R15 001-R20 000, 37 (10.5%) reported earning R20 001-R25 000, and lastly 42 (11.9%) reported earning over R25 000.

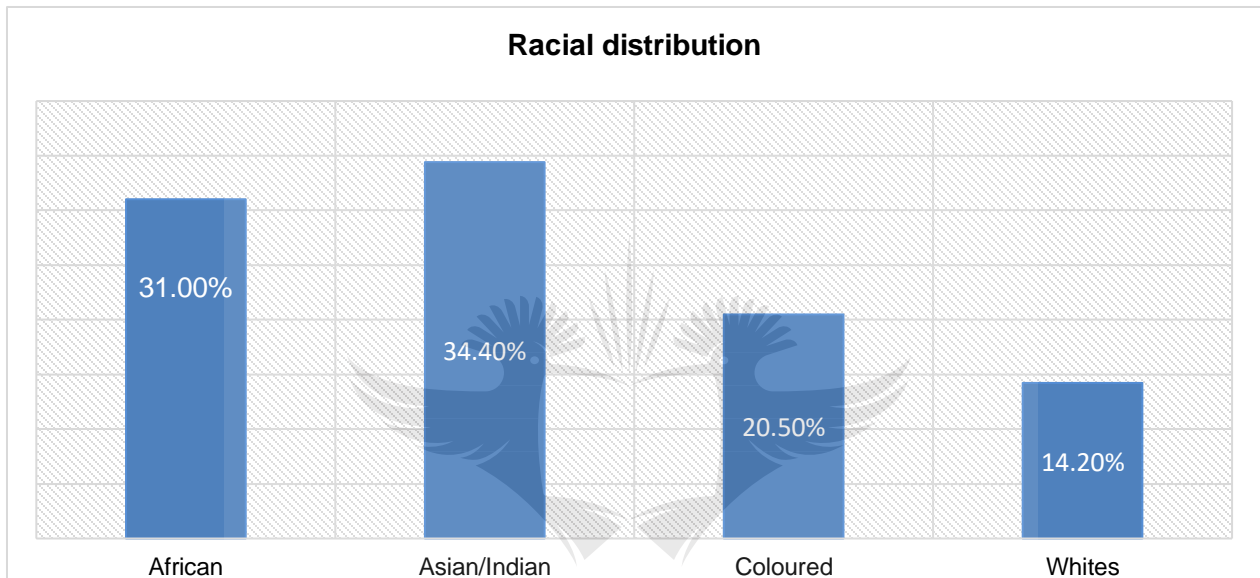
Figure 5.3: Monthly income distribution



iv. Racial distribution of the sample

The descriptive statistics for the racial distribution of the sample are presented in Figure 5.4. The results of the race classification show that the proportion of the Indian/Asian group was slightly higher than that of the other racial groups, with this group comprising 121 (34.4%) of the sample. Africans form the next largest group in of the sample, with 109 (31.0%) of the participants. Participants who classified themselves as coloureds comprised 72 (20.5%) of the sample, while the rest, 50 (14.2%), were whites.

Figure 5.4: Racial distribution



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5.2.2 MOBILE BANKING APP USE PATTERNS

i. Mobile banking app installation

Participants were requested to indicate if they had installed a banking app on their mobile device(s). The results of the analysis are presented in Table 5.1.

Table 5.1: Mobile banking app installation

	Frequency	Percent
Yes	352	100%
No	0	0%

The findings presented in Table 5.1 indicate that all of the respondents who participated in the study had mobile banking apps installed on their mobile devices.

ii. Mobile banking apps usage frequency

Participants were also required to specify their frequency of using the mobile banking app. The results of the analysis are presented in Table 5.2, showing that most of the participants, 141 (40.1%), use mobile banking apps a few times a week. They were followed by the respondents who stated that they use mobile banking apps daily – a total of 70 (19.9%); 54 (15.3%) of the respondents said they use mobile banking apps once a week; 38 (10.8%) use mobile banking apps once a month; 30 (8.5%) use mobile banking apps a few times a month; and a few respondents, 19 (5.4%), reported that

	Frequency	Percent
Never	19	5.4%
Daily	70	19.9%
Once a week	54	15.3%
A few times a week	141	40.1%
Once a month	38	10.8%
A few times a month	30	8.5%

they never use mobile banking apps.

Table 5.2: Frequency of mobile banking apps usage

(iii) Time spent on mobile banking apps

Table 5.3 indicates the time spent by respondents on the mobile banking apps. Most of the respondents pointed out that they do not spend more than 15 minutes on the mobile banking apps. Of the participants, 116 (33.5%) indicated that they spend 0-5 minutes,

while 101 (29.2%) said they spend 16-30 minutes, 85 (24.6%) spend 31-60 minutes, and lastly 44 (12.7%) indicated that they spend over 60 minutes on the mobile banking apps.

Table 5.3: Time spent on mobile banking apps

	Frequency	Percent
0-15 minutes	116	33.5%
16-30 minutes	101	29.2%
31-60 minutes	85	24.6%
Over 60 minutes	44	12.7%

5.3 DESCRIPTIVE ANALYSIS OF THE MEASURE OF CONSTRUCT

This section discusses the descriptive analysis of the measures of the constructs used in the study. These constructs were performance expectancy, effort expectancy, social influence, habit, hedonic motivation, facilitating conditions, price value, and perceived risk. The constructs are measured on a seven-point Likert response format scale with the following scale descriptions: 1 – ‘strongly disagree’, 2 – ‘disagree’, 3 – ‘somewhat disagree’, 4 – ‘neutral’; 5 – somewhat agree’, 6 – ‘agree’, and 7 – ‘strongly agree’.

5.3.1. PERFORMANCE EXPECTANCY

This construct measures the extent to which consumers believe that mobile banking apps will be beneficial in performing their banking transactions. The results of the descriptive analysis using mean, standard deviation, and percentages are shown in Table 5.4.

Table 5.4: Descriptive statistics of measures of performance expectancy

Measures of construct: Performance expectancy	Mean	SD	Percentages						
			SD 1	D 2	SD 3	N 4	SA 5	A 6	SA 7
"I find mobile banking apps useful in my daily banking transactions"	5.98	1.192	0.6	0.6	1.7	9.5	18.7	2.3	4.6
"Using mobile banking apps increases my chances of achieving things that are important to me"	5.80	1.133	0	0.9	2.3	9.4	25.9	27.0	34.7
"Using mobile banking apps helps me accomplish things more quickly"	6.00	1.004	0	0	1.1	8.2	18.8	33.2	38.6
"Using mobile banking apps increases my productivity"	5.58	1.112	0	0	2.3	16.5	28.4	26.7	26.1
"I find mobile banking apps useful in my daily life"	5.72	1.137	0	1.1	2.6	11.4	21.9	34.7	28.4
Overall performance expectancy	5.821	.884							

According to the results, the overall mean for the construct is 5.821 with a standard deviation of .884. This result suggests that the respondents generally agree with most of the statements measuring the construct. This can be seen in the percentage distribution of the scale items measuring the construct. For example, 38.6% of the participants strongly agree with the statement, "Using mobile banking apps helps me accomplish things more quickly". A further 33.2% of the participants also agree with that statement. Moreover, 34.7% of the participants strongly agree with the statement, "Using mobile banking apps increases my chances of achieving things that are important to me". Respondents are convinced that using mobile banking apps will improve the performance of their banking transactions. According to the findings, the highest rated attribute of performance expectancy was the point at which respondents believe that mobile banking apps help them to accomplish things quickly (mean = 6.00; SD = 1.004) and that the mobile banking apps are useful in the daily banking transactions performed by the respondents (mean = 5.98; SD = 1.137).

5.3.2. EFFORT EXPECTANCY

This construct measures the point at which users are convinced that the mobile banking app requires less effort and fewer skills to use an innovation. The findings of the

descriptive analysis using mean, standard deviation, and percentages are presented in Table 5.5.

Table 5.5: Descriptive statistics of measures of effort expectancy

Measures of construct: Effort expectancy	Mean	SD	Percentages						
			SD 1	D 2	SD 3	N 4	SA 5	A 6	SA 7
“Learning how to use mobile banking apps is easy for me”	5.82	1.184	0	0	3.1	13.9	20.2	23.6	39.2
“My interaction with mobile banking apps is clear and understandable”	5.64	1.260	0	0.9	6.8	11.4	20.5	29.8	30.7
“I find mobile banking apps easy to use”	5.78	1.142	0.3	0	2.0	13.1	23.0	27.0	34.7
“It is easy for me to become skillful at using mobile banking apps”	5.71	1.151	0	0.9	2.3	12.8	24.4	28.7	31.0
Overall effort expectancy	5.736	1.056							

The results in Table 5.5 show that the overall mean value for effort expectancy was 5.736 and the standard deviation value was 1.056. This means that the respondents agreed with the statements measuring performance expectancy. Support for this is provided in the percentage distribution of the scale items measuring the construct. From the table, the results show that 39.2% of the respondents strongly agree with the statement, “Learning how to use mobile banking apps is easy for me”, and 34.7% strongly agree that mobile banking apps are very easy to use. The highest rated item measuring effort expectancy was “Learning how to use mobile banking apps is easy for me” (mean = 5.82, SD = 1.184), followed by “I find mobile banking apps easy to use” (mean = 5.78, SD = 1.142). Thus participants generally find mobile banking apps easy to use and require less effort to learn and understand.

5.3.3 SOCIAL INFLUENCE

In this study, *social influence* denotes the level at which a person believes that people who are significant to them, specifically friends and family, think that they must adopt and use mobile banking apps. The results of the descriptive analysis using mean, standard deviation, and percentages are presented in Table 5.6.

Table 5.6: Descriptive statistics of measures of social influence

Measures construct: Social Influence	Mean	SD	Percentages						
			SD 1	D 2	SD 3	N 4	SA 5	A 6	SA 7
"People who are important to me think that I should use mobile banking apps"	5.30	1.298	0.6	2.3	5.4	16.8	29.8	23.9	21.3
"People who influence my behaviour think that I should use mobile banking apps"	5.01	1.342	1.7	4.3	6.0	18.5	29.5	29.5	10.5
"People whose opinion I value prefer that I use mobile banking apps"	5.12	1.354	2.0	2.8	5.1	18.8	28.7	27.6	15.1
Overall social influence	5.142	1.122							

The results presented in Table 5.6 show that the overall mean for social influence was 5.142 and the standard deviation was 1.122. These findings suggest that the highest rated attribute of social influence was the extent to which respondents believe that their significant others think that they must use mobile banking apps (mean = 5.30, SD = 1.298); 21.3% of the respondents agreed with this statement. Of all three items used to measure social influence, the mean values were all above 4, thus indicating that participants generally agree with statements measuring social influence on mobile banking apps adoption.

5.3.4 HEDONIC MOTIVATION

In this study, *hedonic motivation* is described as the level of fun, joy, or entertainment linked with the use of mobile banking apps. The mean and the standard deviation for the items used to measure the construct are presented in Table 5.7.

Table 5.7: Descriptive statistical measures of hedonic motivation

Measures of construct: Hedonic motivation	Mean	SD	Percentages						
			SD	D	SD	N	SA	A	SA
			1	2	3	4	5	6	7
"Using mobile banking apps is fun"	5.03	1.321	0.6	2.6	7.4	25.6	26.8	20.5	16.5
"Using mobile banking apps is enjoyable"	5.34	1.396	0.6	1.4	8.3	17.7	26.3	16.6	29.1
"Using mobile banking apps is very entertaining"	5.07	1.320	0.6	1.7	11.4	19.9	23.4	29.3	13.7
Overall hedonic motivation	5.150	1.205							

The overall mean value was 5.150 and the standard deviation estimate was 1.205. This suggests that participants generally agree with the statements used to measure the construct. On a statement-by-statement analysis, the mean values for all the items of the measure were above 4. For example, 29.1% of the respondents strongly agree with the statement, "Using mobile banking apps is enjoyable" (mean = 5.34, SD = 1.396) and 29.3% agree with the statement, "Using mobile banking apps is very entertaining" (mean = 5.07, SD = 1.320). According to the findings, the highest rated attribute of hedonic motivation was "Using mobile banking apps is enjoyable" (mean = 5.34, SD = 1.396).

5.3.6 PRICE VALUE

This construct measures the degree to which users trust that mobile banking apps will provide monetary value. The results of the descriptive analysis using mean, standard deviation, and percentages are illustrated in Table 5.8.

Table 5.8: Descriptive statistics of measures of price value

Measures of construct: Price value	Mean	SD	Percentages						
			SD 1	D 2	SD 3	N 4	SA 5	A 6	SA 7
"Banking transactions conducted on mobile banking apps are reasonably priced"	5.23	1.220	0.6	1.7	6.6	11.2	43.3	18.3	18.3
"Mobile banking app is good value for money"	5.36	1.190	0	2.3	2.6	17.0	33.5	23.9	20.7
"At the current price, mobile banking apps provide good value"	5.43	1.238	0	0.9	6.6	15.1	27.9	25.4	24.0
Overall price value	5.353	1.035							

The overall mean and standard deviation were 5.353 and 1.035 respectively. This result suggests that the respondents generally agree with most of the statements measuring the construct. This is evident in the percentage distribution of the scale items measuring the construct. For example, 24% of the respondents strongly agree with the statement, "At the current price, mobile banking apps provide good value". A further 25.4% of the participants agree with the same statement. Moreover, 20.7% of the participants strongly agree with the statement, "Mobile banking app is good value for money". Respondents believe that using mobile banking apps provide good value for money. According to the findings, the highest rated attribute of price value was the extent to which respondents believe that "mobile banking apps are good value for money" (mean = 5.36), and the mean values on individual items were all above 4, thus indicating that the respondents generally agree that using mobile banking apps provide good monetary value.

5.3.6. HABIT

This construct measures the extent to which consumers believe that using mobile banking apps is a habit for them. The results of the descriptive analysis using mean, standard deviation, and percentages are presented in Table 5.9.

Table 5.9: Descriptive statistics of measures of habit

Measures of construct: Habit	Mean	SD	Percentages						
			SD 1	D 2	SD 3	N 4	SA 5	A 6	SA 7
"The use of mobile banking apps has become a habit for me"	5.20	1.426	2.3	2.0	7.4	16.8	24.1	27.8	19.6
"I am addicted to using mobile banking apps"	4.43	1.835	9.7	9.4	8.8	18.5	23.0	15.6	15.1
"I must use mobile banking apps"	4.60	1.676	7.7	5.1	8.5	19.9	31.3	12.2	15.3
Overall habit	4.744	1.308							

The overall mean and standard deviation for habit were 4.744 and 1.308 respectively. This indicates that the respondents generally agreed with the individual statements used to measure habit. This is evident in the percentage distribution of the scale items measuring the construct; 27.8% of the respondents agree with the statement, "The use of mobile banking apps has become a habit for me", and 19.6% of the respondents strongly agree with the same statement. The highest mean value was noted on the first statement, "The use of mobile banking apps has become a habit for me" (mean = 5.20; SD = 1.426). This implies that most respondents use mobile banking apps more often because it has become a habit.

5.3.7 FACILITATING CONDITIONS

This construct measures the degree to which consumers rely on existing technical support to support their use of mobile banking apps, and believe in their abilities to use the system. Table 5.10 presents the results of a descriptive analysis using mean, standard deviation, and percentages.

Table 5.10: Descriptive statistics of measures of facilitating conditions

Measures of construct: Facilitating conditions	Mean	SD	Percentages						
			SD 1	D 2	SD 3	N 4	SA 5	A 6	SA 7
"I have the resources necessary to use mobile banking apps"	5.67	1.288	0.6	0.6	2.8	17.6	20.7	21.3	36.4
"I have the knowledge necessary to use mobile banking apps"	5.83	1.205	0	0.6	3.4	12.3	19.2	25.2	39.3
"Mobile banking apps are compatible with other technologies I use"	5.74	1.222	0.6	0.6	2.9	12.6	21.4	27.4	34.6
"I can get help from others when I have difficulties using mobile banking apps"	5.47	1.450	2.6	1.4	4.5	14.5	21.6	25.3	30.1
Overall facilitating conditions	5.722	1.077							

The overall mean was 5.722 and the standard deviation was 1.077. These results suggest that the respondents generally agree with most of the statements measuring the construct. This can be seen in the percentage distribution of the responses on the scale items measuring the construct. For example, 39.3% respondents strongly agree with the statement, "I have the knowledge necessary to use mobile banking apps", and 36.4% strongly agree with the statement, "I have the resources necessary to use mobile banking apps". The highest mean was scored by the item, "I have the knowledge necessary to use mobile banking apps" (mean = 5.83, SD = 1.205). This indicates that most respondents believe that they are experienced in using mobile banking apps.

5.3.8 BEHAVIOURAL INTENTION

Behavioural intention to use refers to the measure of the likelihood that an individual will accept the innovation. This construct measured the respondents' behavioural intention to start using or carry on using mobile banking apps.

Table 5.11: Descriptive statistics of measures of behavioural intention

Measures of construct: Behavioural intention	Mean	SD	Percentages						
			SD 1	D 2	SD 3	N 4	SA 5	A 6	SA 7
"I intend to continue using mobile banking apps in the future"	5.72	1.302	0	4.0	1.7	10.8	20.2	28.8	34.5
"I always try to use mobile banking apps in my daily life"	5.78	1.298	0	1.7	5.4	8.3	22.8	21.1	40.7
"I plan to continue to use mobile banking apps frequently"	5.65	1.267	0	2.3	3.7	11.6	23.6	26.4	32.4
Overall behavioural intention	5.719	1.092							

As shown in Table 5.11, the overall mean and standard deviation values were 5.719 and 1.091 respectively. This result suggests that the respondents generally agree with most of the statements measuring the construct. This is evident in the percentage distribution of the scale items measuring the construct; 40.7% of the respondents strongly agreed with the statement, "I always try to use mobile banking apps in my daily life", and 34.5% strongly agreed with the statement, "I intend to continue using mobile banking apps in the future". The mean values for all the statements were very high (>5), which indicates that respondents generally intend to start or continue using mobile banking apps. The item, "I always try to use mobile banking apps in my daily life", (mean = 5.78; SD = 1.298) had the highest mean value. This implies that the respondents agreed that they are already using mobile banking apps and that they intend to continue using them.

5.3.9 ACTUAL USE

The participants were requested to specify the extent to which they used mobile banking apps to conduct selected banking activities. The results of the descriptive analysis using mean and standard deviation are presented in Table 5.12.

Table 5.12: Descriptive statistics of measures of actual use

Measures of construct: Actual use	Mean	SD	1	2	3	4	5
“Pay a beneficiary “	3.50	1.265	9.7	12.8	20.7	13.3	25.6
“Block a stolen/lost card”	2.36	1.443	41.8	19.6	10.8	16.5	11.4
“Pay accounts (cell phone account, clothing account etc)”	3.69	1.204	7.4	7.4	25.2	28.1	31.8
“Inter-account transfer”	3.64	1.322	11.6	6.8	21.3	26.4	33.8
“Check account balances”	4.12	1.056	4.3	2.9	15.8	30.4	46.7
“Pay for products ordered online”	3.13	1.452	22.7	8.8	24.4	21.3	22.7
“Obtain a bank statement”	3.52	1.244	8.5	11.7	26.8	25.6	27.4
“Buy prepaid airtime or data bundle”	3.86	0.984	3.4	3.1	26.4	38.6	28.4
Overall actual use	3.482	.753					

The results in Table 5.12 show that the participants in this survey use mobile banking apps for a number of banking transactions. Of the respondents who indicated using a mobile banking app, nearly all of them indicated that they have used mobile banking apps to check account balances. This is shown by the highest valid percentage of 46.7%, followed by those who indicated using mobile banking apps to do inter-account transfers (33.8%), pay accounts (31.8%), buy prepaid airtime (28.4%), obtain bank statements (27.4%), pay beneficiaries (25.6%), and pay for products ordered online (22.7%). Only 11.4% of the respondents indicated that they use mobile banking apps to block stolen or lost cards. The highest mean and the only mean value that is above the mid-point score (4) (mean = 4.12; SD = 1.056) was recorded for “Check account balances”, while the lowest mean was for “Block stolen/lost card” (mean = 2.36; SD = 1.443), which is lower than the mid-point of the scale (4). This suggests that the majority of the participants do not use mobile banking app to block lost or stolen cards. The overall mean for the actual use of mobile banking apps was 3.482, and the standard deviation was .753.

5.3.10 PERCEIVED RISK

Table 5.13 presents the descriptive statistics relating to perceived risk. In mobile banking apps, risk is seen as a customer’s anticipation of suffering a loss when using

mobile banking apps to perform banking transactions. The overall score for perceived risk had a mean rating of 3.939 with a standard deviation of 1.817. This means that the respondents somewhat agreed that perceived risk is an essential consideration that influences the acceptance and use of mobile banking apps, since the mean value was close to 4. This can be seen in the percentage distribution of the scale items measuring the construct. The mean values computed in most of the items were not very high, and were below the mid-point of the scale (4); the individual mean values were all between 3.7 and 3.9, which means that respondents on average did not disagree with the fact that there is risk associated with using mobile banking apps. The highest mean value was computed from the item, “I believe that making queries and/or banking transactions with this app is a risky choice” (mean = 4.22; SD=2.139). This means that respondents agreed that using mobile banking apps to make transactions is risky.

Table 5.13: Descriptive statistics of measures of perceived risk

Measures of construct: Perceived risk	Mean	SD	SD 1	D 2	SD 3	N 4	SA 5	A 6	SA 7
“Others may know information about my online transactions if I use this app”	3.77	2.108	20.7	12.5	16.8	11.4	11.1	12.8	14.8
“There is a significant risk when making my queries and/or my banking transactions through the mobile app”	4.00	2.131	19.3	10.2	13.9	12.8	12.5	13.9	17.3
“I believe that making queries and/or banking transactions with this app is a risky choice”	4.22	2.139	16.0	10.3	12.3	15.7	13.4	8.3	24.2
“Conducting banking transactions on mobile phones is risky because one can easily lose or misplace the mobile phone”	3.74	2.050	19.9	14.2	14.2	12.3	14.0	13.4	12.0
“Others may know information about my online transactions if I use this app”	3.94	1.979	16.8	9.7	16.8	15.6	14.2	14.5	12.5
Overall perceived risk	3.939	1.817							

5.4. RELIABILITY ANALYSIS

A measuring instrument is considered reliable when it is stable and consistent (Schiffman *et al.*, 2010:58; Burns & Bush, 2010:319; Malhotra, 2010:318). For that reason, reliability explains the stability of a measure (Shukla, 2008:83; Remler & Van Ryzin, 2011:118). The internal-consistency reliability has two main measurements, split-half reliability and the Cronbach's alpha coefficient (Malhotra, 2010:317). Cronbach's alpha is the most popular technique for measuring internal reliability (Malhotra, 2010:319). This study therefore uses Cronbach's alpha to measure the consistency of the measuring tool (Pallant, 2010:6). The rate of Cronbach's alpha ranges from zero, denoting no relationship between the scale items, to one, demonstrating a good association among the scale items (Van Deventer, 2015:222; Malhotra, 2010:319). A Cronbach's alpha value of 0.70 or higher is suggested as a good measure of internal consistency (Malhotra, 2010:319). On the other hand, a value of 0.5 symbolises satisfactory reliability, and a value below 0.5 usually denotes poor internal consistency reliability (Nunally, 1978:245; Peterson, 1994:382). The Cronbach's alpha estimates for scales employed in this study are presented in Table 5.14.

Table 5.14: Internal reliability using Cronbach's alpha

	Number of items	Cronbach's alpha
Actual use	8	0.775
Behavioural intention	3	0.918
Effort expectancy	4	0.936
Facilitating conditions	4	0.893
Habit	3	0.819
Hedonic motivation	3	0.945
Perceived risk	5	0.955
Performance expectancy	5	0.925
Price value	3	0.939
Social influence	3	0.938

The results show that the Cronbach's alpha for each of the constructs ranged between 0.755 for actual use and 0.955 for perceived risk. Given that these estimates are above the 0.7 threshold of good internal reliability, it is concluded that the scales of measuring the various constructs employed in the study demonstrate good internal reliability, and thus are appropriate for this study.

5.5. STRUCTURAL EQUATION MODELLING DATA ANALYSIS

This study adopted structural equation modelling (SEM) as the central technique for data analysis. SEM has the capability to test theoretical assumptions statistically against observed data (Bowen & Guo, 2011:7). SEM evaluates the properties of the measures used to measure the theoretical constructs, and estimates the hypothesised relationships among these constructs (Anglim, 2007:1). A partial least squares SEM technique was used, because this study aimed to examine how a given set of independent variables (performance expectancy, effort expectancy, social influence, hedonic motivation, price value, facilitating conditions, and habit) predict dependent variables (behavioural intention and actual behaviour). Dijkstra and Henseler (2015a:15) argued that, where the purpose of the research is to predict, PLS is a suitable approach to use.

In conducting an SEM, Anderson and Gerbing (1988) proposed a two-step approach: measurement model analysis to measure the validity of the psychometric properties of the measurement model, and structural model analysis to estimate the significance of the hypothesised relationships in a research model. This study therefore uses the two-step approach of Anderson and Gerbing (1988) by first analysing the psychometric properties of the measurement model, and then testing the proposed model to examine the significance of the hypothesised relationships.

5.5.1 MEASUREMENT MODEL ANALYSIS

The measurement model points out the associations among the constructs and the indicators: reliability, convergence validity, and discriminant validity.

i. CONVERGENT VALIDITY

The first procedure applied in the measurement model analysis is the examination of convergent validity. Convergent validity is “the extent to which a measure correlates positively with alternative measures of the same construct” (Hair *et al.*, 2014:102). Convergence is examined using standardised factor loading, composite reliability (CR), and average variance extracted (AVE). According to Hair *et al.* (2016:100), to achieve convergent validity the standardised factor loading should be significant and greater than 0.7. Moreover, the AVE of latent constructs should exceed 0.50, and the composite reliability for each latent construct should be more than 0.8.

The initial specification of the measurement model shows that a number of items, including those measuring actual use (AU1 and AU2), effort expectancy (EE3 and EE5), and performance expectancy (PE3), were below the 0.7 factor loading threshold. As a result, these items were dropped and the model was consequently re-specified. The final results of the convergent validity analyses are presented in Table 5.15 and Figure 5.5.

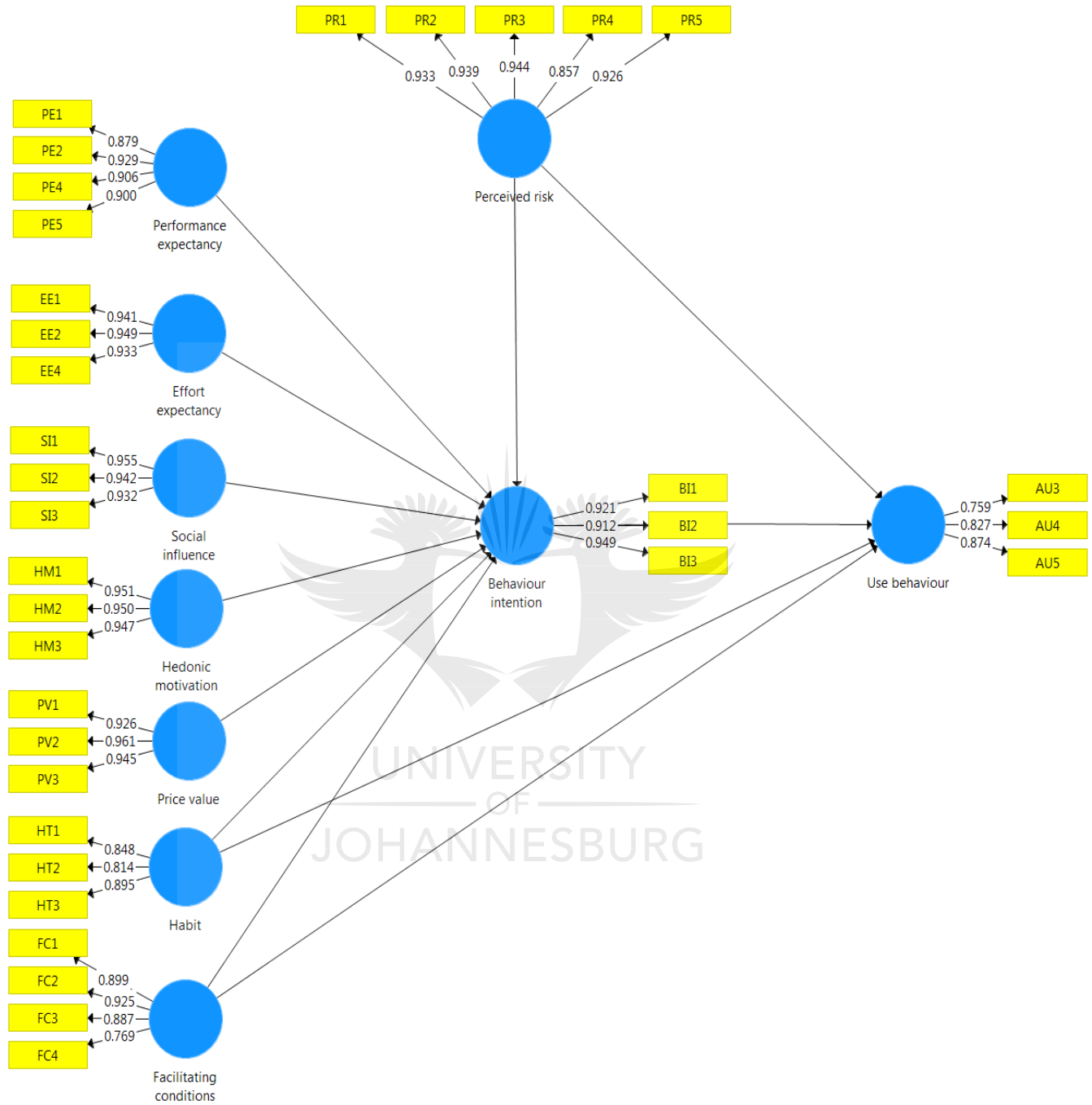
Table 5.15: Convergent validity of the measurement model

	Factor loading	Composite reliability	Average variance extracted
Actual use		0.861	0.675
AU3	0.790		
AU4	0.827		
AU5	0.874		
Behaviour intention		0.948	0.860
BI1	0.921		
BI2	0.912		
BI3	0.949		
Effort expectancy		0.959	0.886
EE1	0.941		
EE2	0.949		
EE4	0.933		
Facilitating conditions		0.927	0.761
FC1	0.899		
FC2	0.925		
FC3	0.887		
FC4	0.769		
Habit		0.889	0.727
HT1	0.848		
HT2	0.814		
HT3	0.895		
Hedonic motivation		0.965	0.901
HM1	0.951		
HM2	0.950		
HM3	0.947		
Perceived risk		0.965	0.848
PR1	0.933		
PR2	0.939		
PR3	0.944		
PR4	0.857		
PR5	0.927		
Performance expectancy		0.947	0.817
PE1	0.879		
PE2	0.929		

	Factor loading	Composite reliability	Average variance extracted
PE4	0.906		
PE5	0.900		
Price value		0.961	0.891
PV1	0.926		
PV2	0.961		
PV3	0.945		
Social influence		0.960	0.890
SI1	0.955		
SI2	0.942		
SI3	0.932		



Figure 5.5: Measurement model with standardised factor loading



The results presented in Table 5.15 and Figure 5.5 show the following:

- That for all the constructs, the factor loadings are significant at $p < 0.001$ and above 0.70.

- The CR estimates are above the recommended threshold of 0.8.
- The AVEs of all the constructs are above the 0.5 threshold, with 0.675 (actual use) as the lowest AVE estimate.

Taken together, these estimates provide strong statistical evidence to confirm the convergent validity of the measurement.

ii. DISCRIMINANT VALIDITY

The second part of the measurement model analysis is the assessment of discriminant validity. “Discriminant validity is defined as the extent to which constructs are distinctive from one another” (Hair *et al.*, 2016:90). In assessing discriminant validity, the Fornell-Larcker technique (Fornell & Larcker, 1981), cross-loading, and the heterotrait-monotrait ratio (HTMT) (Henseler *et al.*, 2016) techniques were used.

(a) Fornell-Larcker technique for testing discriminant validity

According to the Fornell-Larcker technique (Fornell & Larcker, 1981), discriminant validity is achieved when the square root of the AVEs is higher than the inter-factor correlations. The results of the Fornell-Larcker technique for discriminant analyses are presented in Table 5.16. According to those results, the square root of each construct’s AVE is greater than its relationship with another construct. As shown in the table, the lowest square root of the AVEs (bold diagonal values) is 0.821. This estimate is greater than the highest bivariate correlation of 0.744, between performance expectancy and behavioural intention, thus confirming discriminant validity.

(b) Cross-loading technique to confirming discriminant validity

According to the cross-loading technique, discriminant validity is attained when the indicators of a latent variable load much greater on the latent variables they measure than on other latent variables (Chin, 1998:296). For this study, discriminant validity

using this criterion was evaluated by assessing the cross-loadings of each item in the constructs, assessing the cross-loadings between indicators, and testing other latent variables. Appendix (A) presents the results of this analysis, which indicates that all the indicators load greater on the latent variables they measure than on other latent variables. Consequently, for this study, discriminant validity using the cross-loading technique has also been confirmed for the measurement model.

(c) Heterotrait-monotrait ratio (HTMT) technique to confirm discriminant validity

The heterotrait-monotrait ratio of correlations (HTMT) is one of the latest methods used for examining discriminant validity in partial least squares structural equation modelling (Henseler *et al.*, 2015:116). A number of simulation tests conducted by Henseler *et al.* (2015) confirm that the HTMT criterion evidently performs better than the common approaches to discriminant validity assessment such as the Fornell-Larcker criterion and (partial) cross-loadings, as these techniques are sometimes not capable of spotting a lack of discriminant validity. The HTMT technique uses either of two methods to evaluate discriminant validity: (a) as a criterion or (b) as a statistical test. Assessing HTMT as a criterion includes comparing it with a stated threshold. If the value of the HTMT is above this threshold, it can be said that there is a lack of discriminant validity (Henseler *et al.*, 2015:121). Following the guidelines of Henseler *et al.* (2015:121), we compared each of the HTMT construct values with a threshold of 0.85 (correlation value), considering that this value was adequate to use with the Technology Acceptance Model to assess discriminant validity (Henseler *et al.*, 2015:123).

The results of the HTMT criteria for discriminant analysis are presented in Table 5.17. These results show that the values were below 0.85, ranging from 0.496 to 0.833. The maximum value was achieved on the construct facilitating conditions (0.833).

Table 5.16: Discriminant validity using the Fornell-Larcker criterion

	Actual use	Behavioural intention	Effort expectancy	Facilitating conditions	Habit	Hedonic motivation	Perceived risk	Performance expectancy	Price value	Social influence
Actual use	0.821									
Behavioural intention	0.469	0.927								
Effort expectancy	0.420	0.639	0.941							
Facilitating conditions	0.449	0.683	0.763	0.872						
Habit	0.282	0.577	0.485	0.521	0.853					
Hedonic motivation	0.192	0.463	0.389	0.369	0.595	0.949				
Perceived risk	-0.242	-0.362	-0.371	-0.352	-0.117	0.068	0.921			
Performance expectancy	0.489	0.744	0.771	0.703	0.570	0.521	-0.308	0.904		
Price value	0.243	0.609	0.620	0.639	0.637	0.498	-0.222	0.641	0.944	
Social influence	0.375	0.508	0.575	0.606	0.569	0.395	-0.136	0.546	0.467	0.943

Bold diagonal values are the square roots of the AVEs



Table 5.17: Heterotrait-monotrait ratio (HTMT)

	Actual use	Behavioural intention	Effort expectancy	Facilitating conditions	Habit	Hedonic motivation	Perceived risk	Performance expectancy	Price value	Social influence
Actual use										
Behavioural intention	0.500									
Effort expectancy	0.456	0.687								
Facilitating conditions	0.498	0.752	0.833							
Habit	0.275	0.629	0.514	0.580						
Hedonic motivation	0.200	0.494	0.413	0.402	0.678					
Perceived risk	0.268	0.385	0.391	0.377	0.147	0.069				
Performance expectancy	0.537	0.806	0.828	0.772	0.621	0.556	0.327			
Price value	0.240	0.651	0.659	0.697	0.687	0.529	0.235	0.686		
Social influence	0.423	0.547	0.615	0.669	0.647	0.419	0.141	0.586	0.496	

5.5.3. STRUCTURAL MODEL ANALYSIS

(i) COLLINEARITY DIAGNOSTICS

The structural model analysis starts with collinearity diagnostics. Collinearity is defined as the circumstance in which more than two independent variables in a statistical model are linearly related (this is sometimes referred to as *multicollinearity*). If collinearity exists, regression estimates are unstable and have high standard errors (Dormann *et al.*, 2013:55). According to Tabachnick and Fidell (2014:138), a variance inflation factor (VIF) value of less than 5 signifies that the collinearity between the independent variables is not a concern in the structural model analysis.

In this study, collinearity diagnostics using the VIF were done to measure the extent of the threat of collinearity between the independent variables. The results of the collinearity diagnostics are presented in Table 5.18.

Table 5.18: Collinearity test: VIF values

	VIF VALUES	
	Actual use	Behaviour intention
Actual use		
Behavioural intention	2.257	
Effort expectancy		3.465
Facilitating conditions	2.034	3.066
Habit	1.612	2.351
Hedonic motivation		1.844
Perceived risk	1.209	1.297
Performance expectancy		3.225
Price value		2.371
Social influence		1.938

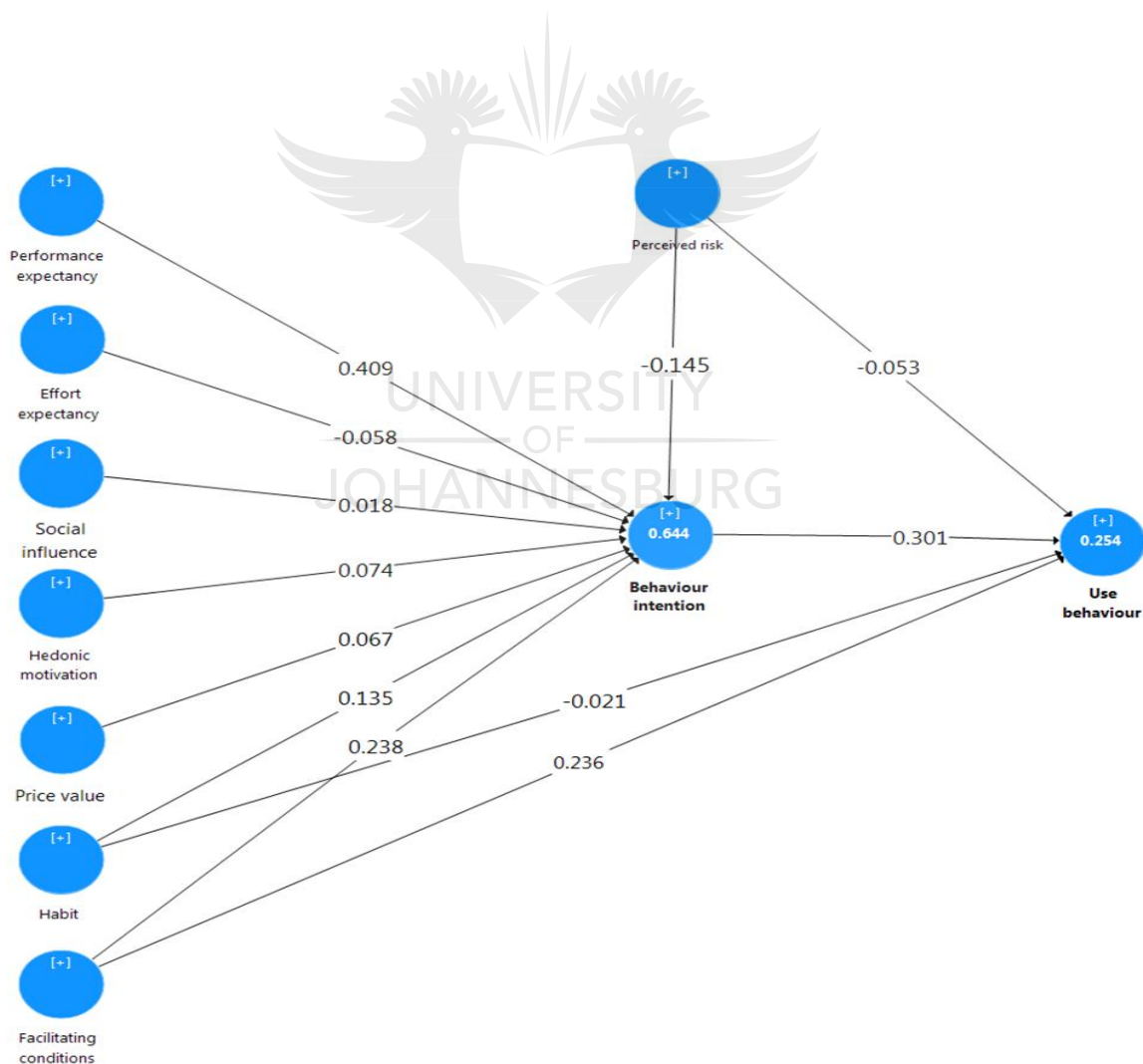
The collinearity assessment for the present study shows that the VIF values for the independent variables predicting actual use of mobile banking apps range from 1.209 (perceived risk) to 2.257 (behavioural intention). For the independent predictors of use behaviour, the VIF estimates range between 1.297 (perceived risk) and 3.465 (effort expectancy). These show that the VIF estimates of the independent

predictors of behavioural intention and use behaviour are less than the critical VIF threshold of 5, thus suggesting that collinearity does not present a critical threat to the independent variables in the structural model.

5.5.4 HYPOTHESES TESTING

The analysis of the structural model was also accomplished using the partial least squares structural equation modelling technique using SmartPLS 3. The results of the PLS-SEM of the structural model analysis are presented in Table 5.19 and depicted in Figure 5.

Figure 5.6: Structural model analysis with path coefficients and R² estimates

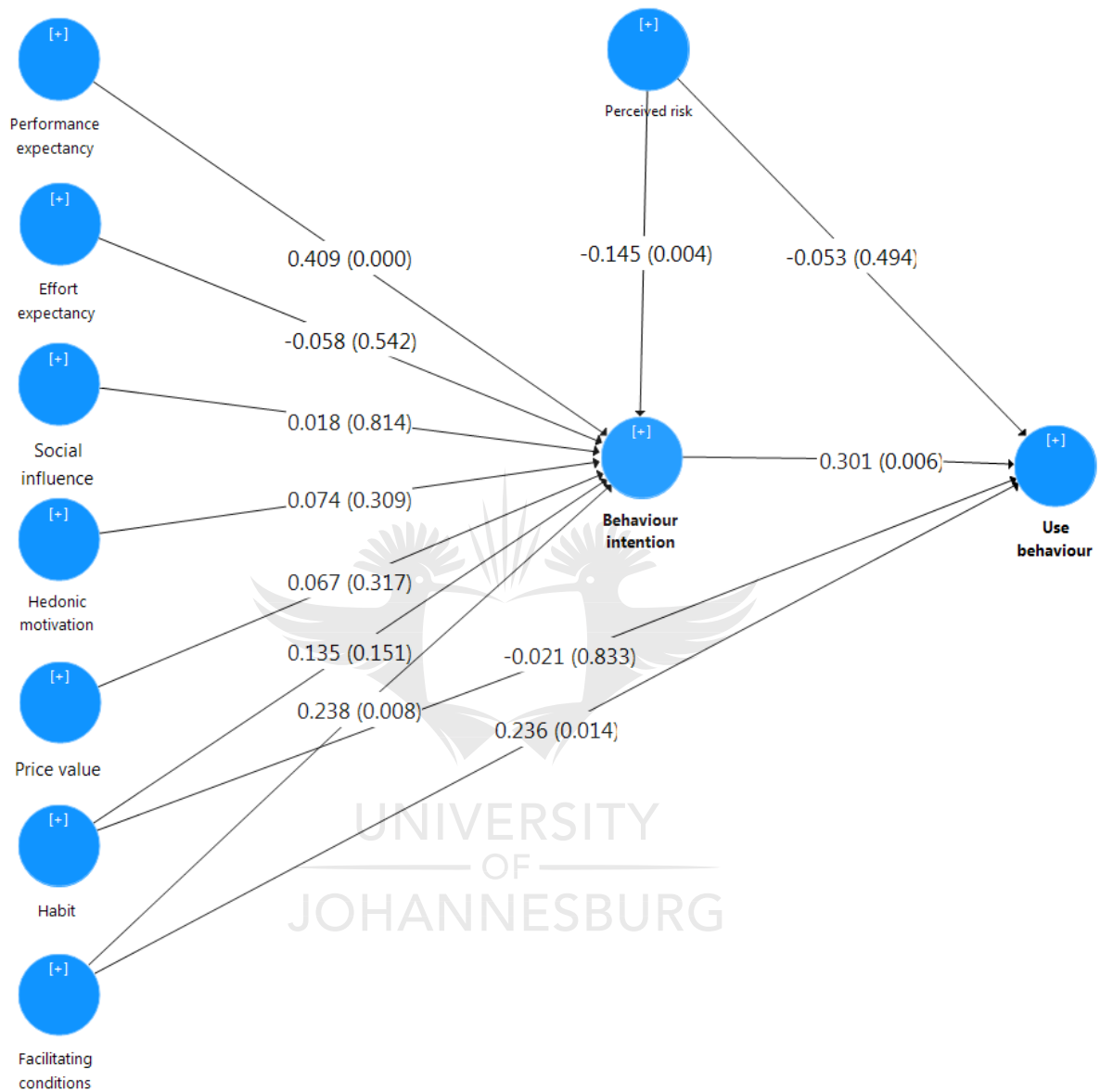


As indicated in Figure 5.6, the outcomes of the structural model analysis with the path coefficients and the coefficients of determination (R^2) are presented. The coefficient of determination (R^2) is used to assess the structural model, and measures the model's accuracy. Hair *et al.* (2014:78) stated that “coefficients of determination (R^2) are calculated for endogenous variable constructs by the squared correlations between the constructs and the predicted values, and represent the exogenous latent variable shared effects on the endogenous latent variable”. The value of R^2 varies between 0 and 1, while higher values denote a higher level of prediction.

The results show that the significant factors influencing behavioural intention to use mobile banking apps explain 64.4% per cent of the variance in behavioural intention to use mobile banking apps. Moreover, the results suggest that behavioural intention to use mobile banking apps and facilitating conditions explain 25.4% of the inconsistency in the use of mobile banking apps.

To examine the statistical significance of the relationships between the constructs, a bootstrapping technique using 5 000 re-samples was used. The significance level was set at $p < 0.05$. The path coefficients with $p > 0.05$ suggest that there is no statistically significant relationship between the constructs. The results of the bootstrapping for path significance are presented in Figure 5.7.

Figure 5.7: Structural model with path coefficients with p-values



Hypothesis 1 (H1)

H1 states:

Performance expectancy will significantly and positively influence millennials' behavioural intention to use mobile banking apps.

The results of the analyses suggest that performance expectancy of mobile banking apps has a significant and positive relationship with millennials' behavioural intention to use the technology ($\beta = 0.409, p < 0.001$); therefore, H1 is empirically supported.

Hypothesis 2 (H2)

H2 states:

Effort expectancy will have a significant positive influence on millennials' behavioural intention to adopt mobile banking apps.

The results of the analysis indicate that the connection between effort expectancy and behavioural intention to use mobile banking apps is not statistically significant ($\beta = -0.548, p > 0.05$). Therefore, H2 is not statistically supported.

Hypothesis 3 (H3)

H3 states:

Social influence will have a significant positive influence on millennials' behavioural intention to adopt mobile banking apps.

The results of the analysis suggest that social influence is not statistically significant to predict behavioural intention to adopt mobile banking apps ($\beta = 0.018, p > 0.05$). Therefore, H3 is not statistically supported.

Hypothesis 4 (H4)

H4 states:

Facilitating conditions will have a significant positive effect on millennials' behavioural intention to adopt mobile banking apps.

This hypothesis explains a relationship between facilitating conditions and behavioural intention to use mobile banking apps. The results of the analysis suggest that facilitating conditions is statistically significant. Therefore, H4 is supported ($\beta = 0.238, p < 0.05$).

Hypothesis 5 (H5)

H5 states:

Facilitating conditions will have a significant positive effect on mobile banking app use behaviour among millennials.

This hypothesis explains a relationship between facilitating conditions and actual use of mobile banking apps. The results of the analysis suggest that facilitating conditions is statistically significant. Therefore, H5 is supported ($\beta = 0.236$, $p < 0.05$).

Hypothesis 6 (H6)

H6 states that:

Hedonic motivation will positively influence millennials' behavioural intention to adopt mobile banking apps.

The results from the structural model show that the relationship between hedonic motivation and behavioural intention to use mobile banking apps is not significant ($\beta = 0.074$, $p > 0.05$). Therefore, H6 is not supported.

Hypothesis 7 (H7)

H7 states:

Price value will positively impact millennials' behavioural intention to adopt mobile banking apps.

Hypothesis 7 represents the relationship between price value and behavioural intention. The results from the structural model show that this relationship is not statistically significant. Therefore, H7 is not supported ($\beta = 0.067$, $p > 0.05$).

Hypothesis 8 (H8)

H8 states:

Habit will have a significant positive influence on millennials' behavioural intention to adopt mobile banking apps.

The results from the structural model show that the relationship between habit and behavioural intention to use mobile banking apps is not significant ($\beta = 0.135$, $p > 0.05$). Therefore, H8 is not supported.

Hypothesis 9 (H9)

H9 states:

Habit will have a significant positive influence on millennials' mobile banking app use behaviour.

The results from the structural model show that the relationship between habit and the actual use of mobile banking apps is not significant ($\beta = -0.021$, $p > 0.05$). This implies that there is no strong positive relationship between actual use of mobile banking apps and habit. Therefore, H9 is not supported.

Hypothesis 10 (H10)

H10 states:

The impact of behavioural intention on millennials' use behaviour of mobile banking apps will be positive.

The findings of the analyses suggest that the association between behavioural intention and use behaviour is significant and positive ($\beta = 0.301$, $p < 0.05$). These results provide support for H10. The influence of behavioural intention on actual use is supported ($\beta = 0.006$, $p < 0.001$). This implies that there is a strong positive relationship between behavioural intention and actual use.

Hypothesis 11 (H11)

H11 states:

Perceived overall risk will have a significant negative impact on millennials' behavioural intention.

The findings of the analyses suggest that the association between behavioural intention and perceived risk is significant. These results provide support for H11. H11

is represented by the path perceived risk → behavioural intention, and it is supported ($\beta = -0.145$, $p < 0.05$).

Hypothesis 12 (H12)

H12 states:

Perceived overall risk will have a significant negative impact on millennials' actual use of mobile banking apps.

The findings of the analyses suggest that the association between actual use and perceived risk is not significant. H12 is represented by the path perceived risk → actual use, and H12 is not supported ($\beta = -0.053$, $p > 0.05$).

An overview of the results of the hypotheses testing with the path coefficients, T-values, and P-values is presented in Table 5.19.

Table 5.19: Summary of the results of the hypotheses testing

Hypotheses		Path coefficient	T Statistics	P Values	Result
H1	Performance expectancy → behavioural intention	0.409	4.444	0.000	Supported
H2	Effort expectancy → behavioural intention	-0.058	0.610	0.542	Not supported
H3	Social influence → behavioural intention	0.018	0.235	0.814	Not supported
H4	Facilitating conditions → behavioural intention	0.238	2.646	0.008	Supported
H5	Facilitating conditions → use behaviour	0.236	2.458	0.014	Supported
H6	Hedonic motivation → behavioural intention	0.074	1.080	0.303	Not supported
H7	Price value → behavioural intention	0.067	1.001	0.317	Not supported
H8	Habit → behavioural intention	0.135	1.435	0.151	Not supported
H9	Habit → use behaviour	-0.021	0.210	0.833	Not supported
H10	Behavioural intention → use behaviour	0.301	2.758	0.006	Supported
H11	Perceived risk → behavioural intention	-0.145	2.875	0.004	Supported
H12	Perceived risk → use behaviour	-0.053	0.684	0.494	Not supported

5.6 CHAPTER SUMMARY

This chapter aimed to report on the results of this study. The first part of this chapter presented the demographics results and mobile banking apps background information. This was followed by the section that focused on the descriptive data, including the mean, standard deviation, and frequency distributions, which were computed to summarise the data concerning the adoption and use of mobile banking apps among millennials. The SEM and PLS analysis steps of establishing a model of

better fit was followed by considering relevant model fit assessment indices (convergent validity and discriminant validity). Only results considered significant in responding to the research questions and reaching the research targets were included. A collinearity test using the variance inflation factor (VIF) was done to measure the level of collinearity threat between the independent variables. This chapter then analysed the structural model results. Hypotheses were tested for significance. Five of the 12 proposed relationships were accepted. In the next chapter, the practical findings are analysed, and the research questions and goals are re-visited to assess whether they have been addressed.



CHAPTER 6

DISCUSSION OF RESULTS

6.1. INTRODUCTION

In the previous chapter, the results of data analyses using various techniques of data analysis, including descriptive statistics, measures of central tendency and internal consistency, and structural equation modelling, were presented. This chapter discusses the results of the study described in the preceding chapter with reference to the findings of prior studies. This chapter therefore aims to outline the major concerns identified in the analyses, and to interpret the findings and associate them with the literature and previous studies. The chapter has four sections. It starts by highlighting the results attained from the demographic profile of the respondents. Second, the results relating to the respondents' use of mobile banking apps are discussed. The third section outlines the descriptive statistics of the measurement items, and the final section discusses the results relating to the hypotheses testing.

6.2. DISCUSSION OF THE RESULTS FROM THE SAMPLE CHARACTERISTICS: GENDER, AGE, INCOME LEVELS, RACE

The results of this study indicated that more females (50.70%) participated in the study than did males (49.30%). The findings on the gender distribution of the study are supported by the national statistics of South Africa, which show that there are more females (51%) than males in the Gauteng Province of South Africa (49%) (Stats SA, 2016). Hence, the gender composition of the sample of this study relates to the gender distribution of the province's population.

The study was focused on the millennial generation of the general population. In terms of the age composition of the sample, the participants aged 18 to 24 years dominated this study, with this age group comprising 51.1% of the sample. Participants falling in the age group of 25 to 30 years (30.7%) comprised the second-largest group in the sample.

With reference to the racial composition of the sample, the results of the study show that the Indian/Asian racial group had the highest number of participants, with 121 (34.4%) of the sample. These results do not reflect the racial distribution of Gauteng's population, which has a low representation of the Indian/Asian population (3%), and is 83% African (Stats SA, 2016). A possible reason for the dominant representation of the Indian/Asian group in the sample is that much of the data gathering took place in communities with a higher representation of Indians/Asians. This notwithstanding, previous studies (Singh, 2004; Abaereia, Ncayiyanaa & Levina, 2017) that were conducted in Gauteng had a high representation of white and Indian/Asian participants, even though Africans dominate the general population. This suggests that the dominant racial composition of specific locations where a study takes place could skew the racial composition of the study in favour of the dominant race in the location of the study.

With regard to income levels, most of the participants (99, or 28.10%) reported earning an income of between R0 and R5 000, and 91 respondents (25.9%) reported earning between R5 001 and R10 000. This shows that the majority of the participants earn a monthly income of R10 000 and below. A research report by the Unisa Bureau of Market Research (2011) found that over 70% of South Africans earn below R50 000 per annum, suggesting that the average monthly income of 70% of South Africans is less than R5 000. Hence, the findings of this study indicate that most participants earn a monthly income of R0 to R5 000; this is consistent with monthly income earned by the largest proportion of the South African population.

6.3. DISCUSSION OF THE RESULTS ON MOBILE BANKING APP USE PATTERNS

6.3.1 MOBILE BANKING APP INSTALLATION

The analyses of the results show that all the respondents (100%) who took part in this study have mobile banking apps installed in their mobile devices. This finding is in line with that of the World Wide Worx (2011) study, which examined the use of mobile phones for banking purposes. The result of the study showed that two out of every 10 South Africans use mobile banking. The results also showed that the

majority of the users (79%) are aged under 40 years, and are mostly found in Gauteng Province.

6.3.2 MOBILE BANKING APPS USAGE FREQUENCY

The findings show that most of the participants (141, or 40.1%) use mobile banking apps a few times a week, while 70 (19.9%) indicated that they use mobile banking apps daily. This shows that most of the participants were active users of mobile banking apps. These findings support the mobile banking app study carried out by eMarketer (2017) among consumers in the United States. According to that study, about four in 10 respondents (40%) used their banking app on a daily basis, while 45% did so weekly. Again, younger users were found to be friendlier towards banking apps, with a larger percentage (60%) from that cohort opening their app on a daily basis.

6.3.3. MOBILE BANKING APPS TRANSACTIONS PERFORMED

The results reveal that most of the respondent use mobile banking apps to check their bank balances. This mobile banking app activity has the highest score at 46.7%, followed by inter-account transfers and paying accounts (33.8%). These findings are supported by earlier studies (Van Deventer, 2015; Maduku, 2012), which identified checking balances and inter-account transfers as two of the most common activities performed by internet and mobile banking users. However, no huge difference was noted between the selected banking activities that were measured; and only one banking activity had a low percentage (11.4% of the respondents) who strongly agreed that they use mobile banking apps to 'block stolen/lost card'. Thus one can conclude that mobile banking apps are used by different individuals to complete a wide range of transactions, with checking balances and inter-account transfers being the most common transactions performed.

6.3.4 TIME SPENT ON MOBILE BANKING APPS

The results show that a large number of the respondents do not spend more than 15 minutes on mobile banking apps per day. One hundred and sixteen (33.5%) of the respondents indicated that they spend 0-5 minutes on their mobile banking apps, while 101 (29.2%) stated that they spend 16-30 minutes; 85 (24.6%) spend 31-60 minutes, lastly 44 (12.7%) indicated that they spend more than 60 minutes on mobile banking apps. The findings are in line with e-Marketer Research (2017), which reported that, in 2017, users of the banking app in the United States spent an average of eight minutes per day on their app.

6.4 DESCRIPTIVE STATISTICS

6.4.1. PERFORMANCE EXPECTANCY

The results of the descriptive analysis suggest that respondents' perception of the performance expectancy of mobile banking apps is high. This is evidenced in the overall construct mean of 5.821 and a standard deviation of .884. This result suggests that the participants generally agree with the items measuring the performance expectancy construct, as the mean values are above the neutral point of the scale (4) on a seven-point scale. The respondents' high rating of the items measuring the performance expectancy construct is further evidenced in the percentage distribution of responses on the scale items measuring the construct. For instance, 38.6% of the respondents strongly agree with the statement that "using mobile banking apps helps me accomplish things more quickly". A further 33.2% of the participants also agree with the same statement. Therefore, one can conclude that respondents in general are certain that using mobile banking apps will improve their banking transactions. These results support the findings of a related study of Alalwan *et al.* (2017:100), which indicated that respondents find mobile banking beneficial. This strong perception of the usefulness of mobile banking apps among millennials can be used by banks as a strategy to convert non-users, thus increasing the usage rates of mobile banking apps.

6.4.2 EFFORT EXPECTANCY

The results of the analyses generally reflect the respondents' strong perceptions of their ability to use mobile banking apps. The overall mean value for effort expectancy was 5.736, and the standard deviation value was 1.056. This suggests that the respondents generally agreed with the statements measuring the construct, as the mean values were above the neutral point of the scale (4) on a seven-point scale. For example, most respondents (39.2%) strongly agree that learning how to use mobile banking apps is very simple. A further 34.7% of the respondents strongly agreed that using mobile banking apps is very easy. These results are comparable with those of Faria (2012). In a study to assess mobile banking adoption in the Portuguese context, participating consumers found mobile banking to require no effort and skill to use.

Park *et al.* (2007:56) argued that customers always consider adopting technologies that simplify their activities while needing less effort to use them. Furthermore, research shows that when consumers perceive an innovation to require less effort to use – that is, it is easy to use – they develop a strong intention to use the innovation (Lin, 2012:1194). Thus the strong perception of millennials about the effort expectancy of using mobile banking apps evidenced in this study is considered a major benefit for mobile banking apps adoption, compared with other methods of banking (Chiwara *et al.*, 2017:30). Indeed, millennials in South Africa use their mobile banking apps daily, and are becoming more reliant on these apps for numerous banking activities (Balabanoff, 2014:22). Hence, the conclusion that participating South African millennials find mobile banking apps easy to use or user-friendly is amply supported.

6.4.3 SOCIAL INFLUENCE

With regard to social influence, the results of the analyses generally show a strong effect of consumers' referent groups on their perception of mobile banking apps. The overall mean for social influence was 5.142, and the standard deviation was 1.122. The respondents' high ratings of the items measuring the social influence construct can be evidenced in the percentage distribution of the scale items measuring the construct. For example, 21.3% of participants strongly agreed with the statement,

“People who are important to me think that I should use mobile banking apps”. A further 29.5% of the participants agreed with the statement, “People who influence my behaviour think that I should use mobile banking apps”. This shows that many respondents felt that they need to conform to the opinion of their referent groups when deciding whether or not to use mobile banking apps. These results support the findings of the study conducted by Appiah, 2017, which suggests that Ghanaian internet/mobile banking customers depend on their referent groups’ opinions (friends and family) to form their opinions and decide whether or not to use Internet and mobile banking services.

6.4.4. HEDONIC MOTIVATION

The results of the descriptive analysis suggest that the respondents’ perceptions of the hedonic motivation of mobile banking apps was high. The overall mean value was 5.150, and the standard deviation value was 1.205. This strong relationship can be observed in the individual items that were measured. For example, 29.1% of the respondents strongly agreed that “using mobile banking apps is enjoyable”. A further 29.3% agreed that “using mobile banking apps is very entertaining”, and 20.5% of the participants agreed with the statement, “Using mobile banking apps is fun”. This generally indicates that respondents believe that using mobile banking apps is entertaining and fun. These results are in line with prior studies (Raman & Don, 2013; Baptista, 2017; Venkatesh *et al.*, 2012) that suggest that users’ behavioural intention to use mobile technologies is strongly influenced by the enjoyment and entertainment found in those apps. Furthermore, Kahneman (1999:23) argued that hedonically motivated customers spend most of their time engaged in activities that entertain them. This means, therefore, that retail banks need to develop their mobile banking apps further and make them more appealing and enjoyable if they wish to attract more young users and non-users to this innovation.

6.4.5 PRICE VALUE

With regard to price value, the overall mean and standard deviation were 5.353 and 1.035 respectively. These results suggest that respondents in general agreed that the mobile banking apps are affordable. In other words, respondents perceived that

the cost of mobile banking apps provides good value for money, and that the cost of mobile banking app adoption is reasonable enough to enable them to adopt the system. The respondents' high rating of the items measuring the price value construct can be seen in the distribution of the scale items measuring the construct. For example, 43.3% of respondents agreed with the statement, "Banking transactions conducted on mobile banking apps are reasonably priced", and 33.55% of the respondents agreed with the statement, "At the current price, mobile banking apps provide good value". This means that South African millennial mobile banking app users have a generally positive perception of the price value related to the acceptance and use of mobile banking apps, and that they believe that the cost of adopting mobile banking apps is lower than its expected benefits. This finding support the observation of Baptista (2017:68), who found that customers are most likely to use mobile banking if they believe that its benefits outweigh its cost. The respondents' rating of the price value may be attributed to the respondents' high rating of the performance expectancy construct. Researchers have noted that adopters' perception of innovation cost is influenced by the perceived benefits of the innovation (Seng, Wilkin & Sugianto, 2013:1789). Therefore, if users and potential users of mobile banking apps perceive mobile banking apps to be highly beneficial and useful to their banking activities, their cost would not be seen as a barrier to their adoption and use.



6.4.6 HABIT

The overall arithmetic mean computed for this construct is 4.744, and the standard deviation is 1.307, denoting that participants generally neither disagreed nor agreed with the statement measuring the construct. This suggests that respondents were unsure whether their mobile banking intentions and use behaviour are influenced by their habits. This can be seen in the percentage distribution of the scale items measuring the habit construct. For example, 19.6% of the respondents strongly agreed with the statement, "The use of mobile banking apps has become a habit for me", 27.8% of the participants agreed with the same statement, and a further 24.1% of the respondents somewhat agreed with it. These results contradict most previous research studies that have revealed habit as a critical factor for innovation

acceptance (Lewis *et al.*, 2013; Moorthy *et al.*, 2017; Venkantesh *et al.*, 2012). In a study to examine barriers to mobile commerce adoption intention in Malaysia, Moorthy *et al.* (2017:46) found habit to be one of the key barriers to customer adoption of an innovation. This therefore means that users who have formed strong habitual behaviour for a particular technology are not likely to adopt a new technology when it is introduced to them.

6.4.7 FACILITATING CONDITIONS

The participating millennials were generally confident of the presence of facilitating conditions for their adoption and use of mobile banking apps. The overall mean and standard deviation for facilitating conditions were 5.772 and 1.077 respectively, denoting that participants generally agreed with the statement measuring the construct. For example, 39.3% respondents strongly agreed with the statement, “I have the knowledge necessary to use mobile banking apps”, and 36.4% strongly agreed with the statement, “I have the resources necessary to use mobile banking apps”. This indicates that respondents generally believed that their mobile banking apps skills were sufficient to allow them to perform banking transactions via mobile banking apps. These results confirm those of Joshua and Koshy (2011), who evaluated mobile banking adoption in India. In that study it was noted that the more consumers believe in their ability to use mobile banking, and the more that support services are provided, the higher their use of the mobile banking innovation. The reason for this could be the fact that certain elements are essential in order for one to have easy access to mobile banking apps: a smartphone, 4G services, internet access, and secured applications. Thus it is important that banks provide the required resources, information, and continuous support to encourage users and non-users to accept and use mobile banking apps.

6.4.8 BEHAVIOURAL INTENTION

The behavioural intention to use mobile banking apps was highly rated by those who participated in the study. This is seen from the overall mean and standard deviation values, which were 5.719 and 1.091 respectively. This therefore means that participants generally agreed with the statements measuring their behavioural

intention to use mobile banking apps. This is further evidenced by the fact that 40.7% of the respondents agreed with the statement, "I always try to use mobile banking apps in my daily life". Furthermore, 34.5% of the respondents agreed that they plan to continue to use mobile banking apps in the future. Ajzen (1991:181) and Seyal and Turner (2013:1247) suggested that intentions represent the motivational factors that encourage behaviour and determine the degree to which people are willing to try something. It can therefore be said that millennials in Gauteng have a strong positive intention to start and to continue to use mobile banking apps, and that they would recommend mobile banking apps to current non-users of this innovation. This is evidenced by the higher mean scores achieved for the constructs measuring the intention to start and continue using mobile banking apps.

6.4.9 ACTUAL USE

The overall arithmetic mean and standard deviation computed for this construct are 3.482 and .753 respectively. This construct was measured on a five-point scale; therefore, these results indicate that participants generally agreed with the statements measuring the construct. For example, the majority of the respondents, 46.7%, indicated having used mobile banking to check account balances, followed by those who indicated using mobile banking apps to do inter-account transfers (33.8%). A further 31.8% indicated that they use mobile banking apps to pay accounts. These findings are in line with the observations of Van Deventer (2015) and Maduku (2012), who also found that most of their respondents used mobile banking and internet banking to check account balances, buy prepaid airtime, and perform inter-account transfers. These findings show that respondents use mobile banking apps to carry out diverse transactions, with the most performed ones being checking balances, inter-account transfers, and paying accounts. These results present a good opportunity for financial institutions and banks to invite current users of mobile banking apps to use banking services, apart from the three listed above, that are also accessible from the app.

6.4.10 PERCEIVED RISK

The overall mean score for perceived risk was 3.939, with a standard deviation of 1.817. The mean values computed for most of the items were not very high or below the mid-point of the scale (4): the individual mean values were all between 3.7 and 4.22. This means that respondents generally agreed that perceived risk is a significant consideration that influences the intention to adopt and use mobile banking apps, since the mean values were close to 4 (the neutral point of the scale) on a seven-point scale, and others were above 4. This is supported by the percentage distribution of the scale items measuring the construct. For example, 24.2% of the respondents strongly agreed with the statement, “I believe that making queries and/or banking transactions with this app is a risky choice”, and 17.3% strongly agreed with the statement, “There is a significant risk when making my queries and/or my banking transactions through the mobile app”. The results thus suggest that perceived risk is a significant concern for the participating millennials in their adoption and use of mobile banking services.

6.5 DISCUSSION OF THE RESULTS OF THE HYPOTHESIS TESTING

6.5.1 PERFORMANCE EXPECTANCY AND INTENTION TO USE MOBILE BANKING APPS

The analysis of the results revealed a substantial positive association between performance expectancy and the intention to start or continue using mobile banking apps ($\beta = 0.409$, $p < 0.001$). Thus hypothesis H1 is supported. The findings thus show that South African millennials who believe that mobile banking apps could improve their performance of banking transactions are likely to adopt or to continue using mobile banking apps if they already use this innovation. This is in line with the suggestion under the UTAUT2, as well as observations by academics in different geographic locations who have found performance expectation to be a salient factor predicting behavioural intentions towards the adoption of mobile banking services (Farah, Hasni & Abbas, 2018; Sripalawat, Thongmak & Ngramyarn, 2011; Sarfaraz, 2016; Baptista & Oliveira, 2017). For, instance, in the study of Farah *et al.* (2018) evaluating mobile banking adoption in Pakistan, the results show that performance

expectancy is a significant and positive factor influencing the adoption intention. Thus consumers are likely to adopt and use mobile banking apps if their perception of the performance expectancy of the innovation is high.

6.5.2. EFFORT EXPECTANCY AND INTENTION TO USE MOBILE BANKING APPS

Effort expectancy represents the level of perceived ease or difficulty connected to the use of an innovation (Venkatesh *et al.*, 2012:163). The results of this study propose that effort expectancy is not a salient factor associated with the acceptance of mobile banking apps among millennials ($\beta = -0.058$, $p > 0.05$). Consequently, hypothesis H2 is not supported. This result is not in line with the proposition in the UTAUT2 and other studies (Carlsson *et al.*, 2006; Im *et al.*, 2011) that have found effort expectancy to be a significant factor that influences technology acceptance. For example, in a study to evaluate factors that impact the use of the internet for job-seeking purposes among a sample of final-year South African students, Chiwara *et al.* (2017:7) found effort expectancy to be a significant element influencing the participants' intention to use the internet for job searching. Although this study's findings of the insignificant association between effort expectancy and behavioural intention is not in line with the propositions under the UTAUT2, the result of the study is similar to those of some previous studies (Faria, 2012; Zhou *et al.*, 2010; Yang, 2010) that have similarly found a non-significant association between performance expectancy and behavioural intention. For example, in a study to identify the factors influencing mobile banking adoption in Portugal, Faria (2012:28) found effort expectancy to be an insignificant predictor of behavioural intention.

A possible reason for an insignificant association between effort expectancy and millennials' behavioural intention to use mobile banking apps may be due to the fact that millennials are familiar with mobile devices and that they regularly use apps. Indeed, Vasseur and Kemp (2015:30) pointed out that familiarity with an innovation diminishes its complexity and requires less effort and fewer skills from the users to use the innovation, thus erasing any potential impact that it might have on users' acceptance of the innovation.

6.5.3 SOCIAL INFLUENCE AND INTENTION TO USE MOBILE BANKING APPS

Social influence denotes the level at which individuals consider the opinions of their referent groups when deciding to use a new system (Venkatesh *et al.*, 2012:162). Findings show that social influence does not significantly influence the intention to use mobile banking apps ($\beta = 0.018$, $p > 0.05$). Hence, hypothesis H3 is not supported. This suggests that respondents seem not to be interested in the perception of their reference groups (friend and family) in forming their intention to adopt mobile banking apps. This finding contradicts that of the UTAUT2, which posits social influence to be a major influence on users' intention to accept an innovation (Venkatesh *et al.*, 2012:12). However, follow-up studies, such as those of Baptista and Oliveira (2015), Riffai *et al.* (2012), Alalwan *et al.*, (2017), and Govender and Sihlal (2014), also presented a non-significant association between social influence and behavioural intention. For instance, in a study of mobile banking adoption intention of mobile banking adoption among Generation Y IT university students in South Africa, Govender and Sihlal (2014:455) found that social influence does not significantly influence Generation Y consumers' intention to adopt and use mobile banking adoption.

A reasonable explanation for this inconsistent finding could be that millennial banking customers value their independent opinions when making decisions about banking activities. As such, they may not consider the ideas of their significant others to be important (Maduku, 2012:137). Furthermore, Baptista (2016:115) argued that mobile banking is not yet perceived as a social topic to be discussed with friends or relatives, as it is still perceived as a private issue. This might therefore explain the insignificant association between social influence and millennials' intention to adopt mobile banking apps.

6.5.4. FACILITATING CONDITIONS AND INTENTION TO USE MOBILE BANKING APPS

Facilitating condition denotes the point at which a person observes that the technical infrastructure and support needed to use a technology is accessible (Venkatesh *et al.*, 2012:160). The relationships between facilitating conditions on the one hand and behavioural intention and actual use respectively are both found to be significant ($\beta =$

0.238, $p < 0.05$ and $\beta = 0.236$, $p < 0.05$ respectively). Therefore, hypotheses H4 and H5 are supported. This finding was expected, as previous studies had also identified facilitation conditions as a strong salient factor influencing the adoption of mobile banking (Alalwan *et al.*, 2017, Ghalandari, 2012; Yu, 2012; Zhou *et al.*, 2010). For example, in a study to predict users' intention and adoption of mobile banking in Jordan, Alalwan *et al.* (2017:100) found facilitating conditions to be a major predictor of behavioural intention. This suggests that mobile banking app users are attracted by the resources they have, and by technical and informational resources provided by banks, to support their use of mobile banking apps. Moreover, the compatibility of the app with other innovations that are currently used by millennials are instrumental in their adoption decisions. From these results, it can be concluded that millennials in Gauteng are motivated by the availability of strong institutional support and infrastructure that helps them use mobile banking apps.

6.5.5. HEDONIC MOTIVATION AND INTENTION TO USE MOBILE BANKING APPS

Hedonic motivation can be described as the level of fun, joy, or entertainment connected with the use of an innovation (Venkatesh *et al.*, 2012:163). The results from the structural model show that hedonic motivation has no significant effect on the behavioural intention to use mobile banking apps ($\beta = 0.074$, $p > 0.05$). Thus hypothesis H6 is not supported. These results are contrary to the propositions under the UTAUT2 and other research studies that have assessed the impact of hedonic motivation on behavioural intention (Baptista & Oliveira, 2015; Gharaibh, 2018; Raman & Don, 2013; Venkatesh *et al.*, 2012). However, in a comparable study to evaluate factors that have an influence on the adoption of mobile banking services among consumers in Jordan, Gharaibh (2018:422) found that hedonic motivation is a non-significant factor influencing the intention to use mobile banking in both countries. Thus the influence of hedonic motivation on the acceptance of innovation is inconsistent.

A possible explanation for this insignificant correlation between hedonic motivation and behavioural intention to accept mobile banking apps among South African millennials is that most respondents mentioned that they do not experience any

pleasure and joy when using mobile banking apps. This might therefore explain why hedonic motivation is an insignificant factor predicting their intention to use mobile banking apps. In a study conducted by Lim, Cyr and Tan (2012) to investigate the untangling and hedonic consumption behaviours in online shopping, it was found that there is a strong relationship between functional and hedonic motivations; therefore there is a need for balance in the design of online shopping apps in order to satisfy both utilitarian and hedonic expectation. Furthermore, Mettler, Wortmann and Flutcher (2014) state that the attractiveness of the hedonic design features has to be balanced with the perceived distance from the utilitarian features of the apps. Again, according to Kumar and Lim (2008), emotions such as enjoyment and a sense of fun influence the perceived level of satisfaction with mobile services. Therefore, the lack of attractive designs and entertaining features on the mobile banking apps may explain why hedonic motivation is an insignificant factor in predicting their intention to use mobile banking apps.

6.5.6. PRICE VALUE AND INTENTION TO USE MOBILE BANKING APPS

Price value is customers' trade-off between the benefits of using a particular technology and the financial costs of using as innovation (Venkatesh *et al.*, 2012:161). In mobile banking apps, the cost would include the cost to download and install the app using an internet data bundle, and the consequent need to have data bundles on their mobile devices in order to use the innovation. The results of this study show that price value is not a statistically significant predictor of behavioural intention to adopt mobile banking apps ($\beta = 0.067$, $p > 0.05$). As a result, hypothesis H7 is not supported. These findings are contrary to the proposition under the UTAUT2 and other previous studies that have identified price value as a significant factor that influences the behavioural intention to adopt mobile banking (Hernan & Rios, 2010; Alalwan *et al.*, 2017; Rahia *et al.*, 2018; Baptista & Oliveira, 2017). Conversely, the results of this study are in line with other studies (Alalwan *et al.*, 2015; Baptista, 2016; Oliveira *et al.*, 2014; Koeng-Lewis, 2010; Yang *et al.*, 2012). For example, in a study to evaluate users' intention to accept internet banking in Malaysia, Rahia *et al.* (2018:149) found that price value is non-significant and did not have a positive influence on the intention to adopt internet banking. This finding

supports that of Oliveira *et al.* (2014:691), who conducted a study of mobile banking adoption in Portugal, and found that price value is not a significant factor in determining a customer's intention to adopt mobile banking services. A possible justification for this inconsistent finding may be the fact that a mobile banking service is essentially perceived to be free to use, without special charges, and cheaper than other ways of accessing banking services, such as auto-teller machines and personal teller services, which do attract fees. Moreover, young consumers are more technologically savvy, and do not bear any costs associated with using the technology provided (Lewis *et al.*, 2013; Raman and Don, 2013).

6.5.6 HABIT AND INTENTION TO USE MOBILE BANKING APPS

Habit denotes the level at which people tend to engage spontaneously in behaviours due to learning (Venkatesh *et al.*, 2012:163). The results of the study suggest that the relationship between habit and the behavioural intention of millennials to adopt or to continue using mobile banking apps is not significant ($\beta = 0.135$, $p > 0.05$). Thus hypothesis H8 is not supported. These results contradict a UTAUT2 proposition and findings from previous studies (Luo *et al.*, 2010; Zhou *et al.*, 2010; and Baptista, 2017) that validate a positive and a strong relationship between habit and behavioural intention. However, in a study to evaluate users' intention to accept internet banking in Malaysia, Rahia *et al.* (2018:149) similarly identified an insignificant association between habit and behavioural intention among respondents. Likewise, in a study to investigate the influence of a social networking site (Facebook) in the context of online shopping among young consumers, Nadeem, Cripps and Salo (2017) found the influence of habit to be insignificant. Thus, the influence of habit on the acceptance of innovation is inconsistent.

The findings of this study suggest that habit is not a significant factor influencing the behavioural intention to adopt mobile banking apps among millennials in South Africa. These results are supported by previous studies that also found no significant relationship between habit and intentions (Gardner *et al.*, 2012b; Verplanken & Faes, 1999, Nadeen *et al.*, 2017). A possible explanation for the insignificant correlation between habit and behavioural intention to use mobile banking apps could be that habit plays different roles at different phases of technology adoption, as users are

more engaged during the initial usage that leads to post-adoption behaviour (that is, continuance intention) (Jasperson, Carter & Zmud, 2005:20). Thus negative experiences from mobile banking apps could inhibit millennial banking customers from relying on their habits to continue using mobile banking apps. Moreover, Orbell and Verplanken (2010) argued that, in situations where intentions are enacted by strong self-control, habit becomes inconsequential. Orbell and Verplanken (2010) contend that millennials are characterised as masters of self-control. Thus their high self-control may provide a reasonable explanation for the insignificant relationship between habit and behavioural intention revealed in this study.

6.5.7. HABIT AND MOBILE BANKING APP USE BEHAVIOUR

The relationship between the actual use of mobile banking apps and habit was found not to be significant ($\beta = -0.021$, $p > 0.05$). Thus hypothesis H9 is not supported. These results contradict an UTAUT2 proposition and findings from previous studies (Luo *et al.*, 2010; Baptista, 2016; Zhou *et al.*, 2010) that have validated a strong and positive relationship between habit and actual use of mobile banking in different contexts. The results of this study are comparable with the observation of Lewis *et al.* (2013:30), who found the relationship between habit and the actual use of classroom technology among classroom instructors in the United States not to be significant.

A possible explanation for this insignificant relationship between habit and the actual use of mobile banking apps could be because the creation of habit requires a particular action to be performed repetitively and frequently. For that reason, habit is most likely to be significant in activities that are daily routines (for example, checking emails or social media). Consequently, behaviours performed at medium to longer intervals, such as performing banking transactions, do not generally become habits, regardless of their repetitive nature (Ye & Potter, 2011:33). The descriptive analysis of this study reported that only 70 (19.9%) of the respondents use mobile banking apps daily. This might therefore explain why habit is an insignificant factor predicting their actual use of mobile banking apps. Another possible reason for this insignificant relationship may be that millennials perform banking transactions frequently using mobile banking apps, but that their frequent behavior may not be habitual because

they only use mobile banking apps for banking purposes (Nilsen *et al.*, 2012). These results are consistent with the finding of Raman and Don (2013), who also found habit to be an insignificant determinant of pre-service teachers' actual use of Moodle.

6.5.8. BEHAVIOURAL INTENTION AND ACTUAL USE OF MOBILE BANKING APPS

“Behavioural intention to use is a measure of the possibility that a person will accept the application” (Venkatesh *et al.*, 2012:173). The results of this study suggest that millennials' behavioural intention to use mobile banking apps has a significant and positive association with their actual use behaviour ($\beta = 0.301$, $p < 0.05$). Thus hypothesis H10 is supported. This implies that there is a strong positive relationship between behavioural intention and actual use behaviour with mobile banking apps. This is consistent with earlier studies that examine the influence of behavioural intention on actual use (Baptista & Oliveira, 2017; Venkantesh *et al.*, 2012). In a study to evaluate mobile banking and mobile payment acceptance among Mozambican users, Baptista and Oliveira (2015:430) found a significant positive relationship between behavioural intention and the use behaviour of mobile banking services. The findings of this study, therefore, show that South African millennials can be expected to accept mobile banking services if they have the positive intention to use them.

6.5.9. PERCEIVED RISK AND BEHAVIOURAL INTENTION TO USE MOBILE BANKING APPS

With mobile banking apps, risk is perceived as a customer's expectation of suffering a loss when using mobile banking apps to perform banking transactions. The results of this study suggest that perceived risk has a significant negative relationship with the behavioural intention to use these apps ($\beta = -0.145$, $p < 0.05$). Therefore, hypothesis H11 is supported. This implies that perceived risk is a significant barrier to users' intentions to use mobile banking apps. This is consistent with the findings of prior studies (Featherman & Pavlou, 2002; Luo, Li, Zhang & Shim, 2010; Yang *et al.*, 2016). A study by Luo, Li, Zhang and Shim (2010) among consumers in the United

States revealed that perceived risk negatively affects the behavioural intention of potential users towards mobile banking services adoption. The results of this study that show a negative association between perceived risk and the behavioural intention to use mobile banking apps suggests that mobile banking app users are concerned with the level of risk associated with the acceptance and use of mobile banking apps.

6.5.10. PERCEIVED RISK AND USE BEHAVIOUR

The results of this analysis indicate that perceived risk is not a significant factor associated with mobile banking app use behaviour ($\beta = -0.053$; $p > 0.05$). Therefore, hypothesis H12 is not supported. This finding contradicts prior studies that have validated this relationship (Featherman & Pavlou, 2002; Marriot & Williams, 2016). However, these findings support the observation of Suorantas (2003), who conducted a study of mobile banking acceptance in Finland and found that perceived risk has no negative impact on the acceptance and use of mobile banking. Furthermore, Suorantas (2003:63) observed that the non-significant influence of perceived risk on the acceptance of mobile banking services indicates that users are not concerned about the risk of performing banking transactions using mobile devices. Likewise, this could be a possible explanation for the non-significant association between perceived risk and the actual use of mobile banking apps among millennials in South Africa. Thus one can conclude that South African millennials who are currently using mobile banking apps are not worried about the potential risks that might be inherent in the system. This is corroborated by Arenas-Gaitán (2015:6), who suggested that a user's familiarity with the use of a system diminishes the initial risk associated with it. Furthermore, it is noted that, in South Africa, the retail banks are running programmes to raise the awareness of consumers about the security issues of newly implemented technologies such as mobile banking apps (The South African Risk Information Centre, 2018). As a result, South African banking customers are well-informed about and familiar with the use of mobile technology and online banking services. This is corroborated by Arenas-Gaitán (2015:6), who suggested that a user's familiarity with the use of a system diminishes the initial risk associated with the system's use. Again, Njenga and

Ndlovu (2012) noted that the perceived benefits of mobile banking had a stronger influence on South African bank consumers' minds than perceived risk.

6.6. CHAPTER SUMMARY

This chapter has contributed to the overall study by discussing the results obtained in Chapter 5. The first part of this chapter started by explaining the results of the descriptive statistics used to analyse the characteristics of the sample (age, gender, income levels, and race). The second section discussed the results relating to the respondents' use of mobile banking apps. Thereafter, the discussion of the descriptive statistics that were obtained from the assessment of the constructs' means and standard deviations followed. Lastly, the SEM results acquired from the testing of this study's conceptual model were discussed. In discussing these results, close attention was given to the analysis of prior studies that have focused on the same issues. The results were also compared with the literature that was reported in Chapter 2 of the study.

Chapter 7 presents the conclusions of the study, and outlines the recommendations, limitations, and future research directions.



CHAPTER 7

RECOMMENDATIONS AND CONCLUSION

7.1. INTRODUCTION

The purpose of this research was to examine the factors influencing the adoption and use of mobile banking apps among millennials in Gauteng, South Africa. The overarching theoretical model for this study is the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2). The model included factors that are important in understanding the adoption and use of technology innovations among consumers. These factors were performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), habit (HT), price value (PV), and hedonic motivation (HM).

Perceived risk is a critical element in the context of banking that influences consumers' acceptance of banking innovations. Indeed, prior studies on consumers' acceptance of banking innovations, such as mobile banking, have identified perceived risk as a critical factor influencing their acceptance of this banking innovation. To account for this contextual factor in the acceptance of mobile banking applications among millennials, this study integrated perceived risk into the UTAUT2 to study the drivers of and barriers to mobile banking acceptance and use among South African banking millennial customers.

Data collection was conducted using a survey research strategy in the form of a structured questionnaire. A total of 356 usable responses were attained. The data analyses were done using the Statistical Package for Social Sciences (SPSS) version 25, and the partial least squares SEM technique using the SmartPLS 3.2 software. The results of the study and the discussion of the findings were presented in chapters 5 and 6 respectively.

The objective of this chapter is, therefore, to summarise the research findings in relation to the research objectives of the study that were presented in Chapter 1, and to draw conclusions from the study based on the main findings. Theoretical and managerial implications of the study are also presented in this chapter. Moreover, its limitations and directions for future research studies are discussed.

7.2. REVIEW OF RESEARCH OBJECTIVES, FINDINGS, AND CONCLUSIONS

The aim of the study was to understand the drivers of and barriers to mobile banking app acceptance and use among millennials in Gauteng, South Africa. In order to achieve the aim, the following specific objectives were established:

- To identify the drivers associated with mobile banking app use among millennial retail banking customers in Gauteng, South Africa.
- To identify the barriers to mobile banking app acceptance among millennial retail banking customers in Gauteng, South Africa.
- To analyse the impact of perceived risk on millennials' intention and actual use of mobile banking apps.
- To examine the validity of the extended UTAUT2 model in a South African millennial sample.

7.2.1. SUMMARY OF FINDINGS

The outline of the research findings in relation to the aforementioned objectives are presented below.

- ***To identify the drivers associated with mobile banking app use among millennial retail banking customers in Gauteng, South Africa.***

The analysis from the structural model identified two factors driving South African millennials' behavioural intention to use mobile banking apps: performance expectancy, and facilitating conditions.

This study suggests that facilitating conditions and performance expectancy are the drivers of millennials' behavioural intention to use mobile banking apps. Millennials' perception of the performance expectancy of mobile banking apps is found to be high. Thus the identification of performance expectancy as a direct driver of behavioural intention was expected. This suggests that millennial banking customers in general feel that mobile banking apps are beneficial to their banking transactions and improve their banking performance. This, therefore, leads to the inference that,

in South Africa, millennials' intentions to use mobile banking apps are strongly influenced by the benefits derived from using this innovation. Furthermore, facilitating conditions are identified as a salient driver of the behavioural intention to carry on using mobile banking apps. This explains that millennials' positive intentions towards mobile banking apps are motivated by the availability of infrastructure and institutional support. They will therefore have strong intentions to use banking apps if they have the expertise, abilities, and resources required to use the innovation.

The analysis from the structural model identified two factors driving South African millennials actual use of mobile banking apps: facilitating conditions, and behavioural intention. First, the results indicate that behavioural intention significantly and positively influences millennials' actual use of mobile banking apps, thus suggesting that behavioural intention is a significant driver of mobile banking app use behaviour. This therefore indicates that millennials who have a positive intention to perform banking activities via mobile banking apps will eventually use the innovation. Moreover, facilitating conditions was found to be a significant driver of the actual use of mobile banking apps among millennial banking customers in Gauteng. The perception of facilitating conditions for mobile banking app use among customers was very high. These results show that customers believe in their abilities to use mobile banking apps, and that they have enough infrastructural and technical support from the service providers of mobile banking apps. This may account for the respondents' higher perceptions of the ease of using mobile banking apps. The results show that the acceptance and use of mobile banking apps among millennials in South Africa is not driven by effort expectancy, social influence, hedonic motivation, or price value, as initially anticipated.

The study concludes that the main drivers of mobile banking app adoption and use among millennials in South Africa are performance expectancy, facilitating conditions, and behavioural intention. The conclusion drawn from the findings is that customers in general perceive mobile banking apps as highly beneficial, and will continue to use this innovation if they believe it is useful. Furthermore, customers will adopt mobile banking apps if they possess the skills, facilities, and resources required to use them.

- ***To identify the barriers of mobile banking app acceptance among millennial retail banking customers in Gauteng, South Africa.***

This study gives insight into the barriers to the acceptance and usage rate of mobile banking apps among millennials in South Africa. The results of the analyses suggest that most of the millennials who participated in the study have installed mobile banking apps on their mobile devices. However, there is a barrier that still inhibits customers from adopting and using mobile banking apps. A key finding of this study is that perceived risk is a significant barrier to users' intentions to use mobile banking apps. The results showed that perceived risk had a significant negative influence on millennials' intentions to continue using mobile banking apps. Furthermore, the findings show that their perception of the risk was that their personal information and account details would be divulged to third parties, or that criminals could hack and steal their sensitive personal and banking information from the system. This perception therefore serves as a significant barrier to millennials' intention to use mobile banking apps. However, the perceived risk is not a negative influence on the actual use of mobile banking apps, thus suggesting that current users of mobile banking apps are not concerned about the potential risks inherent in the system. Thus the perception of risk tends to diminish when customers move from intention to actual use of mobile banking apps.

From the findings, it is concluded that, while perceived risk is a significant deterrent to the mobile banking app use intention among the participating South African millennials, its association with actual use behaviour is not statistically significant. Hence, millennials who uses mobile banking apps are not worried about the perceived risk related to the use of the innovation.

- ***To analyse the impact of perceived risk on millennials' intention and actual use of mobile banking apps***

Apart from the factors of the UTAUT2 model, the influence of perceived risk on behavioural intention and actual use of mobile banking apps was also assessed in this study. Perceived risk is known as the level of doubt about the security of the use of technology (Cruz *et al.*, 2010:188). The results of this study show that perceived risk is a negative influence on consumers' intentions to adopt and use mobile

banking apps. This infers that millennial retail banking customers in South Africa will be hesitant to start using mobile banking apps if they perceive a high level of risk connected to these apps. Conversely, the results show that perceived risk does not have a negative impact on the actual use of mobile banking apps. This explains that the millennials who are current retail banking customers in South Africa trust mobile banking apps, and that they believe that it is less risky. The reason for this could be the users' familiarity with the use of mobile banking apps, which diminishes the initial risk associated with their use.

7.3. IMPLICATIONS OF THE FINDINGS

The results of this study have managerial and theoretical implications. These implications are outlined in the subsections below.

7.3.1. MANAGERIAL IMPLICATIONS

The findings of this study will allow banks and other financial associations to develop marketing strategies that promote millennials' behavioural intention towards mobile banking app adoption and use. Specific managerial implications that could be pursued, based on the outcomes of the study, are stated below:

- **Managerial implications of the findings on the drivers of mobile banking apps**

In order for retail banks to improve the acceptance and usage rate of mobile banking apps among South African millennials, it is important that they understand the issues that affect the intentions and usage behaviour relating to mobile banking apps. For example, this study identified performance expectancy as a salient driver of millennials' behavioural intention to adopt mobile banking apps. This suggests that, if mobile banking apps are to be acknowledged by millennials, they must be made to recognise the innovation as a more useful way to conduct banking transactions than other banking systems, including internet banking. In doing this, banks and their marketers can use promotional messages that increase alertness and highlight the benefits or values related to the use of mobile banking applications, thus appealing to customers' performance expectancy motives. It is also imperative for marketing

managers to underscore the overall usefulness of mobile banking apps. This will enable banks to increase the perceived value of these applications, lessen customers' concerns, and encourage new customers to use mobile banking apps.

Banks may also need to make significant efforts to invent systems to advance their apps, incorporating more creative features that will keep mobile banking app users actively engaged with the apps. This strong perception of usefulness on the part of users can be used by banks as a strategy to convert non-users, thereby improving the use rate of mobile banking apps.

The study found a significant positive correlation between facilitating conditions and both behavioural intention and actual use of mobile banking apps. Thus it is necessary for banking institutions that wish to keep their clients and attract new clients to have the required resources, infrastructure, and continuous support for their mobile banking apps. Moreover, developing customers' competence to use mobile banking apps requires more attention from managers in the banking sector. For example, banks can do this by presenting online training conferences and awareness campaigns on mobile banking apps to help customers get used to using mobile banking apps.

- **Managerial implications of perceived risk as a barrier to the acceptance and use of mobile banking apps**

This study found that perceived risk negatively influences the behavioural intention to use mobile banking apps. Indeed, these findings suggest that mobile consumers' risk concerns have a negative influence on their intention to use mobile banking apps. Therefore, mobile banking institutions need to reduce the risk concerns by developing a comprehensive banking environment and implementing strong safety practices to eliminate risk. A number of strategies need to be presented for prospective users to boost their confidence that using mobile banking is safe and protected. For example, security mechanisms, such as secure socket layer (SSL) certificates, should be properly implemented on mobile applications configured for the highest levels of encryption. These significant efforts in improving the safety measures in mobile banking apps will enable banks to attract new customers into using mobile banking apps, and also to encourage current users to continue using

mobile banking apps. Policy makers should lead in protecting customers from security threats, such as new phishing schemes that put customers' confidential information at risk, by enforcing policies that make it a requirement for retail banks to incorporate advanced security systems into their mobile banking apps. Furthermore, South African retail banks can implement the application of mobile digital signatures that would ensure the confidentiality of users' personal information and the legitimacy of the mobile banking app system. Moreover, an emergency security feature should be offered to block mobile banking transactions should users lose their mobile devices.

7.3.2. THEORETICAL IMPLICATIONS

This study provides numerous theoretical contributions by contributing to the spreading of mobile banking understanding and by discovering and discussing direct implications for retail banks, researchers, marketing departments, and users of mobile banking services. This study contributes to the explanation of the factors that have an influence on the intention and actual use of mobile banking apps among millennials in the Gauteng Province of South Africa.

Venkatesh *et al.* (2012:166) emphasised the need for future research to build on UTAUT2 by testing the model in diverse countries, among diverse age groups, and with diverse technologies. The current study responds to this call by validating the UTAUT2 in a different country (South Africa), in a different age group (millennials), and in a different technology domain (mobile banking apps), and thus it contributes towards cross-cultural validation of the UTAUT2 beyond its original setting.

There is a lack of published research – and a definite dearth of empirical research – on this type of study, which focuses specifically on the South African millennial cohort. The current study is exclusive in that it examines mobile banking app acceptance among South African millennial consumers. The study attempts to close the gap in the literature and to offer reasons for the slow growth of mobile banking apps in South Africa. This study fills the gap by widening the evaluation of the elements that have an influence on the mobile banking acceptance among millennial consumers in a developing country.

The validity of the UTAUT2 model was established in a South African millennial sample. This extends its generalisability to a developing country context and to the mobile banking app technology domain. Additionally, the recommendations discussed in this study will permit banks that are targeting millennials with state-of-the-art retail banking products and services to create a positive relationship with consumers while alleviating the fears of non-users of mobile banking apps and enhancing their understanding of the advantages of using mobile banking apps. The theoretical contributions of the present study are directly related to the proposed objectives to the extent that, by adopting the UTAUT2 model, the research objectives were accomplished and the research question of this study was answered. In that way it addresses a major information gap in the literature.

Furthermore, Venkatesh *et al.* (2012:172) emphasised the need for researchers to identify other significant factors that may contribute to increasing the applicability of UTAUT2 to a broad range of technology users' contexts. The current study addresses this research opportunity by integrating perceived risk – a context-specific variable that could influence millennials' acceptance and use of mobile banking apps – into the UTAUT2. The extension to the traditional UTAUT2 offers a more in-depth understanding of millennials' mobile banking app adoption and use behaviour. To the researcher's knowledge, this research study is the first of its kind, as it evaluates the acceptance of mobile banking apps among millennial customers in the South African context using an extended UTAUT model with risk integration.

The results suggest that the integrated UTAUT2 model has good explanatory power for millennials' mobile banking apps acceptance and use. Empirical assessment of the theoretical model shows that 5 of the 12 relationships are statistically significant, further confirming its robustness in predicting user intention to accept mobile banking apps and their actual use of this innovation, and thus contributing to the literature in this research domain. Given that the results of the study highlighted perceived risk as an important factor explaining millennials' intention to use mobile banking apps, it may be argued that the inclusion of perceived risk in the UTAUT2 increases the comprehensiveness of the model in explaining mobile banking apps acceptance among the millennial cohort, and thus contributes to the literature on the applicability of the UTAUT2 in the mobile commerce research domain.

7.5. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Although the study has presented important implications for management and theory, it also has limitations that suggest directions for future research.

7.4.1. LIMITATIONS OF THE STUDY

These limitations include the following:

- The sampling technique applied is regarded as a limitation. The study followed a convenience sampling technique. The first drawback of this method is sampling bias, and that the sample drawn using this method may not represent the entire population.
- This study used a single cross-sectional research design, which means that it measured the factors influencing mobile banking apps adoption and use only once. Changes that may occur in the future were not taken into consideration.
- This study was directed only to members of the Generation Y cohort. It did not include other generational cohorts that are users of mobile banking apps.
- The study only examined the perceptions of the current users of mobile banking apps. Therefore, it did not give non-users a chance to state their views about mobile banking apps and the reasons why they have not adopted this innovation.
- The study only focused in one province, Gauteng. The findings of this study may not be relevant to other mobile banking app users in other provinces of South Africa.

7.5 DIRECTIONS FOR FUTURE RESEARCH

Based on the limitations identified above, the opportunities for future research could include the following:

- Future research studies could use a longitudinal research design. This would provide useful information about any modifications of the factors that influence millennials' intention and usage behaviour with mobile banking apps.

- A similar study could be carried out to study the factors that influence the adoption and usage behaviour of members from other generational cohorts (for example, Generation X) alive today, allowing differences to be identified.
- Future research could be carried out in different provinces across the country, so as to make the results of the study more widely applicable.
- Future studies could investigate the reasons for the non-usage of mobile banking apps among those customers who still rely on their traditional ways of doing banking transactions.
- This study found an insignificant relationship between the habit concept and both behavioural intention and use behaviour. These results were not consistent with many studies of mobile banking. Therefore, there is a need for a further investigation in future studies into the effect of habit on technology acceptance in South Africa. For example, the influence of habit could be tested on other technologies used by millennials in South Africa, such as mobile shopping apps.

7.6 CONCLUDING REMARKS

In conclusion, the substantial and rapid expansion of mobile technologies has resulted in the introduction of mobile banking apps. This has transformed the banking industry in different ways. However, the success of mobile banking rests on users' acceptance. When compared with other generational cohorts, millennials are leading the way in technology adoption, and are regarded as early adopters of new technology. Given that this generation represents the future, it is necessary for banking institutions, financial and business analysts, marketers, policy makers, and strategy developers within the banking sector to understand the major factors that influence this generation's intentions and usage behaviour with mobile banking apps in order to develop applicable strategies that will stimulate the acceptance and usage rate of mobile banking apps.

This research undertook a broad literature review, conducted a quantitative research study, and accomplished the necessary statistical analyses into understanding and identifying the factors contributing to consumer acceptance of mobile banking apps

among millennials in Gauteng, South Africa. From the findings, it is concluded that performance expectancy, facilitating conditions, and perceived risk emerged as the factors that influence the intention and use behaviour of mobile banking apps among millennials. Furthermore, this study found that customer's behavioural intention towards mobile banking apps contributes significantly to their use behaviour of this innovation. Hence, this study advises that banks develop strategies that will reduce risk, provide the necessary infrastructural support to users, and make mobile banking apps more useful.

This chapter provided an outline of the managerial and theoretical implications of the research findings, the study's limitations, and its contributions. Moreover, the recommendations resulting from the research conclusions were discussed according to the findings. Lastly, recommendations for future studies were outlined.



REFERENCES

- Aboelmaged, M.G. & Gebba, T.R. (2013). Mobile banking adoption: an examination of Technology Acceptance Model and Theory of Planned Behaviour. *International Journal of Business Research and Development*, 2(1):35-50.
- Accenture. (2016). ATM Benchmarking Study 2016 and Industry Report. [Available]: https://www.accenture.com/_acnmedia/PDF-10/Accenture-Banking-ATM-Benchmarking-2016.pdf Accessed October 2017.
- Al-Lozi, E. & Papazafeiropoulou, A. (2012). Intention-Based Models: The Theory of Planned Behaviour within the Context of IS. *Information Systems Theory: Explaining and Predicting 219 Our Digital Society*, 2(1):219-239.
- Apple. (2017). iPhone-Apple. [Available]: <https://www.apple.com/iphone/> [Accessed]. August 2017.
- Appiah, B. (2017). Examining the factors affecting internet adoption in Ghana. Thesis [Available]: <ir.knust.edu.gh/bitstream/123456789/9982/1/BRIGHT%20APPIAH.pdf> Accessed October 2018.
- Arenas-Gaitan, J., Peral, B., & Jeronimo, M. (2015). Elderly and internet banking: An application of UTAUT2. *Journal of Internet Banking and Commerce*, 20(1):1-23.
- Ajzen, I. and Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice-Hall.
- Ajzen, I. (1991). *The Theory of Planned Behaviour*. Organisational behaviour and Human decision processes, (50):19-211.
- Alalwan, A., Dwivedi, Y. K., & Williams, M. D. (2014). Examining factors affecting customer intention and adoption of Internet banking in Jordan. *In Proceedings of United Kingdom academy of information systems UKAIS conference*.
- Alalwan, A.A., Dwivedi, Y.K., Rana, N.P., Lal, B., Williams, M.D. (2015). Consumer adoption of Internet banking in Jordan: examining the role of hedonic motivation, habit, self-efficacy and trust. *International Journal of Information management*, 20(2):145-157.

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(1):99-110.

Amy, J.L and B.J. Charvat (2008). *Research methods in child welfare*. 3rd ed. Columbia university press.

Anderson, J. C., & Gerbing, D. W. (1992). Assumptions and comparative strengths of the two-step approach comment on Fornell and Yi. *Sociological Methods & Research*, 20(3), 321-333.

Anderson, J. C. and Gerbing D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103(3): 411-423.

Anderson, E.A., Buchko, A.K., Buchko, J. (2016). Giving negative feedback to Millennials: How can managers criticize the most praised generation. *Management Research Review*, 39(6):692-705.

Anglim, J. (2007). Structural equation modelling. [Available]: <http://web.psych.unimelb.edu.au/jkanglim/IntroductiontoSEM.pdf> Accessed October 2018.

Akuturan, U. & Tezcan, N. (2012). Mobile banking adoption of the youth market perceptions and intentions. *Marketing Intelligence & Planning*, 30(4):444-459.

Audi, F.M., Wahda, M. Abdalla, S. Jaber, L. & Kassem, N. (2016). Adoption of mobile banking applications in Lebanon. *Journal of Internet Banking and Commerce*, 21(1):1-5.

Babbie, E. & Mouton, J. (2010). *The practice of social research*. 10th ed. South Africa, Cape town. Oxford university press.

Babbie, E. (2013). *The Practice of Social Research*. 13th ed. Wadsworth: Cengage.

Babin, J.B. & Svensson, G. (2012). Structural equation modelling in social science research: issues of validity and reliability in the research process. *European Business Review*, 24(4): 320-330.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological review*, 84(2):1-191.

- Balabanoff, G.A. (2014). Mobile banking application: consumer behaviour, acceptance and adoption strategies in Johannesburg, South Africa. *Mediterranean Journal of Social Sciences*, 5(27):247-258.
- Baptista, G. & Oliveira, T. (2015). Understanding mobile banking: The unified theory of acceptance and use of technology combined with cultural moderators. *Computers in Human Behavior*, 5(1):418-430.
- Baptista, G. and Oliveira, T. (2016). A weight and a meta-analysis on mobile banking acceptance research. *Computers in Human Behavior*, 63 (41):80-489.
- Baptista, G. & Olaveira, T. (2017). Why so serious? Gamification impact in the acceptance of mobile banking services. *Internet Research*, 27(1):118-139.
- Bhatiasevi, V. (2015). An extended UTAUT model to explain the adoption of mobile banking. *Information Development*, 32(4):799-814.
- Batyashe, T.N. & Tiko, I. (2017). Examining IT Governance through Diffusion of Innovations: A Case of a South African Telecom. *Information Resources Management Journal (IRMJ)*, IGI Global, 30(3): 26-40.
- Bartikowski, B., and Walsh, G. (2011). Investigating mediators between corporate reputation and customer citizenship behaviours. *Journal of Business Research*, 64(1), 39-44.
- Beri, G. C. (2013). *Marketing research*. Tata McGraw-Hill - New Delhi
- Berndt, A. & Petzer, D. (2011). *Marketing research*. Cape Town: Pearson.
- Berndt, A.D., Saunder, S.G. & Petzer, D.J. (2010). Readiness for banking technologies in developing countries. *Southern African Business Review*, 14(3):47-76.
- Blumberg, B., Cooper, D.R. & Schindler, P.S. (2014). *Business Research Methods*. 4th ed. London. McGraw-Hill.
- Bowen, N.K. & Guo, S. (2011). *Structural equation modelling*. New York: Oxford University Press.
- Burns, A. C., & Bush, R. F. (2014). *Marketing Research*. 6th ed: Pearson Education.

BusinessTech. (2017). Capitec is now the third biggest bank in South Africa. [Available]: <https://businesstech.co.za/news/banking/138243/capitec-is-now-the-third-biggest-bank-in-south-africa/> Accessed March 2017.

BusinessBrief. (2016). South Africa beating online mobile adoption. [available]: <https://www.bbrief.co.za/2016/12/09/sa-beating-online-mobile-adoption-rates/> Accessed September 2017.

Boonsiritomachai, W. & Pitchayadejanant, K. (2017). Determinants affecting mobile banking adoption by generation Y based on the Unified Theory of Acceptance and Use of Technology Model modified. *Kasetsart Journal of Social Science*. [Available]: <https://doi.org/10.1016/j.kjss.2017.10.005>

Bryman, A. & Bell, E. (2014). *Business research methods*. 3rd ed. New York: Oxford University Press.

Bradley, N. (2010). *Marketing research: tools and techniques*. 2nd ed. New York: Oxford University Press.

Cant, M., Gerber-Nel, C., Nel, D. & Kotze, T. (2008). *Marketing research*. 2nd ed. Pretoria: New Africa Books

CapeGemini consulting. (2016). Top 10 trends in banking in 2016. [Available]: https://www.capgemini.com/wpcontent/uploads/2017/07/banking_top_10_trends_2016.pdf Accessed October 2017.

Capitec (2017). Capitec rated world first digital bank. [Available]: <https://www.capitecbank.co.za/bankbetterlivebetter/articles/capitec-rated-worlds-best-bank> Accessed 14 August 2017.

Chandran, R. (2014). Pros and Cons of mobile banking. *International Journal of Scientific and Research Publications*, 4(10):1-5.

Chatrand, R. (2016). Advantages and disadvantages of using mobile devices in a university language classroom. [Available]: <http://hdl.handle.net/11316/445> Accessed July 2018.

Chiwara, J.R., Chinyamurindi, W.T. and Mjoli, T.Q. (2017). Factors that influence the use of the internet for job-seeking purposes amongst a sample of final-year students in the Eastern Cape province of South Africa, *SA Journal of Human Resource Management*, 15 (1):1-9.

- Carlsson, C. (2006). Adoption of mobile devices/services-searching for answers with the UTAUT in System Sciences, *HICSS'06. Proceedings of the 39th Annual Hawaii International Conference on*. 2006. IEEE.
- Chen, H. & Huang, S.C. (2016). Domestic technology acceptance. *Human factors & ergonomics in manufacturing & service industries*, 26(2):199-199.
- Chung, N. & Kwon, S.J. (2009). The effects of customers 'mobile experience and technical support on intention to use mobile banking. *Cyber Psychology & Behaviour*, 12(5):539-543.
- Chin, W.W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research*. 295(2):295-336.
- Chilisa, B. & Kawulich, B. B. (2012). Selecting a research approach: paradigm, methodology and methods. In *Doing social research: 4th ed.* London: McGraw Hill. 51-56.
- Chong, A. (2013). A two-staged SEM-neural network approach for understanding and predicting the determinants of m-commerce adoption. *Expert Systems with Applications*, 40(4):1240-1247.
- Creswell, J.W. (2012). *Research design*. 4th ed. London: SAGE Publications, Inc.
- Cruz, P., Salo, J., Muñoz-Gallego, P. & Luukkanen, T. (2010). Heavy users of e-banking and customer experience management. *International Journal of Electronic Business*, 8(2):187-209.
- Cooper, D.R. and Schindler, P.S. (2011). *Business Research Methods*. 11th ed. London: McGraw-Hill.
- Cocosila, M. & Trabelsi, H. (2016). An integrated value-risk investigation of contactless mobile payments adoption. *Electronic Commerce Research and Applications*, 20(1):159-170.
- Cudmore, B.A., Patton, J., Ng, K. & McClure, C. (2010). The millennials and money management. *Journal of Management and Marketing Research*, 4(1):1-28.
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 3(13):319-340.

Deloitte (2013). Global mobile consumer survey. [Available]: <http://www.iabeurope.eu/files/1913/8574/2118/deloitte-nl-global-mobile-consumer-survey.pdf> Accessed 03 April 2017.

Deloitte. (2012). M-Banking and M-Payments, an introduction. [Available]: <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/financial-services/in-fs-mobile-money-noexp.pdf> Accessed 03 April 2017.

Dijkstra, T. K., & Henseler, J. (2015a). Consistent and asymptotically normal PLS estimators for linear structural equations. *Computational Statistics and Data Analysis*, 81(1):10-23.

Donner, J., & Tellez, C. (2008). Mobile banking and economic development: Linking adoption, impact, and use. *Asian Journal of Communication*, 18(4):318-332.

Dormann, C. F., Elith, J., Bacher, S., Carré, G. C. G., García Márquez, J. R., Gruber, B., Lautenbach, S. (2013). Collinearity: a review of methods to deal with it and a simulation study evaluating their performance: open access. *Ecography*, 36(1): 27-46.

Eastman, J.K. & Liu, J. (2012). The impact of generational cohorts on status consumption: an exploratory look at generational cohort and demographics on status consumption. *Journal of Consumer Marketing*, 29(2):93-102.

Ekka, J. (2014). *Research methodology and data analysis in humanities & social sciences*. 1st ed. Laxmi Book Publications.

eMarketer. (2017). Key digital trends. [Available] : <https://www.emarketer.com/Webinar/Key-Digital-Trends-2017/4000152> Accessed September 2018.

Ellis-Christensen, T. (2014). What is Generation Y?. [Accessed]: <http://wisegeek.org/what-is-generation-y.htm> Accessed May 2017.

Eyerman, R., & Turner, B. S. (1998). Outline of a theory of generations. *European Journal of Social Theory*, 1(1):91-106.

Farah, M.F., Hasni, M.J.S. & Abbas, A.K. (2018). Mobile-banking adoption: empirical evidence from the banking sector in Pakistan. *International Journal of Bank Marketing*, 36(7):1386-1413.

Faria, M.G. (2012). Mobile banking adoption. [Unpublished]. Accessed from : <https://run.unl.pt/bitstream/10362/9183/1/TEGI0326.pdf> . Accessed August 2017.

Featherman, M., S. & Pavlou, P.A. (2003). Predicting E-services adoption: A Perceived risk perspective. *Eighth Americas Conference on Information Systems*, 1033-1046.

Federal Trade Commission (2012). Electronic banking. [Available]: <https://www.consumer.ftc.gov/articles/pdf-0109-electronic-banking.pdf> Accessed October 2017.

Federal Reserve. (2016). Consumers and mobile financial services. [Available]: <http://www.federalreserve.gov/econresdata/consumers-and-mobile-financial-services-report-201603.pdf>. Accessed March 2017.

Fernandez-Durán, J.J. (2016). Defining generational cohorts for marketing in Mexico. *Journal of Business Research*, 69 (2016):435-444.

Fenu, G. and Pau, P.L. (2015). An analysis of features and tendencies in mobile banking app. *The 12th international conference on mobile systems and pervasive computing. Proceeding computer science*, 56(2015):26-33.

FinTech Africa, (2017). ABSA chat banking. [Available]: <https://2017.fintech-africa.com/companies/absa-chatbanking> Accessed August 2017.

First Annapolis Consulting Inc. (2016). Study of Mobile Banking & Payments. [Available]: http://www.firstannapolis.com/wp-content/uploads/2016/08/First-Annapolis-Study-of-Mobile-Banking-Payments-3rd-Ed_Aug-2016.pdf Accessed May 2017.

Fishbein, M. and Ajzen, L. (1975). *Belief, attitude, intention, and behaviour: an introduction to theory and research*, Reading, Mass: Addison-Wesley.

Fu, F.Q., & Elliot, M.T. (2008). Consumer acceptance of technology products: the impact of tactical selling approaches. *The marketing management journal*, 18(2):47-64.

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

Gangwal, N. & Bansal, V. (2016). Application of Decomposed Theory of Planned Behavior for M-commerce Adoption in India. 10.5220/0005627503570367: 357-367.

Garg, A. K & Garg, D (2013). An assessment of 3G Internet Service Acceptance in Botswana: Technology Acceptance Model with Social Influence and Price Perception. *Pakistan Journal of Social Sciences (PJSS)*, 33 (1):6-87.

George, S. (2016). Mobile banking in the present scenario. *The international journal of research commerce and management*, 7 (12):61-63.

Ghalandari, K. (2012). The effect of performance expectancy, effort expectancy, social influence and facilitating conditions on acceptance of e-banking services in Iran: The moderating role of age and gender. *Middle-East Journal of Scientific Research*, 12(6):801-807.

Gharaibeh, M.K., Arshad, M.R. (2018). Using the UTAUT2 model to determine factors affecting adoption of mobile banking Services. *International Journal of Interactive Mobile Technologies (iJIM)*, 12(4):123-134.

Goodwill Community Foundation. (2015). Computer basics: mobile devices. [Available]: <http://www.gcflearnfree.org/computerbasics/9> Accessed: May 2017.

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.

Gupta, A. and Dogra, N. (2017). TOURIST adoption of mapping apps: UTAUT2 perspective of smart travellers. *Tourism and Hospitality Management*, 23(2):145-161.

Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E. (2010). *Multivariate data analysis: a global perspective*. 7th ed. New Jersey: Pearson Prentice Hall.

Hair Jr, J.F., Hult, G. Ringle, T.M., Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. SAGE Publications, Inc. 73-105.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modelling (PLS-SEM)*: Sage Publications. Inc. 73-130.

Hanafizadeh, P., Behboudi, M., Koshksaray, A. A., & Tabar, M. J. S. (2014). Mobile-banking adoption by Iranian bank clients. *Telematics and Informatics*, 31 (1):62-78.

Harrington, R.J., Ottenbacher, M.C., Staggs, A. & Powell, F.A. (2011). Generation Y consumers: key restaurant attributes affecting positive and negative experiences. *Journal of Hospitality & Tourism Research*, 36(4):431-449.

Hernan E. & Rios, R.R.E. (2011). The moderating factor of gender in the adoption of mobile banking. *International Journal of Bank Marketing*, 28(5):328-341.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science*, 1-21.

Herrero, Á. and San Martín, H. (2017). Explaining the adoption of social networks sites for sharing user-generated content: A revision of the UTAUT2. *Computers in Human Behaviour*, 71(1):209-217.

Hershatter, A. & Epstein, M. (2010) Millennials and world of work an organization and management perspective. *Psychology*, 5(15). 55-59.

Huang, C. & Kao, Y. (2015). UTAUT2 based predictions of factors influencing the technology acceptance of Tablets by DNP. *Mathematical Problems in Engineering*, 1(2015):1-23.

Im, I., S. Hong, and M.S. Kang. (2011). An international comparison of technology adoption: Testing the UTAUT model. *Information & Management*, 48(1):1-8.

Islam M.R. & Mazumder, T.A. (2012). Mobile Application and Its Global Impact. *International Journal of Engineering & Technology IJET-IJENS*. 10(6):72-7

Ismail, T. & Masinge, K. 2012. Mobile banking: innovation for the poor. *African Journal of Science. Technology, Innovation and Development*, 4(3):98-127.

IT news Africa. (2015). Will digital finance play a bigger role in SA in 2015? [Available]: <http://www.itnewsafrika.com/2015/02/will-digital-finance-play-a-bigger-role-in-sa-in2015/> Accessed March 2015.

IT web. (2018). Banking App news archive. [Available]: <https://www.itweb.co.za/terms/VKA3Wwqd4ZYqrydZ> Accessed November 2018.

Ivatury, G., Mass, I. (2008). The early experience with branchless banking. [Available]: <http://www.ssrn.com/abstract=1655257> Accessed April 2017.

Jasperson, J.S., Carter, P.E. and Zmud, R.W. (2005). A comprehensive conceptualization of the post-adoptive behaviours associated with IT-enabled work systems. *MIS Quarterly*, 29(3):25-33.

Jordan, Y., Ehlers, L., & Grove, J.M. (2011). Advertising credibility across media channels: perceptions of Generation Y consumers. *Communicare*, 30(1):1-20.

Joshua, A. & Koshy, M.P. (2011). Usage patterns of electronic banking services by urban educated customers. *Canadian, Journal of Social Science*. 7(2):60-63.

Jones, V, Jo, J., and Martin, P. (2012). Future school and hot technology can be used to support millennials and generation-z students. [Available]: <http://www.webkb.org/doc/papers/icut07/icut07JonesJoMartin.pdf> Accessed April 2017.

Kahneman, D., Diener, E & Schwartz, N. (1999). The foundations of hedonic psychology. New York: Russell Sage Foundation. 2-25.

Kamat, P.V (2018). Research ethics. [Available]: <https://www3.nd.edu/~pkamat/pdf/ethics.pdf> Accessed July 2017.

Kent, R. (2007). *Marketing research: approaches, methods and applications in Europe*. London: Thomson Learning.

Khanna, R.M.S., Kavookjian, S.V.G., Scott, V.G.G., Kamal, K.M., Miller, L.N. & Neal, W.A. (2009). Using the TRA to determine physicians' intention to measure body mass index in children and adolescents. *Research in Social and Administrative Pharmacy*, 5(2):170-181.

Khasawneh, M.H.A. (2015). A Mobile banking adoption model in the Jordanian market: An integration of TAM with perceived risks and perceived benefits. *Journal of Internet Bank Commerce*, 20(3):1-13.

Kim, D.Y., Park, J. and Morrison, A.M. (2008). A model of traveller acceptance of mobile technology. *International Journal of Tourism Research*, 10(5):393-407.

Kit, A. Ni, A. Badri, E. & Yee, T. (2014). UTAUT2 influencing the behavioural intention to adopt mobile applications. Unpublished. [available]: <http://eprints.utar.edu.my/1277/1/AC-2014-1005389.pdf> Accessed June 2017.

Kirk, J. (2015). Mobile banking apps in developing nations have weak security. *Journal of Social Sciences*. 3 (22):1-14.

Kline, R.B. (2011). *Principles and practice of structural equation modelling*. 3rd ed. New York: Guilford Press.

Koeng-Lewis, N., Palmer, A., Moll, A. (2010). Predicting young consumers' uptake of mobile banking services. *International Journal of Bank Marketing*. 28(5):410-432.

Kotler, P. & Armstrong, G. (2012). *Principles of marketing*. 14th ed. Upper saddle river, NJ: Pearson.

Krugel, G.T. (2007). Mobile banking technology: an overview of the different mobile banking technology options, and their impact on the mobile banking market. [Available]: http://www.gsma.com/mobilefordevelopment/wpcontent/uploads/2012/06/finmark_mbt_aug_07.pdf Accessed August. 2018.

KPMG (2015). Mobile banking in 2015. [Available]: <http://emergingpayments.org/wp-content/uploads/2017/02/KPMG-Mobile-Banking-2015.pdf> Accessed October 2017.

Kumar, A. and Lim, H. (2008) Age differences in mobile service perception: comparison of Generation Y and baby boomers. *Journal of services marketing*, 22(7):568-577.

Iacobucci, D. & Churchill, G.A. (2010). *Marketing research: methodological foundations*. Canada: South-Western Cengage Learning.

Laukkanen, T. and Pasanen, M. (2008). Mobile Banking Innovators and Early Adopters: How They Differ from Other Online Users? *LIU*, (13):86-94.

Laukkanen, T. (2016). Consumer adoption versus rejection decisions in seemingly similar service innovations: The case of the Internet and mobile banking. *Journal of Business Research*, 69(2016):2432–2439.

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

Leiva, F. Climent, S. & Cabanillas, F. (2016). Determinants of intention to use the mobile banking apps: An extension of the classic TAM model. *Spanish Journal of Marketing. Esic*, 1 (2016):1-14.

Lenhart, A., Duggan, M., Perrin, A., Stepler, R., Rainie, H. and Parker, K., (2015). Teens, social media & technology overview. *Pew Research Centre Internet & American Life Project*. 04-09.

Lewis, C.C., Fretwell, C.E., Ryan, J. and Parham, J.B. (2013). Faculty use of established and emerging technologies in higher education: A Unified Theory of Acceptance and Use of Technology perspective. *International Journal of Higher Education*, 2(2): 22-34.

Li, F. (2014). Why users adopt mobile banking service: An empirical study. In 2013 10th *International Conference on Service Systems and Service Management - Proceedings of ICSSSM 2013* (490–493). doi:10.1109/ICSSSM.2013.6602554.

Liu, S. (2012). The impact of forced use on customer adoption of self-service technologies. *Computers in Human Behaviour*, 1(28):1194-1201.

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.

Localytics (2015). Media and entertainment app industry report. [Available]:http://info.localytics.com/hubfs/eBooks/Media__Entertainment_App_Industry_Report.pdf?t=1446481324994 Accessed October 2017.

Luarna, P., & Lina, H.H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, 21(6): 873-891.

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

- Ma, L., Lee, C., Goh, D.H. (2014). Understanding news sharing in social media: An explanation from the diffusion of innovations theory. *Online Information Review*, 38(5): 598-615.
- Maduku, D. K. & Mpinganjira, M. (2012). Empirical investigation into customers' attitude towards usage of cell phone banking in Gauteng, South Africa. *Journal of Contemporary Management*, 9(1):172-189.
- Maduku, D.K. (2013). Predicting retail customers' attitude towards Internet banking service in South Africa. *Southern African Business Review*, 17(3):76-100.
- Maduku, D.K. (2014). Behavioural intention towards mobile banking usage by South African retail banking clients. *Investment management and Financial Innovation*, 11 (3):58-72.
- Maduku, D. (2016). Fostering M-banking continuance intention: the role of trust in banks and mobile network quality. *International business conference*, 25-28 September.
- Maji, S.K., & Pal, k. (2017). Factors affecting the adoption of e-Filing of income tax returns in India. *The IUP Journal of Accounting Research & Audit Practices*, 1 (2017):47-66.
- Malhotra, N, K. (2007). *Marketing research: an applied approach*. 3rd ed. European Edition, Harlow, UK, Pearson Education.
- Malhotra, N. & Birks, D. (2007). *Marketing research: an applied approach*. 3rd ed. Harlow: Pearson Prentice Hall.
- Malhotra, N.K. (2010). *Marketing research: an applied orientation*. 6th ed. New Jersey: Pearson Prentice Hall.
- Marriot, M. & Williams, M. (2016). Developing a theoretical model to examine consumer acceptance behaviour of mobile shopping. *Research Gate*, 1(1):264-264.
- Martins, C., Oliveira, T. & Popovic, A. (2014). Understanding the Internet banking adoption: a Unified Theory of Acceptance and Use of Technology and perceived risk application. *International Journal of Information Management*, 34(1):1-13.
- Maree, K., Creswell, J.W., Ebersöhn, L., Eloff, I., Ferreira, R., Ivankova, N.V., Jansen, J.D., Nieuwenhuis, J., Pietersen, J., Plana Clark, V.L. & Van der Westhuizen, C. (2011). *First steps in research*. 9th ed. Pretoria: Van Schaik.

Mashagba, F., A. & Nassar, M, O. (2012). Modifies UTAUT model to study the factors affecting the adoption of mobile banking in Jordan. *International journal of sciences: basic and applied research*, 6(1):83-94.

Matthews, B. & Ross, L. (2010). *Research methods: a practical guide for the social sciences*. Harlow: Pearson Prentice Hall.

McDaniel, C. & Gates, R. (2013). *Marketing research essentials*. 8th ed. United States of America John Wiley & Sons, Inc.

Meyer, J. (2015). The future of mobile banking in South Africa. [Available]: <http://www.fin24.com/Tech/Opinion/The-future-of-mobile-banking-in-South-Africa-20150211> Accessed March 2017.

Mishra, D, Akman, I, & Mishra, A. (2014). Theory of Reasoned Action application for Green Information Technology acceptance. *Computers in Human Behaviour*, (36):29-40.

Mohd, T.A., Abdul, S.Z & Syhada, & A.H. (2014). Factors influencing e-filing usage among Malaysian tax payers: Does tax knowledge matter? *Journal of Pensurusan*, 40(11):91-101.

Moons, I. & Pelsmacker, P. (2015). An Extended Decomposed Theory of Planned Behaviour to predict the usage intention of the electric car: A multi-group comparison. *Sustainability*, 2015 (7):6212-6245.

Moser, F. (2015). Mobile banking a fashionable concept or an institutionalized channel in future retail banking? Analysing patterns in the practical and academic mobile literature. *International Journal of Banking Marketing*, 33(2):167-177.

Moorthy, K., Ling, C.S., Fatt, Y.W., Yee, C.M., Yin, E.C.K., Yee, K.S. and Wei, L.K. (2017). Barriers of mobile commerce adoption intention: perceptions of generation X in Malaysia. *Journal of Theoretical and Applied Electronic Commerce Research*, 12(2): 37-53.

Moqbel, M., Charoensukmongkol, P., Bakay, A. (2013). Are U.S. academics and professionals ready for IRFs? An explanation using Technology Acceptance Model and Theory of Planned Behaviour. *Journal of International Business Research*, 12(2):47-60.

Munoz-Leiva, F., Climent-Climent, A.S., Liébana-Cabanillas, B.F. (2016). Determinants of intention to use the mobile banking apps: An extension of the classic TAM model. *Spanish Journal of Marketing*, 217(21):25-38.

Nadeem, W., Cripps, H., and Salo, J. (2017) Facebook commerce: empirical study with young consumers. Conference Proceedings. ANZMAC 2017

Nedbank. (2017). Nedbank solution. [Available]:<https://www.nedbank.co.za/content/nedbank/desktop/gt/en/personal/tools-and-guidance/tools/nedbank-app-suite.html>. Accessed May 2018.

Nielsen. (2014). Millennials: technology=social connection. [Available]:<http://www.nielsen.com/us/en/insights/news/2014/millennials-technology-social-connection.html> Accessed February 2017.

Nel, J., Boshoff, C. & Raleting, T. (2012). Exploiting the technology cluster effect to enhance the adoption of WIG mobile banking among low-income earners. *Management Dynamics*, 21(1): 30-44.

Njenga K. & Ndlovu, S. (2012) On privacy calculus and underlying consumer concerns influencing mobile banking subscription. Available online: <http://hdl.handle.net/10210/10037>

Nor, K.M. and Pearson, J.M. (2008). An exploratory study into the adoption of internet banking in a developing country: Malaysia. *Journal of Internet Commerce*, 7(1): 29-73.

Nunnally, J.C. (1978). *Psychometric Methods*. 2nd ed., McGraw-Hill, New York, NY.

Nyaketcho, D., Lindskog, D., & Ruhl, R. (2012). STK implementation in SMS banking in M-PESA -KENYA, exploits and feasible solutions. *Information Systems Security*, 1-10.

Olasina, G. (2015). Factors Influencing the use of M-Banking by academics: a case study of SMS-Based M-Banking. *The African Journal of African System*, 7(4):56-79.

Oliveira, T., Faria, M., Thomas, M. A., & Popovic, A. (2014). Extending the understanding of mobile banking adoption: When UTAUT meets TTF and ITM. *International Journal of Information Management*, 34(5):689-703.

Orbell, S. and Verplanken, B. (2010) The automatic component of habit in health behaviour: habit as cue-contingent automatic. *Health psychology*, 29(4):374-83.

Papies, D. & Clement, M. (2008). Adoption of new movie distribution services on the Internet. *Journal of Media Economics*, 21(3):131-157.

Pallant, J. (2010). *SPSS survival manual: a step by step guide to data analysis using SPSS*. 4th ed. England: Open University Press.

Paradiso, C. (2015). Marketing to Millennials. [Available]: <https://www.paradisopresents.com/marketing-to-millennials/> Accessed May 2017.

Park, S. Tussyadiah, I.P. (2016). Multidimensional Facets of Perceived Risk in Mobile Travel Booking. *Journal of Travel Research*, 34(5):636-652.

Pelto, P.J. (2017). *Mixed methods in ethnographic research: Historical Perspectives*. New York & London: Routledge.

Peterson, R.A. (1994). A meta-analysis of Cronbach's coefficient alpha. *Journal of Consumer Research*, 21(2):381-391.

Power, D.J. (2013). Mobile decision support and business intelligence: *Journal of Decision Systems*, 22(1):4-9.

Puschel, J., Mazzon, J. A., & Hernandez, J. M. C. (2010). Mobile banking: proposition of an integrated adoption intention framework. *International Journal of Bank Marketing*, 28(5):389-409.

Raman, A., & Don, Y. (2013). Preservice teachers' acceptance of learning management software: An application of the UTAUT2 model. *International Education Studies*, 6(7):157-164.

Rana, N. P., Dwivedi, Y. K., & Williams, M. D. (2015). A meta-analysis of existing research on citizen adoption of e-government. *Information Systems Frontiers*, 17(3): 547-563.

Riad, M., Jaradat, M., Khaled S. & Faqih, S. (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):11-147.

Raynard, M. (2016). Understanding academic E-books through the Diffusion of Innovations Theory as a basis for developing effective marketing and educational strategies. *The Journal of Academic Librarianship*, <http://dx.doi.org/10.1016/j.acalib.2016.08.011>

Redlinghuis, A. & Rensleigh, C. (2012). Customer perceptions in Internet banking information protection. *South African Journal of Information Management*, 12(1):1-6.

Redda, E.H. (2015). Electronic banking services in South Africa: Service quality scale development and validation. Thesis.

[Available]:https://dspace.nwu.ac.za/bitstream/handle/10394/16547/Redda_EH.pdf?sequence=1&isAllowed=y Accessed October 2017.

Remler, D.K. & Van Ryzin, G.G. (2011). *Research methods in practice: strategies for description and causation*. London: Sage.

Riffai, M. (2012). Big TAM in Oman: exploring the promise of online banking, its adoption by customers and the challenges of banking in Oman. *International journal of information management*, 32(3):239-250.

Rogers, E.M. (1983). *Diffusion of innovations*. 3rd ed. New York: Free Press.

Rogers, E.M. (2003). *Diffusion of innovation*. 5th ed. New York: Free Press.

Safeena, R., Date, H., Kammani, A. & Hundewale, N. (2012). Technology Adoption and Indian Consumers: Study on Mobile Banking. *International Journal of Computer Theory and Engineering*, 4(6):1020-1024.

SA Financial Sector Forum. (2012). Banks in South Africa.
http://www.finforum.co.za/banks_south_africa.htm Accessed August 2018.

Salkind, N. (2012). *Exploring research*. 8th ed. New Jersey: Pearson Prentice Hall

Saunders, M. Lewis, P. & Thornhill, A. (2012). *Research Methods for Business Studies*. 6th ed. Edinburgh Gate. Pearson.

Sarfaraz, J. (2016). Unified Theory of Acceptance and Use of Technology (UTAUT) model-mobile banking. *Journal of Internet Banking and Commerce*.
[Available]:<http://www.icommercecentral.com/open-access/unified-theory-of-acceptance-and-use-of-technology-utaut-modelmobile-banking.php?aid=86597> Accessed June 2018.

Satama, S. (2014). Consumer Adoption of Access-Based Consumption Services – Case AirBnB. Unpublished thesis. [Available]:<https://aalto.doc.aalto.fi/handle/123456789/13723>. Accessed October 2018.

Search Mobile (2016). Mobile devices. [Available]
<https://searchengineland.com/library/channel/mobile> Accessed June 2018.

Seng, D., Wilkin, C., Sugianto, L. (2013). Towards development of an Instrument to measure mobile portal user satisfaction. *Proceedings - Pacific Asia Conference on Information Systems*, PACIS 2013.

Schiffman, L.G., Kanuk, L.L. & Wisenblit, J. (2010). *Consumer behaviour*. 10th ed. Pearson Prentice Hall.

Schlitzkus, L.L., Schenarts, K.D. & Schenarts, P.J. (2010). Is your residency program ready for Generation Y? *Journal of Surgical Education*, 67(2):108-111.

Seyal, Afzaal & Turner, Rodney. (2012). A study of executives' use of biometrics: An application of Theory of Planned Behaviour. *Behaviour and Information Technology*. 1-15. 10.1080/0144929X.2012.659217.

Shaikh, A. A., & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. *Telematics and Informatics*, 32(1):129-142.

Shaikh, A. A., Karjaluoto, H. & Chinje, N. B. (2015). Continuous mobile banking usage and relationship commitment – A multi-country assessment. *Journal of Financial Services Marketing*, 20(3):208-219.

Shaikh, A. A. & Karjaluoto, H. (2016). Mobile banking services continuous usage – Case study of Finland. *In 49th Hawaii International Conference on System Sciences (HICSS) 2016:1497-1506*.

Shirin, A. & Vandana, A. (2016). An empirical segmentation of users of mobile banking Apps. *Journal of Internet Commerce*, 3(7):390-407.

Shukla, P. (2008). *Essentials of marketing research: part ii*. Ventus Publishing. [Available]:<http://bookboon.com/en/business-ebooks/marketing-ebooks/essentials-of-marketing-research-part-ii> Accessed June 2017.

Shuhaida M. (2017). Perceived risk towards mobile banking: A case study of Malaysia young adulthood: *IOP Conf. Ser: Mater. Sci. Eng.* 226012115.

Singh, A. M. (2004). Trends in South African internet banking. *New Information Perspective*, 56(3):187-196.

Soulez, S. (2012). Recruitment marketing and generational segmentation: a critical analysis based on a sub-segment of Generation Y. *Research Application and Marketing*, 26(1):40-55.

Soares, R.R., Zhang, T., Proença, J.F. & Kandampully, J. (2017). Why are Generation Y consumers the most likely to complain and repurchase? *Journal of Service Management*, 28(3): 520-540.

Standard Bank, (2017) mobile banking. [Available]: <http://app.standardbank.co.za/>. Accessed March 2018.

Stats SA. (2016) Community survey. [Available]: <http://cs2016.statssa.gov.za/>. Accessed October 2018.

Stein, J. (2013). Millennials: The Me Me Me Generation. [Available].<http://time.com/247/millennials-the-me-me-me-generation/> Accessed April 2017.

Strutton, D., Taylor, D. G., & Thompson, K. (2011). Investigating generational differences in e-WOM behaviours: for advertising purposes. *International Journal of Advertising*, 30(4): 559-586.

Struwig, F.W. & Stead, G.B. (2010). *Planning, designing and reporting research*. 7th ed. Cape Town: Pearson Prentice Hall.

Sreejesh S., Anusree M.R. & Amarnath, M. (2016). Effect of information content and form on customers' attitude and transaction intention in mobile banking Moderating role of perceived privacy concern. *International Journal of Bank Marketing*, 34(17):1092-1113.

Suki, N.M., Ramayah, T., Yi, L.M. & Amin, H. (2011). An empirical investigation of Wireless Application Protocol (WAP) services usage determinants. *International Journal of E-business Management*, 5(1):9-11.

Sripalawat, J., Thongamark, M. & Ngramyarn, A. (2011). M-banking in metropolitan Bangkok and a comparison with other countries. *Journal of Computer Information Systems*, 51(3):67-76.

Suorantas, M. (2003). Adoption of mobile banking in Finland. Unpublished Thesis. [available]:https://www.researchgate.net/publication/279687883_Adoption_of_mobile_banking_in_Finland Accessed September 2018.

Tabachnick, B.G. & Fidell, L.S. (2014). *Using multivariate statistics*. 6th ed. England: Pearson Prentice Hall.

Talukder, M., Quazi, A. & Sathye, M. (2014). Mobile phone banking usage behaviour: An Australian perspective. *Australasian Accounting, Business and Finance Journal*, 8(4):83-104.

Tam, C. & Oliveira, T. (2016). Performance impact of mobile banking: using the task-technology fit (TTF) approach. *International Journal of Bank Marketing*, 34(4):434-457.

Taylor, S. & Todd, P. (1995a). Decomposition and crossover effects in the Theory of Planned Behaviour: a study of consumer adoption intentions. *International Journal of Research in Marketing*, 12(2):137-155.

Taylor, S. & Todd, P.A. (1995b). Understanding information technology usage: a test of competing models. *Information Systems Research*, 6(2):144-176.

Tan, K.S., Chong, S.C., Loh, P.L. & Lin, B. (2010). An evaluation of e-banking and m-banking adoption factors and preference in Malaysia: a case study. *International Journal of Mobile Communications*, 8(5):507-527.

Tan, E., & Lau, J. (2016). Behavioural intention to adopt mobile banking among the millennial generation. *Young Consumers*. 17(1):18-31.

Tam, C. & Oliveira, T. (2016). Performance impact of mobile banking: using the task-technology fit (TTF) approach. *International Journal of Bank Marketing*, (34)14:434-457.

Tarawneh, H. Otair, A. & Alomari, M. (2012). Mobile banking based on stand-alone mobile application clients -A suggested mobile banking solution for banks in Jordan. *International Journal of Advanced Research in Computer Science*, 3(1):49-58.

The Banking Association South Africa. (2017). Association and industry overview. [Available]: <http://www.banking.org.za/about-us/association-overview> Accessed April 2017.

Thomas, P.Y. (2010). Towards developing a web-based blended learning environment at the University of Botswana. D.Ed thesis (Didactics), Unpublished: University of South Africa.

- Toh, T. W., Govindan, M., Chong, A. Y. L., Keng-Boon, O., & Seetharam, A. (2009). What drives Malaysian m-commerce adoption? An empirical analysis. *Industrial Management + Data Systems*, 109(3):370-388.
- Ullah, K.I., Zahid, K. (2014). Understanding online banks adoption in a developing country: UTAUT2 with cultural moderators. *Journal of Global Information Management*, 25(1):43-65.
- Unisa Bureau of market research, 407 (2011). Personal income estimates in South Africa. [Available]: https://www.unisa.ac.za/contents/faculties/ems/docs/BMR_infor_blurp_407.pdf Accessed October 2018.
- Van Deventer, M. (2015). Generation Y students' perceived utility and trust in mobile banking.[Available]: https://repository.nwu.ac.za/bitstream/handle/10394/19742/VanDevente_M.pdf?sequence=1 Accessed February 2017.
- Vasseur, V. and Kemp, R. (2015). A segmentation analysis: the case of photovoltaic in the Netherlands. *Energy Efficiency*, 2015(8):6-1105.
- Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly*, 27(3):425-478.
- Venkatesh, V., Thong, J.Y.L. & Xu, X. (2012). The use of modified theory of acceptance to predict prospective users' intention in adoption Tv streaming. *Proceedings of the 5th International Conference on Computing and Informatics, ICOCI 2015*. 157-178.
- Ventola, C.L. (2014). Mobile devices and apps for health care professionals: uses and benefits. *Pharmacy and Therapeutics*, 39(5):356–364.
- Verissom, J.M.C. (2016). Enablers and restrictors of mobile banking app use: A fuzzy set qualitative comparative analysis. *Journal of Business Research*, 69(2016):5454-5460.
- Verplanken, B. & Faes, S. (1999) Good intentions, bad habits, and effects of forming implementation intentions on healthy eating. *European Journal of Social Psychology*, 29(5-6)591-604.
- Wang, Y.S., Wang, Y.M., Lin, H.H., and Tang, T.I. (2010). Determinants of user acceptance of internet banking: An empirical study. *International Journal of Service Industry Management*, 14(5):501-519.

Wilson, S. & MacLean, R. 2011. *Research methods and data analysis for psychology*. London: McGraw-Hill

Williams, K.C. and Page, R.A. (2012). Marketing to generations. *Journal of Behavioural Studies and Studies in Business*, 1(2):1-17.

World Economic Forum (2016). Reports. [Available]:<https://www.weforum.org/reports?page=3>. Accessed March 2017.

World Wide Worx. (2011). Mobility 2011: the mobile consumer in South Africa 2011. [Available]:<http://www.worldwideworx.com/wp-content/uploads/2011/02/Exec-Summary-The-Mobile-Consumer-in-SA-2011.doc> Accessed February 2017.

Wu, J.H. & Wang, S.C. (2005). What drives mobile commerce? An empirical evaluation of the revised Technology Acceptance Model. *Information & Management*, 42(5):719:729.

Wu, M., Chou, H., Weng, Y., & Huang, Y. (2011). TAM2-based Study of Website User Behaviour—Using Web 2.0 Websites as an example. *Business and economics*, 8(4):133-151.

Yadav, A. (2016). Factors influencing the usage of mobile banking among customers. *The IUP Journal of Bank Management*, 5(4):1-13.

Yang, A., S. (2009). Exploring adoption difficulties in mobile banking services. *Canada Journal of Administrative Sciences*, 26(2):136-149.

Yahiya, S. (2011). Prospects and challenges of electronic banking in Ghana- a case study of SGSSB bank limited. Unpublishes Thesis. [Available]: <http://ir.knust.edu.gh/bitstream/123456789/4421/1/SUMANI%20YAHIYA%20THESIS%202011.pdf> Accessed October 2017.

Ye, C. and Potter, R. (2011). The Role of Habit in Post-Adoption Switching of Personal Information Technologies: An Empirical Investigation. *Communications of the Association for Information Systems*, (28):585-610.

Yu, CS. (2012). Factors Affecting Individuals to Adopt Mobile Banking: Empirical Evidence from the UTAUT Model. *Journal of Electronic Commerce Research*, 13(2):104-121.

Zhang, L., Zhu, J., & Liu, Q. (2012). A meta- analysis of mobile commerce adoption and the moderating effect of culture. *Computers in Human Behaviour*, 28(5):1902-1911.

Zhou, T., Lu, Y. & Wang, B. (2010). Integrating TTF and UTAUT to explain mobile banking user adoption. *Computers in Human Behaviour*, 26(4):760-767.

Zhou, T. (2012). Understanding users initial trust in mobile banking: An elaboration like hood perspective. *Computers in Human Behaviour*, 28(4):1518-1525.

Zikmund, W.G., Babin, B.J., Carr, J.C. & Griffin, M. (2010). *Business research methods*. 8th ed. United States of America: South-Western Cengage Learning.

Zikmund, W.G. & Babin, B. J. (2013). *Essentials of marketing research*. 5th ed. United States of America: South-Western Cengage.



APPENDIX A: Cross Loading Technique to Confirming Discriminant Validity

	Actual	Behavi	Effort e	Facilita	Habit	Hedoni	Perceiv	Perform	Price v	Social
AU3	0.759	0.205	0.211	0.208	0.075	0.057	-0.197	0.269	-0.022	0.262
AU4	0.827	0.323	0.339	0.374	0.158	0.184	-0.139	0.358	0.092	0.281
AU5	0.874	0.523	0.422	0.450	0.362	0.191	-0.249	0.506	0.381	0.359
BI1	0.442	0.921	0.613	0.624	0.464	0.379	-0.390	0.684	0.546	0.398
BI2	0.417	0.912	0.536	0.581	0.580	0.443	-0.273	0.664	0.525	0.529
BI3	0.445	0.949	0.625	0.691	0.562	0.464	-0.341	0.721	0.618	0.488
EE1	0.455	0.624	0.941	0.775	0.463	0.383	-0.347	0.773	0.583	0.539
EE2	0.354	0.596	0.949	0.690	0.445	0.352	-0.388	0.730	0.603	0.503
EE4	0.375	0.581	0.933	0.687	0.460	0.363	-0.311	0.671	0.565	0.584
FC1	0.352	0.613	0.702	0.899	0.489	0.321	-0.291	0.684	0.629	0.494
FC2	0.373	0.626	0.701	0.925	0.469	0.352	-0.333	0.655	0.610	0.463
FC3	0.449	0.613	0.692	0.887	0.382	0.298	-0.363	0.599	0.501	0.479
FC4	0.392	0.524	0.559	0.769	0.488	0.318	-0.232	0.507	0.489	0.696
HM1	0.168	0.432	0.373	0.340	0.581	0.951	0.034	0.461	0.438	0.388
HM2	0.215	0.473	0.386	0.378	0.531	0.950	0.095	0.528	0.479	0.378
HM3	0.161	0.408	0.347	0.330	0.588	0.947	0.061	0.492	0.502	0.358
HT1	0.241	0.585	0.576	0.551	0.848	0.522	-0.207	0.591	0.636	0.464
HT2	0.108	0.318	0.234	0.290	0.814	0.505	0.045	0.330	0.369	0.463
HT3	0.320	0.500	0.346	0.426	0.895	0.503	-0.068	0.470	0.552	0.528
PE1	0.397	0.681	0.701	0.612	0.465	0.473	-0.295	0.879	0.532	0.443
PE2	0.478	0.679	0.671	0.657	0.540	0.441	-0.271	0.929	0.591	0.509
PE4	0.432	0.654	0.701	0.621	0.525	0.485	-0.275	0.906	0.630	0.529
PE5	0.461	0.675	0.716	0.650	0.530	0.485	-0.273	0.900	0.568	0.494
PR1	-0.266	-0.349	-0.358	-0.350	-0.112	0.058	0.933	-0.305	-0.222	-0.155
PR2	-0.237	-0.337	-0.326	-0.310	-0.116	0.064	0.939	-0.274	-0.158	-0.147
PR3	-0.262	-0.345	-0.341	-0.348	-0.104	0.099	0.944	-0.303	-0.212	-0.119
PR4	-0.128	-0.306	-0.300	-0.264	-0.160	0.027	0.857	-0.264	-0.272	-0.070
PR5	-0.198	-0.324	-0.378	-0.339	-0.052	0.058	0.926	-0.269	-0.170	-0.120
PV1	0.144	0.511	0.533	0.555	0.535	0.465	-0.172	0.548	0.926	0.402
PV2	0.286	0.601	0.606	0.634	0.609	0.483	-0.216	0.635	0.961	0.466
PV3	0.245	0.603	0.611	0.616	0.652	0.462	-0.235	0.627	0.945	0.450
SI1	0.341	0.480	0.576	0.600	0.585	0.370	-0.129	0.520	0.456	0.955
SI2	0.323	0.457	0.544	0.543	0.540	0.370	-0.148	0.515	0.431	0.942
SI3	0.396	0.500	0.509	0.569	0.487	0.376	-0.108	0.510	0.434	0.932

APPENDIX B- QUESTIONNAIRE

Mobile Banking Apps Acceptance among Millennials in Gauteng, South Africa

Dear Sir/Madam,

You are invited to participate, by completing the attached questionnaire, in a study being conducted to determine the drivers and barriers to the acceptance and use of mobile banking apps among millennials in the Gauteng province of South Africa. The research is part of my studies towards a Master of Commerce (MCom) degree in Marketing at the University of Johannesburg.

Further details of the study are provided below:

Research title	Mobile Banking Apps Acceptance among Millennials in Gauteng, South Africa	
Researcher	Philile Thusi, University of Johannesburg, College of Business and Economics, School of Consumer Intelligence and Information Systems, Department of Marketing Management	
Purpose	The objective of this study is to ascertain the drivers and barriers to mobile banking apps acceptance among South African millennials residing in the Gauteng province	
Procedure	For this study, you will be required to participate in a survey by completing a paper-based questionnaire which will take about <i>15 minutes</i> to finish	
Risk of participation	There are no known risk associated with this research project	
Benefits	Your participation will contribute to findings that will add to the academic body of knowledge through the compilation of a dissertation, journal articles and conference papers published in conference proceedings.	
Confidentiality	Your response will remain anonymous and confidential, and will not be linked to any identifiable information. Please do not provide your name or personal details on any part of the questionnaire.	
Participation right	Your participation in this study is completely voluntary. You have the right to withdraw from this research study at any time without any reprisal and or penalty	
Contacts	Should you have any questions or concerns regarding completing this questionnaire, you may contact the following me or my supervisor on the following details:	
	Name of student: Philile Thusi Phone No:0762054150	Supervisor: Dr DK Maduku Phone No: 011 559 2010

	Email address: philile.thusi@gmail.com	Email address: dkmaduku@uj.ac.za
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Screening Question

SQ1: Do you have a bank account with any one of the following banks?

	Yes	No
ABSA		
Capitec		
FNB		
Nedbank		
Standard bank		

If you **do not** have an account with any one of the banks stated above, you do not have to complete the rest of the questionnaire

SQ2: Do you have a mobile device (i.e smartphone, tablet or PDA) that can enable you download a mobile banking app?

Yes	No
-----	----

If you answered **No**, to SQ2, you do not have to complete the rest of the questionnaire.

SECTION A: PERCEPTION TOWARDS MOBILE BANKING APP USE

The following statements measure your perception towards the use on mobile banking apps. Please indicate the extent to which you agree or disagree with each of the following statements by putting a cross (x) on the numbers to right of each statement. Please note that

1= strongly disagree; 2= disagree; 3=somewhat disagree; 4=neutral; 5=somewhat agree; 6=agree; 7= strongly agree

Statements		Strongly disagree					Strongly agree	
PE1	"I find mobile banking app useful in my daily banking transactions"	1	2	3	4	5	6	7
PE2	"Using mobile banking apps increases my chances of achieving things that are important to me"	1	2	3	4	5	6	7
PE3	"Using mobile banking apps helps me accomplish things more quickly"	1	2	3	4	5	6	7
PE4	"Using mobile banking apps increases my productivity"	1	2	3	4	5	6	7
PE5	"I find mobile banking app useful in my daily life"	1	2	3	4	5	6	7
EE1	"Learning how to use mobile banking apps is easy for me"	1	2	3	4	5	6	7
EE2	"My interaction with mobile banking apps is clear and understandable"	1	2	3	4	5	6	7
EE3	"I find mobile banking apps easy to use"	1	2	3	4	5	6	7
EE4	"It is easy for me to become skilful at using mobile banking apps"	1	2	3	4	5	6	7
SI1	"People who are important to me think that I should use mobile banking apps"	1	2	3	4	5	6	7
SI2	"People who influence my behaviour think that I should use mobile banking apps"	1	2	3	4	5	6	7
SI3	"People whose opinion that I value prefer that I use mobile banking apps"	1	2	3	4	5	6	7
HM1	"Using mobile banking apps is fun"	1	2	3	4	5	6	7
HM2	"Using mobile banking apps is enjoyable"	1	2	3	4	5	6	7
HM3	"Using mobile banking apps is very entertaining"	1	2	3	4	5	6	7
PV1	"Banking transactions conducted on mobile banking apps are reasonably priced"	1	2	3	4	5	6	7
PV2	"Mobile banking app is good value for the money"	1	2	3	4	5	6	7
PV3	"At the current price, mobile banking apps provides a good value"	1	2	3	4	5	6	7
HT1	"The use of mobile banking apps has become a habit for me"	1	2	3	4	5	6	7

HT2	"I am addicted to using mobile banking apps"	1	2	3	4	5	6	7
HT3	"I must use mobile banking apps"	1	2	3	4	5	6	7
FC1	"I have the resources necessary to use mobile banking apps"	1	2	3	4	5	6	7
FC2	"I have the knowledge necessary to use mobile internet"	1	2	3	4	5	6	7
FC3	"Mobile banking apps are compatible with other technologies I use"	1	2	3	4	5	6	7
FC4	"I can get help from others when I have difficulties using mobile banking apps"	1	2	3	4	5	6	7
BI1	"I intend to continue using mobile banking apps in the future"	1	2	3	4	5	6	7
BI2	"I always try to use mobile banking apps in my daily life"	1	2	3	4	5	6	7
BI3	"I plan to continue to use mobile banking apps frequently"	1	2	3	4	5	6	7

SECTION B: MOBILE BANKING APP RISK PERCEPTION

The following statements measure your **risk** perception towards the use on mobile banking apps. Please indicate the extent to which you agree or disagree with each of the following statements by putting a cross (x) on the numbers to right of each statement. Please note that:

1= strongly disagree; 2= disagree; 3=somewhat disagree; 4=neutral; 5=somewhat agree; 6=agree; 7= strongly agree

		Strongly disagree Strongly agree						
		1	2	3	4	5	6	7
PR1	"Others may know information about my online transactions if I use this app "	1	2	3	4	5	6	7
PR2	"There is a significant risk when making my queries and/or my banking transactions through the mobile app"	1	2	3	4	5	6	7
PR3	"I believe that making queries and/or banking transactions with this app is a risky choice"	1	2	3	4	5	6	7
PR4	"Conducting banking transactions on mobile phones is risky because one can easily lose or misplace the mobile phone"	1	2	3	4	5	6	7
PR5	"Others may know information about my online transactions if I use this app"	1	2	3	4	5	6	7

SECTION C: MOBILE BANK APP USE AND BACKGROUND INFORMATION

Please answer the following questions by placing a cross (x) on the section that is most relevant you.

C1: Do you have a mobile banking app installed on your mobile device? Yes No

C2: Approximately, for how long have you been using mobile banking apps?

..... Year(s)..... Months

C3: Please indicate the extent to which you use mobile banking apps to perform the following banking transactions

Statement	Never	Rarely	Occasionally	sometimes	often
AU1 "Pay a beneficiary"	1	2	3	4	4
AU2 "Block a stolen/lost card"	1	2	3	4	4
AU2 "Pay accounts (cell phone account, clothing account etc.)"	1	2	3	4	4
AU3 "Inter account transfer"	1	2	3	4	4
AU4 "Check account balances"	1	2	3	4	4
AU5 "Pay for products ordered online"	1	2	3	4	4

AU6	"Obtain a bank statement"	1	2	3	4	4
AU7	"Buy prepaid airtime or data bundle"	1	2	3	4	4

C4: On the average, how frequently do you use **mobile banking apps** on your mobile device?

1	Never	2	Daily	3	Once a week	4	A few times a week	5	Once a month	6	A few times a month
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C5. In general, **how much time** do you spend at given time using mobile banking apps?

1	0 –15 minutes	2	16 – 30 minutes	3	31 - 60 minutes	4	Over 60 minutes
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C6. On average, **how many different mobile banking apps** have you installed on your mobile device(s)?

1	None	2	1 - 3	3	4 - 5	4	Over 5
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C7: How often have you personally been victim of what you felt was a fraudulent activity on your bank account?

1	Never	2	Rarely	3	sometimes	4	Often	5	Always
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C8: How much have you heard or read during the last year about the fraudulent activities on consumers' bank account?

1	Never	2	Rarely	3	sometimes	4	Often	5	Always
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C9: How often have you experienced incidents where your banking details was a person or organisation without your authorization?

1	Never	2	Rarely	3	sometimes	4	Often	5	Always
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C10: Please indicate the extent to which you the follow statements apply to your use of apps on your mobile device generally.

	1 Not at all	2 Somewhat	3 Moderately	4 Very much
"Apps are part of my everyday activity"	1	2	3	4
"I am proud to tell people that I am using apps"	1	2	3	4
"I feel I am part of the community of people using apps"	1	2	3	4
"The use of apps has become part of my daily routine"	1	2	3	4
"I feel out of touch when I haven't logged onto apps on my mobile device for a while"	1	2	3	4
"I know a lot about how to use mobile banking apps to do transactions"	1	2	3	4
"I am experienced in doing banking transactions with mobile banking apps"	1	2	3	4
"I am an expert user of mobile banking apps to do my transactions"	1	2	3	4
"I am well informed about conducting transactions using mobile banking apps"	1	2	3	4

C11. Gender: Male Female

C12. Age: 18 – 24 25 – 30 31 – 35

C13. Average monthly income (in rand): 0 – 5,000 5,001 – 10,000 10,001 – 15,000

15,001 – 20,000 20,001 – 25,000 Over 25,000
C15. How do you classify yourself? African Coloured Indian/Asian White

