

**CONSUMERS' ADOPTION AND CONTINUANCE INTENTION TO
USE MOBILE PAYMENT SERVICES**

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ABSTRACT

The African continent continues to register an increase in the uptake of smartphones and other personal digital assistants, all of which are capable of making mobile payments. Consequently, mobile payment service providers continue to hold optimistic views about the future of mobile payments. Despite the proliferation of smartphone adoption in African countries, little is known about the factors that influence the adoption and continued use of the novel technology such as mobile payment services, particularly in developing countries such as South Africa. Although there are growing research streams in this regard, there have been conflicting reports, inconsistencies and contradictions in previous research findings that need to be explained.

In particular, there is growing research examining factors that predict the adoption and continuance intention to use new technologies such as mobile payment services. These studies are predominantly Western-based. Not much research has been extended to the African continent to determine how generalisable the results are to a wider context. Due to cultural, social and economic differences, Western theories may not be equally applicable in developing countries. This calls for more research to validate and continuously update and streamline Western theories in developing countries.

The primary purpose of this study is to determine the predictors of the adoption and continuance intention to use mobile payment services. The study uses a three-step approach. First, the study tests the ability of the modified technology readiness index (TRI) to predict adoption, and also tests the moderating effect of gender on the predictors of the adoption of mobile payment services. Second, the study tests the applicability and ability of the extended expectation-confirmation model, in the context of information technology (E-ECM-IT), to predict continuance intention to use mobile payment services. The moderating effect of gender on the predictors of continuance intention is also examined. After the validation of the two models, a synthesised model of the TRI and the E-ECM-IT is proposed to predict both adoption and continuance intention in a single study – a novel perspective not covered in depth thus far in existing research.

Data were collected from a convenience sample by using an online South African consumer panel of an international research firm that was contracted to collect data for analysis. A total of 416 respondents were sampled, comprising consumers aged 18 years and older who owned a credit card and who had downloaded a mobile payment application ('app') at the time of the survey. The sampling units were taken from all nine provinces of South Africa. A self-administered online questionnaire with seven-point Likert scales was used to obtain information pertaining to their adoption and continuance intention to use mobile payment services. First, the study used multiple regression analysis to test the hypotheses set to measure adoption of mobile payment services, grounded in the modified TRI, and to examine the moderating effect of gender on the predictors. Second, a partial least squares-structural equation modelling (PLS-SEM) approach was employed to predict continuance intention, in which the moderating effect of gender was also examined. Third, a structural equation modelling (SEM) was employed to validate the proposed integrated model, measuring both adoption and continuance intention.

This study found the main adoption drivers to be convenience and compatibility. The key barriers to adoption include insecurity, perceived cost, and perceived risk. Contrary to previous reports, this study found that optimism, innovativeness and discomfort are not significant predictors of the adoption of mobile payment services. The results of the regression analysis show that the drivers of mobile payment services are more important to consumers than inhibitors in influencing adoption. It is therefore recommended that service providers focus more on the convenience and compatibility of mobile payments to enhance adoption levels. Of the eight predictors tested in this study, the results reveal that gender only moderates the effect of convenience on the adoption of mobile payment services.

With regard to continuance intention, the majority of the hypothesised paths were confirmed except one: the relationship between perceived ease of use and continuance intention. Although not expected in this study, this result corroborates findings of other previous studies in the literature that suggest that the impact of ease of use on continuance intention to use any new technology is lessened as users gain more experience in using that technology. The results suggest that the expectation confirmation model in the context of information technology (ECM-IT) could be an alternative model to the E-ECM-IT to predict continuance. This is because the ECM-IT does not include perceived ease of use as a post-adoption antecedent to predict

continuance intention. Thus, the results underscore the importance of re-testing and validating Western models in the African context. Satisfaction remains the most significant predictor of continuance intention. Therefore, service providers must focus more on customer satisfaction by avoiding transaction and billing errors or security breaches, among other factors, to enhance continued use. The moderating effect of gender on predictors of continuance intention was also examined, and results show that gender does not play a significant moderating role.

Adoption is the vital first step to facilitate continuous use; and subsequently a combined model of the modified TRI and the E-ECM-IT was proposed and empirically tested to measure adoption and continuance intention to use mobile payment services. The model explained 78.5% of the variance in continuance intention to use mobile payment services. Thus the results provide empirical evidence that the proposed model is generic enough to apply to various new technology adoption and continuance intention studies such as mobile payment services, and that it lays the foundation upon which other models can be integrated.

This study contributes to building and extending the existing adoption and continuance intention literature. First, by including additional constructs relevant to the adoption of new technologies – namely, convenience, compatibility, perceived cost and perceived risk – that were added to the original TRI, our study expands the existing knowledge. Second, the study draws attention to the need to continuously validate consumer behaviour models and theories originally developed in developed countries in other cultural contexts, in tandem with ever-changing technological developments such as those experienced in mobile technology. Such validations are particularly important in South Africa, where huge socio-cultural-economic disparities exist. Third, this study is the first to empirically test an integrated modified TRI and the E-ECM-IT to supplement the paucity of research on the topic in the context of an emerging economy. The results show that the integrated model may provide an ameliorated way to understand the factors that influence adoption and how they impact on the continuance intention to use mobile payment apps. Recommendations concerning how service providers can increase adoption and foster continued use are proposed in the study. For example, the voice of the consumer can be captured during the design of the mobile payment app to create apps that consumers are likely actually to use. Collaboration between service providers could also help to develop and provide robust mobile payment applications that are compatible with consumers' life

style and purchase behaviour. However, the limitations of this study include the use of a cross-sectional design. Future research can address the shortcomings resulting from our cross-sectional study by conducting longitudinal studies that capture changing consumer needs over time.

ACRONYMS

| | |
|------------------|---|
| AJEMS | <i>African Journal of Economic and Management Studies</i> |
| AVE | Average variance extracted |
| CFA | Confirmatory factor analysis |
| CR | Composite reliability |
| DOI | Diffusion of innovation |
| ECM | Expectation confirmation model |
| ECM-IT | Expectation confirmation model in the context of information technology |
| E-ECM-IT | Extended expectation confirmation model in the context of information technology |
| GSMA | Groupe Spéciale Mobile Association |
| IFI | Incremental fit index |
| IJEM | <i>International Journal of Emerging Markets</i> |
| ISS | Information system success |
| IT | Information technology |
| ITU | International Telecommunication Union |
| JAB | <i>Journal of African Business</i> |
| mPOS | Mobile point of sale |
| MRA | Multiple regression analysis |
| NFC | Near field communication |
| NFI | Normed fit index |
| P2P | Person to person |
| PLS | Partial least squares |
| QR | Quick response |
| RFID | Radio frequency identification |
| RMSEA | Root mean square error of approximation |
| SEM | Structural equation modelling |
| SPSS | Statistical program for social sciences |
| TAM | Technology acceptance model |
| TLI | Tucker-Lewis index |
| TPB | Theory of planned behaviour |
| TREECM-IT | Technology readiness extended expectation confirmation model in the context of information technology |

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|--------------|--|
| TRI | Technology readiness index |
| UTAUT | Unified theory of acceptance and use of information technology |

Table of Contents

| | |
|---|-----|
| ACKNOWLEDGEMENTS | ii |
| ABSTRACT | iii |
| ACRONYMS | vii |
| LIST OF FIGURES | xv |
| LIST OF TABLES | xvi |
| CHAPTER 1: CONTEXTUALISATION OF THE STUDY | 1 |
| 1.1 INTRODUCTION | 1 |
| 1.2 PROBLEM STATEMENT..... | 3 |
| 1.3 OBJECTIVES OF THE STUDY | 6 |
| 1.3.1 Primary objective | 6 |
| 1.3.2 Secondary objectives..... | 6 |
| 1.4 BACKGROUND ON MOBILE PAYMENTS..... | 6 |
| 14.1 Mobile payments | 6 |
| 1.5 DEVELOPMENT OF THE THEORETICAL MODEL | 10 |
| 1.5.1 Adoption theories..... | 10 |
| 1.6 CONTINUANCE INTENTION THEORIES..... | 17 |
| 1.6.1 The information system success (ISS) model | 20 |
| 1.6.2 The expectation-confirmation model (ECM) | 20 |
| 1.6.3 The expectation-confirmation in the context of IT (ECM-IT) | 21 |
| 1.6.4 The extended ECM-IT (EECM-IT) | 22 |
| 1.7 PROPOSED MODEL: TECHNOLOGY READINESS EXTENDED EXPECTATION- CONFIRMATION MODEL IN THE CONTEXT OF IT (TREECM-IT) | 24 |
| 1.8 THEORETICAL CONTEXT..... | 27 |
| 1.8.1 Drivers of technology readiness..... | 27 |

| | | |
|---------|--|----|
| 1.8.1.1 | Optimism | 27 |
| 1.8.1.2 | Innovativeness | 27 |
| 1.8.1.3 | Convenience | 28 |
| 1.8.1.4 | Compatibility..... | 29 |
| 1.8.2 | Inhibitors of technology readiness | 29 |
| 1.8.2.1 | Discomfort | 29 |
| 1.8.2.2 | Insecurity | 30 |
| 1.8.2.3 | Perceived cost..... | 30 |
| 1.8.2.4 | Perceived risk..... | 31 |
| 1.8.3 | Adoption vis-à-vis confirmation..... | 31 |
| 1.8.4 | Predictors of continuance intention..... | 32 |
| 1.8.4.1 | Perceived usefulness | 32 |
| 1.8.4.2 | Perceived ease of use..... | 33 |
| 1.8.4.3 | Satisfaction..... | 33 |
| 1.8.4.4 | Continuance intention..... | 33 |
| 1.9 | RESEARCH METHODOLOGY | 34 |
| 1.9.1 | Research design | 34 |
| 1.9.2 | Sampling plan | 35 |
| 1.9.3 | Scale development | 37 |
| 1.9.4 | Pre-testing..... | 38 |
| 1.9.5 | Data collection | 39 |
| 1.9.6 | Data analysis | 40 |
| 1.10 | CONTRIBUTION OF THE STUDY | 44 |
| 1.10.1 | Theoretical contributions..... | 44 |

| | |
|---|-----------|
| 1.10.2 Practical contributions | 46 |
| 1.11 OUTLINE OF THE STUDY | 46 |
| 1.11.1 Chapter 1: Background of the study..... | 46 |
| 1.11.2 Chapter 2: Article 1. Determinants of consumer readiness to adopt mobile payment services | 47 |
| 1.11.3 Chapter 3: Article 2. Predicting continuance intention to use mobile payment services: A partial least squares modelling approach | 48 |
| 1.11.4 Chapter 4: Article 3. An integrated framework for adoption and continuance intentions to use mobile payment services..... | 49 |
| 1.11.5 Chapter 5: Conclusion and recommendations..... | 51 |
| LIST OF REFERENCES | 52 |
| CHAPTER 2: ARTICLE 1 | 63 |
| DETERMINANTS OF CONSUMERS' READINESS TO ADOPT MOBILE PAYMENT SERVICES | 63 |
| ABSTRACT | 64 |
| 1 INTRODUCTION | 64 |
| 2 BACKGROUND | 68 |
| 2.1 Mobile payments..... | 68 |
| 3 DEVELOPMENT OF THE THEORETICAL MODEL | 70 |
| 3.1 Theoretical background | 70 |
| 3.2 Conceptual framework and hypotheses | 72 |
| 3.3 Optimism..... | 73 |
| 3.4 Innovativeness | 74 |
| 3.5 Convenience | 75 |
| 3.6 Compatibility | 75 |
| 3.7 Insecurity..... | 76 |
| 3.8 Discomfort..... | 77 |

| | | |
|-------|--|------------|
| 3.9 | Perceived cost | 77 |
| 3.10 | Perceived risk | 78 |
| 3.11 | The moderating effects of gender..... | 78 |
| 4 | METHODOLOGY..... | 79 |
| 4.1 | Sampling and data collection | 79 |
| 4.2 | Sample profile | 80 |
| 4.3 | Instrument design and measurements | 81 |
| 5 | DATA ANALYSIS AND RESULTS | 82 |
| 5.1 | First and second order factors | 82 |
| 5.1 | Scale reliability and validity..... | 83 |
| 5.1.1 | Convergent validity | 83 |
| 5.1.2 | Discriminant validity | 84 |
| 5.1.3 | Multiple-regression analysis and hypotheses testing | 86 |
| 5.1.4 | Moderating effects of gender | 87 |
| 6 | DISCUSSION AND IMPLICATIONS..... | 89 |
| 7 | LIMITATIONS AND FUTURE RESEARCH..... | 92 |
| 8 | CONCLUSIONS..... | 93 |
| | LIST OF REFERENCES | 94 |
| | CHAPTER 3: ARTICLE 2 | 101 |
| | PREDICTING THE CONTINUANCE INTENTION TO USE MOBILE PAYMENT SERVICES: A PARTIAL LEAST SQUARE (PLS) PATH MODELLING APPROACH | 101 |
| | ABSTRACT | 102 |
| 1 | INTRODUCTION | 103 |
| 2 | THEORETICAL FRAMEWORK AND THE DEVELOPMENT OF HYPOTHESES | 106 |
| 2.1 | Mobile payments in context | 106 |
| 2.2 | The Extended ECM-IT (E-ECM-IT)..... | 108 |
| 2.2.1 | The effect of confirmation on satisfaction, perceived usefulness and perceived ease of use..... | 110 |

| | | |
|-------|---|------------|
| 2.2.2 | The effect of perceived ease of use on perceived usefulness | 111 |
| 2.2.3 | The effect of perceived ease of use on satisfaction and continuance intentions | 112 |
| 2.2.4 | The effect of perceived usefulness on satisfaction and continuance intention | 113 |
| 2.2.5 | The effect of satisfaction on continuance intention | 113 |
| 3 | THE RESEARCH METHOD AND DATA ANALYSIS | 114 |
| 4 | THE RESULTS..... | 116 |
| 4.1 | Evaluation of the outer measurement model | 116 |
| 4.2 | The Structural model (Inner model) | 118 |
| 5 | DISCUSSION..... | 121 |
| 6 | IMPLICATIONS OF THE STUDY | 123 |
| 6.1 | Theoretical contributions..... | 123 |
| 6.2 | Managerial implications | 124 |
| 7 | LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH..... | 126 |
| | LIST OF REFERENCES | 128 |
| | CHAPTER 4: ARTICLE 3 | 135 |
| | AN INTEGRATED FRAMEWORK FOR ADOPTION AND CONTINUANCE INTENTIONS TO USE MOBILE PAYMENT SERVICES..... | 135 |
| 1 | INTRODUCTION | 137 |
| 2 | LITERATURE REVIEW | 141 |
| 2.1 | Conceptualisation of mobile payments | 141 |
| 3 | DEVELOPMENT OF A THEORETICAL FRAMEWORK AND HYPOTHESES FOR EXAMINING THE ADOPTION AND CONTINUED USE OF MOBILE TECHNOLOGY..... | 143 |
| 3.1 | Technology readiness to adopt mobile payment apps | 145 |
| 3.2 | Drivers of the technology readiness..... | 146 |
| 3.3 | Inhibitors of technology readiness | 147 |
| 3.4 | Adoption vis-a-vis confirmation | 148 |
| 3.5 | Continuance intention to use mobile payment apps | 150 |
| 4 | METHODOLOGY..... | 152 |
| 4.1 | Sampling and data collection | 152 |

| | | |
|-------|---|------------|
| 5 | THE RESULTS..... | 153 |
| 5.1 | Descriptive statistics | 153 |
| 5.2 | Measurement model | 154 |
| 5.3 | Reliability and validity..... | 154 |
| 5.3.1 | Convergent validity | 154 |
| 5.3.2 | Discriminant validity | 156 |
| 5.4 | Structural model..... | 158 |
| 5.5 | Hypothesis testing..... | 159 |
| 6 | DISCUSSION..... | 161 |
| 7 | IMPLICATIONS OF THE STUDY | 164 |
| 7.1 | Theoretical implications | 164 |
| 7.2 | Managerial implications | 166 |
| 8 | LIMITATIONS AND FUTURE RESEARCH..... | 167 |
| | LIST OF REFERENCES | 169 |
| | CHAPTER 5: CONCLUSION AND RECOMMENDATIONS..... | 178 |
| 5.1 | INTRODUCTION | 178 |
| 5.2 | PROBLEM STATEMENT, OBJECTIVES AND HYPOTHESES..... | 179 |
| 5.3 | MAIN FINDINGS RELATING TO THE SAMPLE PROFILE AND USE BEHAVIOUR..... | 180 |
| 5.4 | CHAPTER 2: ARTICLE 1: SUMMARY AND MAIN FINDINGS | 183 |
| 5.5 | CHAPTER 3 ARTICLE 2: SUMMARY AND MAIN FINDINGS | 184 |
| 5.6 | CHAPTER 4 ARTICLE 3: SUMMARY AND MAIN FINDINGS | 186 |
| 5.7 | CONTRIBUTIONS OF THE STUDY..... | 189 |
| 5.7.1 | Theoretical contributions..... | 189 |
| 5.7.2 | Practical contributions..... | 191 |
| 5.8 | RECOMMENDATIONS..... | 192 |
| 5.9 | LIMITATIONS OF THE STUDY | 194 |
| 5.10 | DIRECTIONS FOR FUTURE RESEARCH | 195 |
| 5.11 | CONCLUSION | 196 |

| | |
|--|------------|
| LIST OF REFERENCES | 198 |
| APPENDIX A: RESEARCH CONSTRUCTS AND MEASURES | 201 |
| APPENDIX B: QUESTIONNAIRE | 203 |
| APPENDIX C (i): EDITORIAL POLICY AND GUIDELINES FOR AUTHORS OF THE JOURNAL OF AFRICAN BUSINESS | 209 |
| APPENDIX C (ii): ARTICLE ACCEPTANCE LETTER (JAB) | 212 |
| APPENDIX D: EDITORIAL POLICY AND GUIDELINES FOR AUTHORS OF THE AFRICAN JOURNAL OF ECONOMIC AND MANAGEMENT STUDIES | 213 |
| APPENDIX E: EDITORIAL POLICY AND GUIDELINES FOR AUTHORS OF THE INTERNATIONAL JOURNAL OF EMERGING MARKETS | 217 |
| APPENDIX F: PLS-SEM RESULTS OF THE MODERATING EFFECT OF GENDER | 222 |

LIST OF FIGURES

CHAPTER 1

| | |
|--|----|
| Figure 1: Expectation-confirmation theory (ECM)..... | 21 |
| Figure 2: Expectation-confirmation theory in the context of IT (ECM-IT)..... | 22 |
| Figure 3: The extended expectation-confirmation theory in the context of IT (E-ECM-IT)..... | 23 |
| Figure 4: Technology readiness extended expectation-confirmation theory in the context of IT (TREECM-IT) | 27 |
| Figure 5: Technology readiness index TRI) | 48 |
| Figure 6: The proposed extended expectation-confirmation theory in the context of IT | 49 |
| Figure 7: Technology readiness extended expectation-confirmation theory in the context of IT (TREECM)..... | 50 |

CHAPTER 2

| | |
|---|----|
| Figure 1: Technology readiness framework..... | 71 |
|---|----|

CHAPTER 3

| | |
|--|-----|
| Figure 1: The proposed extended expectation-confirmation model in the context of IT..... | 109 |
| Figure 2: PLS-SEM results..... | 119 |

CHAPTER 4

| | |
|---|-----|
| Figure 1: Technology readiness extended expectation-confirmation theory in the context of IT (TREECM-T) | 145 |
| Figure 2: Path diagram and relationships between constructs | 160 |

CHAPTER 5

| | |
|--|-----|
| Figure 1: PLS-SEM results..... | 186 |
| Figure 2: Path diagram between constructs..... | 188 |

LIST OF TABLES

CHAPTER 1

| | |
|---|----|
| Table 1: Classification of mobile payment services by industry in South Africa..... | 9 |
| Table 2: A summary of theories previously used to predict adoption of new technology..... | 12 |
| Table 3: Summary of previously used continuance intention theories..... | 18 |
| Table 4: Reliability of the scales reported in previous studies..... | 37 |
| Table 5: CFA fit indices..... | 43 |

CHAPTER 2

| | |
|---|----|
| Table 1: Sample and population characteristics..... | 80 |
| Table 2: Results of the measurement model..... | 83 |
| Table 3: Discriminant validity of the factors..... | 85 |
| Table 4: CFA fit statistics..... | 85 |
| Table 5: Drivers and inhibitors of mobile payment adoption..... | 86 |
| Table 6: The results of the hypotheses testing..... | 87 |
| Table 7: The effects of predictor and moderator variables..... | 88 |
| Table 8: The significance of the moderating effect..... | 88 |

CHAPTER 3

| | |
|---|-----|
| Table 1: Results of construct validity..... | 117 |
| Table 2: Discriminant validity..... | 117 |
| Table 3: Results of hypotheses testing..... | 119 |

CHAPTER 4

| | |
|---|-----|
| Table 1: Factor loadings, CR, Cronbach's Alpha and AVE alues..... | 155 |
|---|-----|

Table 2: Results of the discriminant validity..... 156

Table 3: Procedures estimating discriminant validity... .. 157

Table 4: Structural model fit statistics... .. 159

Table 5: Results of the hypotheses testing... .. 159

CHAPTER 5

Table 1: Summary of descriptive statistics..... 180

Table 2: Results of the adoption hypotheses testing... .. 184

Table 3: Results of the continuance intention hypotheses testing... .. 185

Table 4: Results of the adoption and continuance intention hypotheses testing..... 187

CHAPTER 1: CONTEXTUALISATION OF THE STUDY

1.1 INTRODUCTION

The rapid adoption of mobile phones and their role in the development of personal and professional activities has been one of the most important technological events in recent decades (Liebana-Cabanillas, de Luna & Montoro-Rios, 2015:1). At the end of 2011 there were six billion mobile subscriptions worldwide, of which about 400 million were estimated at the time to be in Africa (ITU, 2011).

In light of this development, merchants, financial institutions and telecommunications operators are focusing their efforts on increasing the number of mobile enabled services available to mobile phone users. These advances in mobile technology are having a profound impact on people's daily lives, and are beginning to offer interesting advantageous new services (Kim, Mirusmonov & Lee, 2010:310). One area that is experiencing exponential growth is the mobile payment service (Liebana-Cabanillas *et al.*, 2015:1), which enables users to pay for goods and services using their mobile phones wherever they go (Kim *et al.*, 2010:310). Mobile payment services are now available in 61% of the world's developing countries, and about 53% of active global mobile payment services are in Sub-Saharan Africa (GSMA, 2014). Forecasts suggest that global mobile payment services will have 450 million users and \$721 billion in transaction value by 2017 (Slade, Williams & Dwivedi, 2014:312). Due to this expected growth, it is suggested that mobile payments will change lives and ways of conducting business, as consumers and mobile devices have become inseparable (Lee, Park, Chung & Blakeney, 2012:1590).

South Africa has not been left behind. The country has witnessed a plethora of mobile payment applications from 2010 when SnapScan and Vodacom M-Peas mobile payment systems were launched. As a result of this proliferation of innovative mobile payment applications in South Africa, it is expected that consumers will further change the way they use their mobile phones as they strive for safer and speedier payment solutions (Moodycliffe, 2014). Mobile payment is expected to become an important channel for conducting financial transactions because of the convenience and timeliness of such payments (Yang, Lu, Gupta, Cao & Zhang, 2012:129), thus delivering value to both consumers and mobile payment service providers (Slade *et*

al., 2014:311). However, as reported by Yang *et al.* (2012:129), the expected business value that could be derived from mobile payment services relies on their adoption and continued use by consumers. Although mobile payments are gradually gaining popularity, it is less clear what the drivers and inhibitors for users' adoption and continued use of this service are. Available reports indicate that the percentage of consumers who use mobile payments frequently is still low worldwide (Jia, Hall & Sun, 2014:1; Zhou, 2013:1086; Pham & Ho, 2015:2). Individuals cannot benefit from the implementation of mobile payment services if they do not use them, and companies cannot recover their investments in mobile payments if consumers do not adopt and use them constantly (Setterstrom, Pearson & Orwig, 2013:1140). Although the adoption of new technology is important, the literature indicates that the effects of the factors that influence customers' initial adoption decisions may not have the same effect on their continuance intentions (Wu, Jayawardhena & Hamilton, 2014:1008). Therefore, investigating the factors that influence consumers' initial adoption is an important first step; but the ultimate viability of any new technology is dependent on individuals' continued use (Thong, Hong & Tam, 2006:799). Analysing buyers' continued use of mobile payment services is also critical because more resources are needed to attract a new buyer than to retain an existing one (Eriksson & Nilsson, 2007:159). This is in line with the notion that, as buyers gain experience in using mobile payment services, their needs and wants change (Eriksson & Nilsson, 2007:159). In order to keep satisfying these needs, the mobile payment service providers must understand the changing needs and wants of consumers. Thus it is important to explore consumers' adoption and continuance intention to use mobile payment services as a basis for the development and implementation of strategies to acquire new customers and retain existing ones (Wu *et al.*, 2014:1006).

This study investigates factors that influence the adoption and continuance intention of consumers to use mobile payment services, in order to offer recommendations to increase adoption levels and foster continued use. Understanding mobile phone payment adoption and continuance intention can greatly benefit service providers such as the retail industry, the banking industry, and telecommunication operators in growing their businesses (Kim *et al.*, 2010:310).

The goal of this study is thus to contribute to the limited research available and to add to the existing theories by developing a model that is relevant to the consumer

decision-making process in the adoption and continuance intention to use mobile payment services that are offered by the various service providers in a developing country such as South Africa.

1.2 PROBLEM STATEMENT

The mobile penetration rate in South Africa reached 133% in 2014 (Fripp, 2014), and is currently pegged at 145% (Cape Digital Foundation, 2017), suggesting that many of South Africa's 51 million people (Statistics SA, 2016) own more than one active mobile phone. Over 1.4 million tablets were bought in South Africa between 2010 and 2013 (World Wide Worx, 2014), signifying that the high mobile penetration rates could also be attributed to tablet ownership. It is further estimated that over 20 million South Africans currently own smartphones (Vodacom, 2015), which are a great foundation for mobile payments (Qasim & Abu-Shanab, 2015:1). Despite these encouraging statistics, little attention has been given to understanding how to encourage and diffuse the new wave of mobile payment services among mobile payment enabled consumers.

Considering emerging economies, South Africa has the highest rate of smartphone (47%) and mobile (145%) penetration in Africa, followed by Kenya with 31% smartphone and 70% mobile penetration, and Nigeria with 29% and 72% respectively (GSMA, 2017). Based on these statistics, it can be said that South Africans are prolific users of mobile phones, making South Africa a prime market for mobile payment services. Considering this state of affairs, it is surprising to note that by the end of 2014, only 2.1 million South Africans were using Quick Response (QR) code-based mobile payment applications to perform transactions of various kinds (World Wide Worx, 2014). While service providers such as merchants, banks and mobile network operators are actively promoting mobile payment services, the intention to adopt and continue using mobile payment services is still low (Chong, Chan & Ooi, 2012:35). The key difficulty faced by the service providers is how to convert the potential mobile payment service into financial profit. Therefore uncovering the salient motivations that drive or inhibit consumers to adopt mobile payment services, how prior experience of mobile payment services influence users' continued intentions, and understanding the role played by gender in the adoption of mobile payment services are important objectives of the study.

The answers to these questions are important, because no two consumers are alike, and because service providers cannot recover their investments if consumers do not adopt and keep using mobile payment services (Jia *et al.*, 2012:1).

Although some South Africans are using mobile payment services, not much is known about the factors that influence the initial adoption and continued use. Previous studies have focused primarily on factors that influence the adoption of technologies at an international level (Chong *et al.*, 2012:34-43; Mallat, 2007:413-432; Pham & Ho, 2015:1-16), and there is almost no evidence to suggest that similar studies have been conducted locally. According to Cho (2016:76), it is rare to find a universal model that can equally apply to multiple contexts due to differences in social, economic and cultural factors. The selection of South Africa as the data collection site will further the understanding of adoption and continuance intention studies regarding new mobile technologies in developing countries. This is important because reports indicate that the application of a specific model should vary, depending on the context, so as to expand the theoretical scope of that model (Cho, 2016:76). Moreover, the existing literature indicates that adoption and continuance intention studies have been conducted separately, suggesting that the two constructs are distinct although complementary. A review of the existing literature indicates that limited scholarly attention is being paid to consumers' continued use of technologies compared with their adoption, including mobile payment services. In support of this assertion, Eriksson and Nilsson (2007:159) reported that consumer adoption and continuance intentions are influenced by different factors. A delineation of factors that influence adoption and continuance intention is therefore important, because consumers' attitudes and perceptions change after experiencing a service (Schuster, Proudfoot & Drennan, 2015:2). In today's business processes, infrequent, inappropriate, and ineffective long-term use of mobile payment services often contributes to corporate failure (Bhattacharjee, 2001:352). Until the continued use of mobile payments can be confirmed, it is premature to classify its adoption as a success (Thong *et al.*, 2006:799). Thus, apart from the adoption factors, it is equally important to research the salient factors that influence consumers' continued use of mobile payments, because continued use will bring higher profits and lower marketing costs (Jia *et al.*, 2014:1). These reports are corroborated by Hong, Thong and Tam (2006:1820), who reported

that increasing the customer retention rate by 5% could result in a decrease of operating costs by 18%, and contribute to increased profits by 25% to 95%.

Researchers agree that demographic differences should be taken into account when planning mobile marketing strategies (Mukherjee, 2012:3; Karjaluoto, Leppaniemi, Standing, Kajalo, Merisavo, Virtanen & Salmenkivi, 2006:5). The existing literature argues that socio-demographic factors are pivotal in IT adoption. Socio-demographic variables are described as factors that relate to, or involve, a combination of social and demographic characteristics, in which gender is a prominent factor related to the individual person (Niehaves & Plattfaut, 2014:712). Venkatesh, Morris, Davis and Davis (2003) employed the unified theory of acceptance and use of technology (UTAUT) model to determine the effect of gender in user acceptance of information technology. They reported that, while performance expectancy was the most significant determinant of intention to use an IT, the strength of the relationship varied with gender, and that it was more significant for male than for female workers. Moreover, they reported that effort expectancy on intention is also moderated by gender, and that it is more significant for women than for men. Based on these reports, this study seeks to determine the moderating effect of gender on the predictors of mobile payment adoption in the context of an emerging market such as South Africa. There seems to be consensus among researchers that demographic factors – particularly gender – influence the attitude and behaviour of consumers, and must be studied in different contexts. Yet few empirical studies report on the role played by gender on the adoption of mobile technology such as mobile payment services. Understanding the moderating effect of gender is important in market segmentation, understanding buyer behaviour, and the development of potential new product opportunities (Kimloglu, Nasir & Nasir, 2010:403).

Reports indicate that mobile payment applications have the potential to attract more consumers to use and enjoy the security and convenience of mobile payment systems that the comparatively smaller proportion of South Africa's population enjoys (Milosevic, 2014). Consumers will seek out those innovations that offer the best value for money, and about which they are educated (Pham & Ho, 2015:2). Hence, for the adoption and continued use of mobile payment services, it is necessary that service providers make consumers aware of the availability of mobile payment services and

explain how they add value. The high mobile penetration rates in South Africa do not tally with actual transactions and payments. Such a situation calls for more research to identify the factors that affect adoption and continuance usage (Zhou, 2013:1085). Therefore, the purpose of this study is to bridge the gap that has existed over the years, and to assist service providers to develop mobile payment services that are more likely to increase adoption and continued use.

1.3 OBJECTIVES OF THE STUDY

1.3.1 Primary objective

The primary objective of this study is:

To develop a model explaining the adoption and continued use of mobile payment services among mobile payment enabled consumers.

1.3.2 Secondary objectives

The following secondary objectives support the primary objective:

- To determine the factors (drivers and inhibitors) that influence the adoption of mobile payment services among mobile payment enabled consumers.
- To determine the factors that influence the continued use of mobile payment services among mobile payment enabled consumers.
- To determine the products or services that users of mobile payment apps prefer to purchase using their mobile phones.
- To determine the mobile payment apps that consumers often use to make mobile payments.
- To determine whether the adoption of mobile payment apps differs, based on gender, among mobile payment enabled consumers.
- To offer recommendations about the crafting of marketing strategies to promote the adoption and continued use of mobile payment services.

1.4 BACKGROUND ON MOBILE PAYMENTS

1.4.1 Mobile payments

Four key trends are evident across the online retail trading industry such as social functionality and crowdsourced information sources, greater access through lower

fees and barriers to entry, greater sophistication in functionalities and mobile apps (Shier, Canale & Pentland, 2016). The trend of mobile applications is of importance as this study focuses on a specific type of application, namely mobile payment. Advancements in electronic payments began as early as 1994 when the first online purchase was made (Rampton, 2016). Reports indicate that the first example of mobile payments arose in 1997, when The Coca-Cola Company introduced a limited number of vending machines from which the consumer could make mobile purchases. The consumer would send a text message to the vending machine to set up payment, and the machine would then dispense the product (Dahlberg, Guo & Ondrus, 2015:1). Mobile payment research started soon after the first mobile payment transaction took place in 1997 (Dahlberg et al., 2015:1). The PayPal online payment system was founded in 1998 and a year later, consumers began to use mobile phones to purchase movie tickets in many countries. By year 2003, the mobile phone users who made a purchase via their mobile phones rose to 95 million (Rampton, 2016). Other developments included the launch of the Bitcoin in 2008, the Google Wallet in 2011, the Apple Pay in 2014 and later the Android and Samsung Pay that were launched in 2015 (Rampton, 2016).

The prime actors in the mobile payment services market are mobile payment service providers and their customers (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008:166). According to these authors, the various parties assuming these roles in the market include consumers, merchants, financial institutions, and mobile network operators. Additional parties, such as vendors of handsets, software, networks, and other technologies, may also be involved.

Mobile payments have been subject to different conceptualisations (Dahlberg *et al.*, 2015:1). According to Liébana-Cabanillas, Sanchez-Fernandez and Munoz-Leiva (2014:464), a mobile payment can be defined as any type of individual or business activity involving an electronic device with connection to a mobile network, enabling the successful completion of an economic transaction. Mallat (2007:415) defines mobile payments as the use of a mobile device to conduct payment transactions in which money or funds are transferred from the payer to the receiver via an intermediary, or directly without an intermediary. Kim *et al.* (2010:310) describe mobile payment as any payment that uses a mobile device to initiate, authorise, and confirm

a commercial transaction. Despite these conceptualisations, the mobile phone is emphasised as the key characteristic that distinguishes mobile payments from other forms of payments (Schierz, Schilke & Wirtz, 2010:210). Furthermore, the above mobile payment definitions refer to some kind of monetary value transfer with three main entities: the mobile service provider (e.g., Standard Bank's Snapscan), the mobile payment vendor (e.g., the merchant), and the mobile technology in use (e.g., 3G network) (Qasim & Abu-Shanab, 2015:1). For the purpose of this study, we adopt a wider view of mobile payment services, in which we examine all payments for goods and services that are initiated, authorised and realised with a mobile phone. This definition is suitable for this study because it refers mainly to the completion of payments and transactions between service providers, consumers, and merchants in a fast, convenient, safe, and simple way, anytime and anywhere, using a mobile phone.

Mobile payment services have several characteristics that make them useful for payment services. First, mobile payments provide consumers with ubiquitous payment services, allowing them to make payments at anytime (Jia *et al.*, 2014:3). Second, compared with fixed-line computers and telephones, mobile phones are closer to the user, enabling personal information to be stored in them and facilitating their use as a payment instrument (Mallat, 2007:414). Third, existing telecommunications operator billing systems are already suitable for handling payment transactions of low value (Mallat, 2007:414), such as mobile data. Finally, the success of early mobile content services, such as purchasing ring tones, suggests that consumers are already accustomed to using their mobile phones to make payments (Dahlberg *et al.*, 2008:165).

Mobile payments can be categorised in various ways. Some researchers categorise mobile payments into payments for daily purchases and payments of accounts (Kim *et al.*, 2010:312; Dahlberg *et al.*, 2008:166). Mobile payments can also be categorised into six product areas: domestic person to person (P2P) transfer, international transfer, airtime top-up, account payment, bulk payment, and merchant payment (GSMA, 2015:32). According to Zhou (2013:1086), mobile payments can be categorised into remote payment and proximity payment options. Remote payments require users to connect to remote payment servers to make payments such as mobile banking and mobile internet payment services. Thus this type of mobile payment is similar to online

shopping scenarios, which cover payments that are conducted via a mobile web browser or a smartphone application (Qasim & Abu-Shanab, 2015:4). On the other hand, proximity payments require users to conduct payments via their mobile phones without connecting to a remote server, such as paying for bus fares, meals at restaurants, and other services (Zhou, 2013:1086). Proximity payments are also referred to as ‘mobile point of sale’ (mPOS) payments to represent payments that take place when the customer is in close proximity to the merchant. These payments are often based on technologies such as radio frequency identification (RFID) and near field communication (NFC). With RFID technology, the credentials of the transaction are stored on the mobile phone and exchanged over a small distance using barcode scanning or the RFID technology (Qasim & Abu-Shanab, 2015:2). RFID is an alternative to a bar code because it does not require direct contact scanning (Chen, Hancke, Meyes, Lien & Chin, 2010:84). With NFC, consumers conduct payments by holding the NFC-enabled mobile phone in front of an NFC-enabled payment terminal (de Reuver, Verchuur, Nikayin, Cerpa and Bouwman, 2014:1). This provides an easy way for users to interact with their environment (Chen *et al.*, 2010:84). For the purpose of this study, adoption and continuance intention to use mobile payment services will be investigated based on both proximity payments (which involve QR codes, MPOS and NFC technologies) and remote payments via a smartphone application.

Upon investigating the various options for mobile payment that are available in South Africa, it became evident that it is also possible to differentiate these options based first on the industry where the mobile payment options are prevalent and, second, on the method used to execute such payments. The mobile payment services that are based on the industry can be further categorised into retail services, banking services, and telecommunication service industries. An analysis of the industry-based mobile payment options indicates that the various options available in each industry operate essentially in the same manner. Table 1 indicates the various categories of mobile payments in South Africa, based on industry.

Table 1: Classification of mobile payment services by industry in South Africa

| Retail industry | Banking industry | Mobile network operators |
|------------------------|--------------------------|---------------------------------|
| Zapper | FNB GeoPayment | M-Pesa (Vodacom) |
| VCPay | SnapScan (Standard Bank) | MTN Mobile money |
| FlickPay | Nedbank Masterpass | Cell C Mobile money |

| | | |
|--------|-----------------|---------------------|
| Paypal | ABSA Masterpass | Virgin Mobile money |
|--------|-----------------|---------------------|

As for the method of operation, two categories of proximity mobile payments are particularly prevalent in South Africa: mobile point of sale (mPOS), and Quick Response (QR) code-based mobile payment services. With mPOS solutions, a mobile device (smartphone or tablet) owned by the merchant is used in combination with a payment application and hardware accessory (card reader) to allow merchants to accept card payments from consumers (ITU, 2014). With the QR code-based method, consumers scan the QR code displayed in-store, pay via their smartphones, and receive the products or services (ITU, 2014). It is important to note that mobile payment services offered in the three industries mentioned above also include mPOS and QR code-based mobile payment services.

This study investigates consumers' adoption and continuance intentions to use mobile payment services that are offered by service providers across all industries to mobile payment enabled consumers in South Africa. Mobile network operators, merchants and banks are the dominant and inter-dependent actors in the mobile payment services space (Gaur & Ondrus, 2012:172). Banks are indispensable to mobile payment services because they ensure the reliability of the payment system and mitigate the chances of fraudulent activities (Gaur & Ondrus, 2012:173). Mobile network operators provide mobile payment platforms, while merchants create the market for financial institutions and other mobile payment service providers by accepting payments with mobile payment instruments, or even by issuing them (Dahlberg *et al.*, 2008:175). The retail industry is included because a consumer's decision to adopt mobile payment services depends on the perceived number of adopting merchants, since that number also determines the consumers' opportunities to use the new payment service (Mallat, 2007:417).

1.5 DEVELOPMENT OF THE THEORETICAL MODEL

1.5.1 Adoption theories

The literature has drawn on a number of information technology theories to explain the adoption of new technology. These include the technology acceptance model (TAM) (Davis, 1989), the theory of reasoned action (TRA) (Ajzen, 1991), the theory of planned behaviour (TPB) (Ajzen, 1991), diffusion of innovation (DOI) (Rogers, 2003), and the technology readiness index (TRI) models (Parasuraman, 2000) (Kim *et al.*, 2010;

Mallat, 2007; Zhou, 2013), to mention but a few. Each of the above models has been tested in other contexts, and they have generally been found to be reasonably good predictors of the adoption of a specific new technology. Despite the extensive use of these models, there is still a growing need to extend the models to new and additional technology contexts. This is because any model that explains consumer behaviour is bound by the characteristics of a chosen technology (Cho, 2016:76). Therefore, this study's focus on mobile payment services will further validate the model(s) that will be chosen to ground this study. More importantly, it is important to validate models and theories developed in the Western world to determine their applicability in emerging economies. For example, South Africa is different from other countries on the continent, in that there are huge educational and socio-economic inequalities, along with substantial within-country cultural diversity (Duh, 2015:760). So, to improve the theory and advance knowledge of consumer diversity in different cultures, models have to be subjected to different settings. In addition, the adoption of an information technology (IT) is contingent upon cultural, economic and social factors (Dahlberg *et al.*, 2008:167). It is therefore imperative to apply theories that capture environmental factors that are characteristic of the mobile payment services market, since these services differ between markets.

The literature indicates that several conceptualisations are used to describe the adoption of a new technology. Sun (2014) defines adoption as awareness, embracing and using technology fully. According to Straub (2009:629), consumer adoption refers to the individual's decision whether to integrate an innovation into his or her life, while Kiwanuka (2015:40) defines adoption as the use of a technology for the first time. These definitions show that there is no universally accepted definition or usage of the term (Kiwanuka, 2015:40). However, in this study the above definitions are relevant, as they all indicate the propensity to accept a new information technology, and can serve as the viewpoint from which to examine users' adoption of mobile payment services. Table 2 provides an overview of the adoption theories that are regularly used in information technology research, as well as their major advantages and limitations. The purpose of the comparison of these theories is to provide a better picture of the relevant adoption theories, and to serve as the rationale for the selection of an adoption theory to ground the study.

Table 2: A summary of theories previously used to predict IT adoption of new technology

| Theory | Advantages | Limitations |
|--|---|---|
| <p>Technology acceptance model (TAM) (Davis, 1989)</p> <p>Originally developed to predict technology adopting behaviour at work settings.</p> <p>The TAM comprises two variables: perceived usefulness and perceived ease of use.</p> | <p>The theory includes reliable instruments with proven measurement properties, conciseness and empirical soundness (Schierz <i>et al.</i>, 2010:210).</p> <p>The theory also applies to a wide range of research questions (Schierz <i>et al.</i>, 2007:210).</p> <p>It is suitable for predicting initial adoption of a new technology.</p> <p>The theory is also used to understand consumers' use of technology-based self-services.</p> <p>The theory has been applied in many fields to explain human behaviour in relation to the adoption of new technologies' such as use of online services, mobile phones, e-finance, and mobile payments.</p> <p>The theory has also been employed in previous studies to determine continued use of new technology (Hong <i>et al.</i>, 2006:1819-1834).</p> | <p>Questions have been raised about the theory's applicability in non-work settings where adoption is not mandated by management.</p> <p>The theory may not sufficiently explain technology adoption behaviours due to the necessary high involvement of consumers to co-produce the service (Lin, Shih & Sher, 2007:642).</p> <p>The theory incorporates only two definitive determinants of consumers' responses toward technology – perceived usefulness and perceived ease of use – and is therefore unlikely to adequately explain consumers' use of complex technology-based self-services (Pinpathomrat, 2015:42).</p> <p>TAM fails to supply more meaningful information on users' opinions about a specific system (Lu, Yu, Liu & Yao, 2003:207).</p> <p>The theory does not take individual differences into account to explain adoption of new technology.</p> <p>The theory does not consider the effects of social variables such as subjective norms (Schuster <i>et al.</i>, 2015:4).</p> <p>It has also undergone several changes since its inception, due to its limited applicability to various marketing situations (Liébana-Cabanillas <i>et al.</i>, 2014:465).</p> |
| <p>Theory of reasoned action (TRA) (Ajzen, 1991)</p> <p>According to the TRA, a person's performance of a specified behaviour is determined by his or her behavioural intention (BI) to</p> | <p>The theory has been widely used to predict the adoption of information technologies such as mobile payments.</p> | <p>The TRA is very general in nature, and attempts to explain almost any human behaviour (Kim <i>et al.</i>, 2010:311).</p> |

| | | |
|--|---|---|
| <p>perform the behaviour, and BI is jointly determined by the person's attitude and subjective norm concerning the behaviour in question. Thus the two constructs that determine behavioural intention are attitude towards the behaviour and subjective norm.</p> | <p>The theory can be employed to predict continued use of a technology.</p> | |
| <p>Theory of planned behaviour (TPB) (Ajzen, 1991) The theory was developed to improve the TRA by incorporating the construct of perceived behavioural control, which reflects whether or not people perceive that they have the required resources and opportunities to perform the behaviour in question.</p> | <p>The theory includes behavioural control as an explanatory variable to consumer adoption of a new technology. The theory takes into account the influences of external variables such as social influences. The theory has been widely used to predict actual behaviour with respect to mobile internet, Web 2.0, e-learning, and mobile data services (Lee, 2010; Zhou, 2013:1086). The theory can be employed to predict continued use of a new technology (Lee, 2010; Wu <i>et al.</i>, 2014).</p> | <p>In TPB, salient beliefs are used to determine a person's attitude, yet salient beliefs are not easy to ascertain. Some authors argue that many behaviours are determined by one's past behaviours rather than by one's cognitions (Conner & Armitage, 1998:1433); thus the TPB may not fully capture pre-adoption intentions. The theory has been criticised for its exclusive focus on rational reasoning, excluding unconscious influences on behaviour (Sniehotta, Presseau & Araujo-Soares, 2014:2).</p> |
| <p>Technology readiness index (TRI) (Parasuraman, 2000) The TRI is defined as people's propensity to embrace and use new technology to accomplish goals in home life and at work. The TRI 1.0 (old version) comprised 36 items, and the TRI 2.0 (new version) comprises 16 items. The TR construct comprises four sub-dimensions: optimism, innovativeness, discomfort, and insecurity.</p> | <p>TR is an individual-specific construct regarding beliefs derived from memory and prior experience (Parasuraman, 2000:309). The model consists of drivers and inhibitors of adopting a new technology at an individual level (Parasuraman, 2000:311). The theory is used mainly to determine adoption levels of consumers with new technology. The model has been updated and streamlined to reflect current technological changes (Parasuraman & Colby, 2015:59). The TRI can be used as a basis for segmenting markets (Lin <i>et al.</i>, 2007:652).</p> | <p>Empirical findings about the positive impact of users' technology readiness to embrace mobile payment services are scarce (Lin <i>et al.</i>, 2007:644). There is little evidence to suggest the impact of level of education and occupation on users' technology readiness (Parasuraman & Colby, 2014:73). The theory has not been as widely used as other adoption theories, such as the TAM and the DOI.</p> |

| | | |
|---|---|---|
| <p>Diffusion of innovation (DOI) (Rogers, 2003)</p> <p>The DOI explains the pattern of adoption and method, and assists in predicting the successfulness of new technology inventions. The five attributes are observability, trialability, compatibility, relative advantage, and complexity.</p> | <p>The model is suitable for predicting users' initial adoption of a new technology (Mallat, 2007). Certain constructs are similar to TAMS, e.g., relative advantage is similar to perceived usefulness in TAM, while complexity is similar to ease of use (Chong <i>et al.</i>, 2012:36). As a result, the model can be used in place of the over-used TAM theory.</p> | <p>Results of prior diffusion research investigating impacts of the five attributes of the DOI are inconsistent (Lee, Park, Chung & Blakeney, 2012). Certain constructs such as observability and compatibility are not appropriate in the study of individual consumer adoption of mobile technologies (Chong <i>et al.</i>, 2012). The theory does not include the effect of social influences, trust, cost, and variety of services on consumer adoption of new technologies (Chong <i>et al.</i>, 2012:36). The theory neglects the impact of personal innovativeness on adoption, which is a critical factor (Yang <i>et al.</i>, 2012:130).</p> |
|---|---|---|

In respect of adoption theories, a review of the existing literature revealed the TAM to be the most widely used theoretical framework. For example, out of the 42 published papers on e-learning uptake and continuance in higher education institutions (HEI), 55% of the papers grounded their research on the TAM model (Pinpathomrat, 2015:16). Despite its extensive use, the TAM was excluded for several reasons. First, the theory was originally developed to predict technology adopting behaviours in work settings (Davis, 1989:320), which has raised questions for other researchers about its applicability to non-work settings, where adoption is not mandated by management. Second, a study by Lin *et al.* (2007:642) suggests that, due to the high involvement of customers to co-produce the service, the TAM applied in marketing settings may not sufficiently explain consumers' technology adoption behaviours. Third, the TAM fails to supply more meaningful information on users' opinions and beliefs about a specific system (Lu *et al.*, 2003:217). Fourth, Liébana-Cabanillas *et al.* (2014:465) reported that the TAM has undergone several changes since its inception, due to its limited applicability in various marketing situations. Fifth, the consensus among researchers is that the use of only two TAM factors may not be sufficient to explain the issue of mobile payment adoption and continued use (Pinpathomrat, 2015:42), suggesting that other possible factors should be combined with the two key influences. Last, the TAM

does not take into account prior experience, age, gender, or many other demographic characteristics that may influence attitudes to technology, and that in turn influence intention to use an innovation (Straub, 2009:639).

The diffusion of innovation (DOI) theory was not selected as the theoretical background of this study for three reasons. First, certain constructs are similar to TAM – e.g., relative advantage is similar to perceived usefulness in TAM, as to whether the current innovation offers more benefits than the previous methods. On the other hand, complexity in DOI is similar to ease of use in TAM (Chong *et al.*, 2012:36; Thong *et al.*, 2006:802). Because of these similarities, both the DOI and the TAM were excluded from this study. Second, arguments in the literature suggest that certain constructs in the DOI, such as observability and trialability, are not appropriate in the study of individual consumer adoption of mobile technologies (Yang *et al.*, 2012:130). Rogers (2003:16) defined observability as “the degree to which the results of an innovation are visible to others”. Dahlberg *et al.* (2015) conducted a systematic review aimed at assessing the progress of mobile payment research over the last eight years prior to their study. Their review indicates that no study has included observability as a determinant to measure the adoption of mobile payment services. According to Rogers (2003:16), “trialability is the degree to which an innovation may be experimented with on a limited basis”. Since mobile payments involve the use of credit cards, consumers may be hesitant to go through the process of applying for a credit card only to try a mobile payment app. Finally, the theory neglects the impact of personal innovativeness on adoption, which is a critical factor (Yang *et al.*, 2012:130). Innovative consumers feel less perceived danger, are much more open to new technology, and therefore easily embrace opportunities to buy unfamiliar products (Lee *et al.*, 2012:1592). Based on the above arguments, the DOI was found to be unsuitable to ground this study of the adoption of mobile payment services.

In considering the TRA as an adoption theory to ground the study, scholars agree that the model is very general in nature, in that it attempts to explain almost every human behaviour (Kim *et al.*, 2010:311). Its major limitation relates to its failure to give adequate attention to the fact that behaviour is not always under the control of the individual (Mpinganjira, Dos Santos, Botha, du Toit, Erasmus, Maree & Mugobo, 2013:142).

A frequently voiced criticism of the TPB and of other reasoned action models is that they are too 'rational', taking insufficient account of cognitive and affective processes that are known to bias human judgments and behaviour (Ajzen, 2011:1115). Some authors argue that many behaviours are determined by one's past behaviours rather than by one's cognitions (Conner & Armitage, 1998:1433). According to Ajzen (2011:1113), some researchers reject it outright as an adequate explanation of human social behaviour. These investigators tend to deny the importance of consciousness as a causal agent, and view much human social behaviour as driven by implicit attitudes and other unconscious mental processes. Based on the above limitations, the theory was side-lined from the study.

The TRI was chosen as the basis to predict the adoption of mobile payment services for several reasons. First, the model considers individual differences in explaining consumers' intention to adopt a new technology. The TRI is individual-specific – unlike the TAM, which is system-specific (Parasuraman, 2000:644). This means that the TRI measures an individual's readiness to use new technology in general, whereas the TAM was developed to measure users' acceptance of a new information system in work settings, as mandated by management. Since traits differ among people, so do their beliefs about various aspects of technology, and the relative strength of each trait indicates a person's openness to technology (Walczuch, Lemmink & Streukens, 2007:207). Second, the TRI differentiates between the drivers and the inhibitors of technology adoption (Parasuraman, 2000:308), which is in line with the secondary objective of this study – to investigate the drivers and inhibitors of mobile payment services. Previous studies also indicated that potential adopters tend to form their adoption intention by considering both the positive and the negative factors (Yang *et al.*, 2012:137). Third, other prior studies of people's reactions to new technology reported that consumers simultaneously possess favourable and unfavourable views about technology-based products and services (Parasuraman, 2000:309). Because a combination of positive and negative feelings about technology underlies the domain of technology readiness, the TRI forms the basis upon which the new model is proposed. Fourth, the TRI has been updated and streamlined in its content, structure, and psychometric properties to reflect significant changes in the technology landscape (Parasuraman & Colby, 2014:59). Last, research indicates that the success of a technology innovation implementation depends as much on individual differences as

on the technology itself (Lu *et al.*, 2003:213). The technology readiness construct can be viewed as an overall state of mind resulting from a combination of mental drivers and inhibitors that collectively determine a person's predisposition to use new technologies (Parasuraman, 2000:308). Thus it was considered applicable to be employed in this study to measure the adoption of mobile payment services.

1.6 CONTINUANCE INTENTION THEORIES

Continuance intention is defined by Setterstrom *et al.* (2013:1142) as the degree to which an individual currently using a new technology, such as a mobile payment service, has developed conscious plans to keep using it in the future. The existing literature indicates that several theories have been employed to explain factors that influence continuance intention to use a new technology. These theories include the expectation-confirmation model (ECM) (Oliver, 1980), the expectation-confirmation model in the context of IT (ECM-IT) (Bhattacharjee, 2001), the extended expectation-confirmation model, also in the context of IT (EECM-IT) (Thong *et al.*, 2006), the information systems success model (ISS) (DeLone & McLean, 2004), the technology acceptance model (TAM) (Davis, 1989), and the theory of planned behaviour (TPB) (Ajzen & Fishbein, 1973), to mention but a few.

Continued use is critical to the success of mobile payment services (Zhou, 2013:1086). To maximise the financial investment in mobile payment services, banks, merchants, and mobile network operators ought to ensure that customers will continue to use their services after the initial experience (Susanto, Chang & Ha, 2016:8). Yet there is limited empirical evidence of studies investigating the factors that influence consumers' continuance intention to use mobile payment services. Although most studies focus their attention on the adoption of technologies (Lee *et al.*, 2012; Kim *et al.*, 2010; Schierz *et al.*, 2010), a few studies that have investigated continued use of technology have employed the TPB, TAM and ECM to understand consumers' continued use of self-service based technologies and other contexts (Schuster *et al.*, 2015:4; Wu *et al.*, 2014:1006-1038; Setterstrom *et al.*, 2013:1139-1154). However, none of these studies has investigated continued use in the mobile payment context, which involves great uncertainty and risk that may inhibit continued use of mobile phone payment services (Zhou, 2013:1086). Table 3 illustrates the various theories that have been used to investigate continued use of technologies in previous studies.

Table 3: Summary of previously used continuance intention theories

| Theory | Advantages | Limitations |
|---|---|--|
| <p>TAM (Davis, 1989) The TAM is an intention-based model stipulating that the intention to adopt a technology is a good predictor of its actual usage as explained by two major perceptual factors: perceived ease of use and perceived usefulness.</p> | <p>TAM is expected to explain and predict future user behaviour based on simple measures taken “after a very brief interaction with a system” in a pre-adoption trial (Hong <i>et al.</i>, 2006:1822).</p> | <p>TAM was originally developed to predict users’ initial adoption of a new IT in work settings (Davis, 1989).</p> |
| <p>Theory of planned behaviour (TPB) (Ajzen, 1991) The TPB posits that individual behaviour is driven by behaviour intentions, where behaviour intentions are a function of an individual’s attitude toward behaviour, subjective norms, and perceived behavioural control.</p> | <p>The TPB has been applied in various contexts to measure both adoption and continued use (Hong <i>et al.</i>, 2006:1820).</p> | <p>There has not been a study to compare the relative utility of the model for understanding continued usage of information systems (Hong <i>et al.</i>, 2006:1820). Researchers have preferred methods other than the TPB to measure continued use (Hong <i>et al.</i>, 2006:1822). The TPB does not address context (Kim & Crowston, 2011:7). As the TPB intends to explain user acceptance in an IS pre-adoption environment, the constructs of the TPB cannot fully capture user continuance behaviour (Kim, 2010:7033).</p> |
| <p>The information system success (ISS) model (DeLone & McLean, 1992) The ISS model argues that system quality and information quality affect use and user satisfaction, both of which further lead to individual and organisational impact. The model consists of the following interrelated dimensions of information systems quality: system quality, information quality, use, and user satisfaction. The updated model includes service quality and net benefits constructs (DeLone & McLean, 2004:32).</p> | <p>The model has been widely used to predict continuance intention in various information system contexts (Zhou, 2013:1086). DeLone and McLean (2004) developed an updated model based on the empirical and theoretical contributions of researchers. The primary improvements include (a) addition of service quality, and (b) the collapsing of individual impacts and organisational impacts into a more parsimonious net benefits</p> | <p>The model has seldom been tested in the context of mobile payments (Zhou, 2013).</p> |

| | | |
|---|--|--|
| | construct (DeLone & McLean, 2004:32). | |
| <p>The expectation-confirmation theory (ECM) (Oliver, 1980)</p> <p>The ECM was adapted from the TAM and TPB. It posits that an individual's intention to continue information system (IS) usage is determined primarily by their satisfaction with prior use (Bhattacharjee, 2001:353). It states that consumers form an initial expectation, use the product, form perceptions, confirm expectation, form satisfaction, and then form a repurchase intention.</p> | <p>The theory is popularly used to explain consumers' satisfaction and re-purchase decisions in an array of post-purchase contexts (Bhattacharjee, 2001:353; Hong <i>et al.</i>, 2006:1820).</p> | <p>The theory does not take into account the influence of social factors (Stone & Baker-Eveleth, 2013:985).</p> <p>The model assumes that pre-purchase expectations are based on the information from third party reports instead of direct experiences (Hong <i>et al.</i>, 2006:1821).</p> |
| <p>The expectation-confirmation in the context of IT (ECM-IT) (Bhattacharjee, 2001)</p> <p>The model predicts users' intention to continue usage of an IT with three antecedents: (1) user satisfaction with IT; (2) extent of user confirmation; and (3) post-adoption expectations, represented by perceived usefulness.</p> | <p>The theory measures consumers' expectations based on their direct experiences. The ECM-IT focuses on post-adoption expectations rather than on pre-adoption expectations (Bhattacharjee, 2001:355).</p> <p>It is represented by perceived usefulness, which has been demonstrated to be the most consistent and salient factor in determining user intention over time (Venkatesh, 2000:346).</p> | <p>The model does not include perceived performance of an IT, assuming that the effect of perceived performance is already captured by the confirmation construct (Bhattacharjee, 2001:356).</p> |
| <p>The extended ECM-IT (EECM-IT) (Thong <i>et al.</i>, 2006)</p> <p>The EECM-IT is a hybrid model that integrates ECM-IT and TAM as developed by Hong <i>et al.</i> (2006) by including perceived ease of use as an additional construct.</p> | <p>The model included perceived ease of use to provide a better understanding of continued IT usage behaviour.</p> <p>The model has more explanatory power than TAM and ECM-IT in measuring continuance intention (Hong <i>et al.</i>, 2006).</p> | <p>The model has not been widely used, and requires empirical validations across different technology contexts to determine its generalisability (Hong <i>et al.</i>, 2006:1822).</p> |

The above theories are explained further below. However, as the TAM, TPB, TRA and DOI have already been explained in the previous section, the discussion that follows will focus on the remaining theories.

1.6.1 The information system success (ISS) model

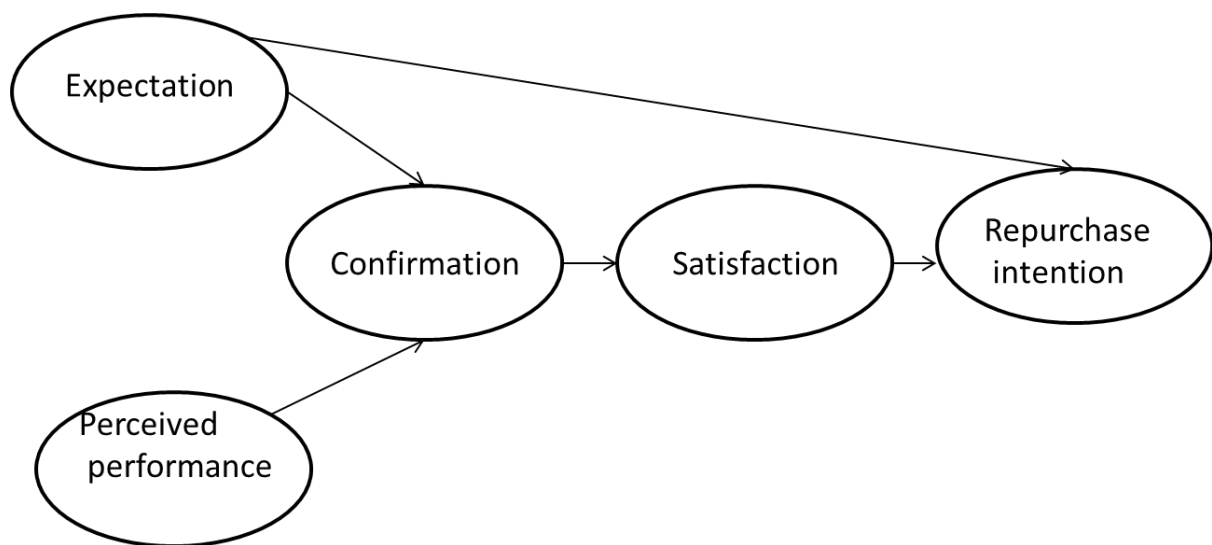
The information system success (ISS) model was proposed by DeLone and McLean in 1992. The original model provided a comprehensive framework for measuring the performance of an information system. The model argues that system quality and information quality affect use and user satisfaction, both of which further lead to individual and organisational impact (DeLone & McLean, 2004:34). Later, the authors developed an updated model and added service quality to the model. The new and updated model is based on the empirical and theoretical contributions of researchers who have tested or discussed the original model (DeLone & McLean, 2004:32). Since its inception, the model has been used widely to predict continuance intention in various contexts such as healthcare, online shopping, and electronic government success (Zhou, 2013:1086). Although the information success model has been used in these previous studies, it has seldom been tested in the context of mobile payment (Zhou, 2013:1086). Furthermore, some of its main constructs correspond with certain constructs in the EECM-IT. For example, system quality is a measure of functionality of a system and is associated with system ease of use. In fact, Vance, Elie-Dit-Cosaque & Straub (2008:79) observe that often “ease of use may be a consequence of system quality”. On the other hand, both perceived information quality and service quality reflect cognitive beliefs about usability, reliability, accessibility, and easy to understand (DeLone & McLean, 2004:34), and can be equated with perceived usefulness, which is incorporated in the EECM-IT; so it was excluded from this study.

1.6.2 The expectation-confirmation model (ECM)

The ECM was developed by Oliver (1980), who adapted it from the technology acceptance model (TAM) developed by Davis (1989) and the theory of planned behaviour (TPB) developed by Ajzen & Fishbein (1973) (Bhattacharjee, 2001:353). The ECM is widely used in the consumer behaviour literature to study consumer satisfaction, post-purchase behaviour (e.g., repurchase, complaining) and service marketing in general (Bhattacharjee, 2001:353). The predictive ability of this theory has been demonstrated over a wide range of product repurchase and service continuance contexts, such as automobile repurchase, camcorder repurchase, restaurant service, and mobile payments (Bhattacharjee, 2001:353).

According to this framework, buyers first develop expectations about a product or service before purchase. Second, following a period of initial consumption, they form perceptions about its performance. Third, by assessing perceived performance against their frame of reference (i.e., expectations), they either confirm or disconfirm pre-purchase expectations. Fourth, users form a satisfaction, or affect, based on their confirmation level and the expectation on which that confirmation was based. Finally, satisfied customers form a repurchase intention, while dissatisfied users discontinue its further use (Bhattacharjee, 2001:353). The ECM is illustrated below.

Figure 1: Expectation-confirmation theory



1.6.3 The expectation-confirmation in the context of IT (ECM-IT)

Bhattacharjee, (2001) developed and empirically tested an expectation-confirmation model of continued IT usage (ECM-IT), which is rooted in the ECM. The model predicts users' intention to continue usage of an IT with three antecedents: (1) user satisfaction with IT; (2) extent of user confirmation, and (3) post-adoption expectations, represented by perceived usefulness (Bhattacharjee, 2001:353).

While initial acceptance of an IT is an important first step toward realising IT success, the long-term viability of an IT and its eventual success depend on its continued use rather than on first-time use (Bhattacharjee, 2001:352). In the same vein, a user's expectation toward using an IT after gaining experience from using it should be different from those expectations before using it (Hong *et al.*, 2006:1821). Thus the ECM-IT focuses on post-adoption expectations (Bhattacharjee, 2001:352) rather than

on pre-purchase expectations, as depicted in the original ECM. Expectations based on consumers' direct experiences are the major determinants of consumer satisfaction (Bhattacharjee, 2001:353). From this perspective, the ECM-IT theorises that post-adoption expectation plays an important role in determining users' satisfaction and continuance intention decisions (Hong *et al.*, 2006:1821).

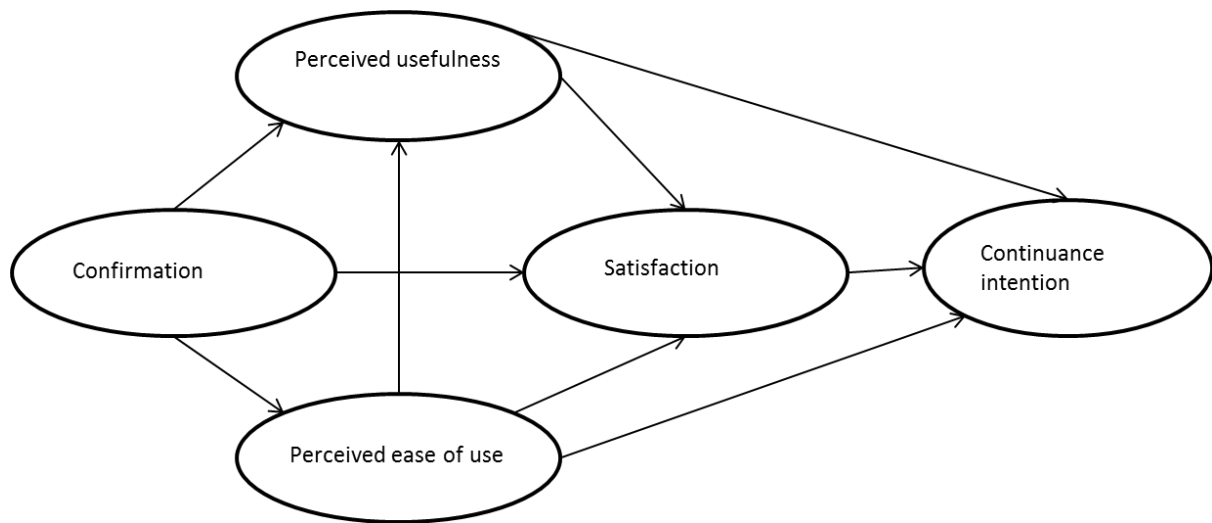
Figure 2: The expectation-confirmation model in the context of information technology (ECM-IT)



1.6.4 The extended ECM-IT (EECM-IT)

Later, a hybrid model integrating ECM-IT and TAM was developed by Thong *et al.* (2006), as depicted in Figure 3. The model included perceived ease of use to provide a better understanding of continued IT usage behaviour. Davis (1989:320) defines perceived ease of use as the degree to which a person believes that using a particular system would be free of effort. Given the accumulated evidence of the significant impact of perceived ease of use on both perceived usefulness and IT usage intention from previous TAM-based studies, perceived ease of use was added to the ECM-IT (Thong *et al.*, 2006:801). Perceived ease of use has also been identified as one of the salient beliefs in determining IT acceptance and continued use (Venkatesh, 2000:345).

Figure 3: The extended expectation-confirmation model-IT (EECM-IT)



After considering the continuance intention models in Table 3, this study adopts the perspective of the extended expectation confirmation model in the context of IT (EECM-IT) to measure continuance intention to use mobile payment services. In their study, Hong *et al.* (2006:1819-1834) examined the utility of three models for understanding IT usage behaviour – namely, the ECM-IT, the TAM, and the extended ECM-IT – among 1,826 consumers. The extended ECM-IT had the highest R^2 (67%), followed by TAM (63%) and the ECM-IT (50%). Since reports indicate that the extended ECM-IT has not been widely used, it therefore requires empirical validations across different technology contexts to determine its generalisability (Hong *et al.*, 2006:1822). Thus this study will test the potential utility of the newer model that encapsulates both the E-ECM-IT and the TAM to measure users' continuance intentions to use mobile payment services in the context of an emerging market.

The TAM was not chosen to investigate continuance intention to use mobile payment services for several reasons. First, although the TAM has been applied in prior studies to measure continuance intention to use information systems, it was originally developed to predict users' initial adoption of a new technology in work settings (Hong *et al.*, 2006:1822). Secondly, many studies based on TAM seemed to have implicitly assumed, intentionally or unintentionally, that continued usage is an extension of adoption, and have used TAM in post-adoption situations (Hong *et al.*, 2006:1822), which other scholars do not agree with (Eriksson & Nilsson, 2007:159). Previous studies have shown that different factors influence consumers' adoption and continuance behaviour (Eriksson & Nilsson, 2007:159). The two constructs measuring technology

acceptance in TAM, perceived ease of use and perceived usefulness, are also included in the E-ECM-IT model. Last, based on the previous study by Hong *et al.*, (2006), the E-ECM-IT has greater explanatory power than the TAM in measuring continuance intention to use a new IT. Based on the above, the TAM was not selected to predict continuance intentions of consumers to use mobile payment services.

Although previous studies have applied the TPB to investigate continued use of an innovation (Kim, 2010:7033), the theory was not chosen to base this study for several reasons. Hsieh, Rai and Keil (2008:100) have criticised the tendency to use the same constructs in both initial adoption and post-adoption studies because results are inconsistent. For example, subjective norm is significant in the pre-adoption stage, but not significant in the post-adoption stage (Hsieh *et al.*, 2008:100). These sentiments were echoed by Kim (2010:7033), who reported that, as the TPB intends to explain user acceptance in an information system pre-adoption environment, the constructs of the TPB cannot fully capture user continuance behaviour. Furthermore, the TPB does not address context. The existing literature on information system adoption and use introduces a number of different variables that are often context-independent (Kim & Crowston, 2011:7). Based on the above, the TPB was excluded from this study as a theoretical model to investigate continued use of mobile payment services.

1.7 PROPOSED MODEL: TECHNOLOGY READINESS EXTENDED EXPECTATION-CONFIRMATION MODEL IN THE CONTEXT OF IT (TREECM-IT)

A combination of the two models (TRI and EECM-IT) resulted in the formation of a new technology readiness extended expectation confirmation model in the context of IT (TREECM-IT). Understanding the various adoption and continuance intention theories and their limitations provided some insights into developing the new framework on the adoption and continuance intention to use mobile payment services. There seems to be some confusion in the literature, since some previous adoption research studies have also been applied to study consumers' continuance intentions, suggesting that the two constructs are synonymous (Kim & Crowston, 2011:7). To clarify these concepts, a theoretical framework that explains both adoption and continuance intentions to use mobile payment services is needed. In this regard, the study proposes to integrate the extended TRI model with the EECM-IT model to investigate both

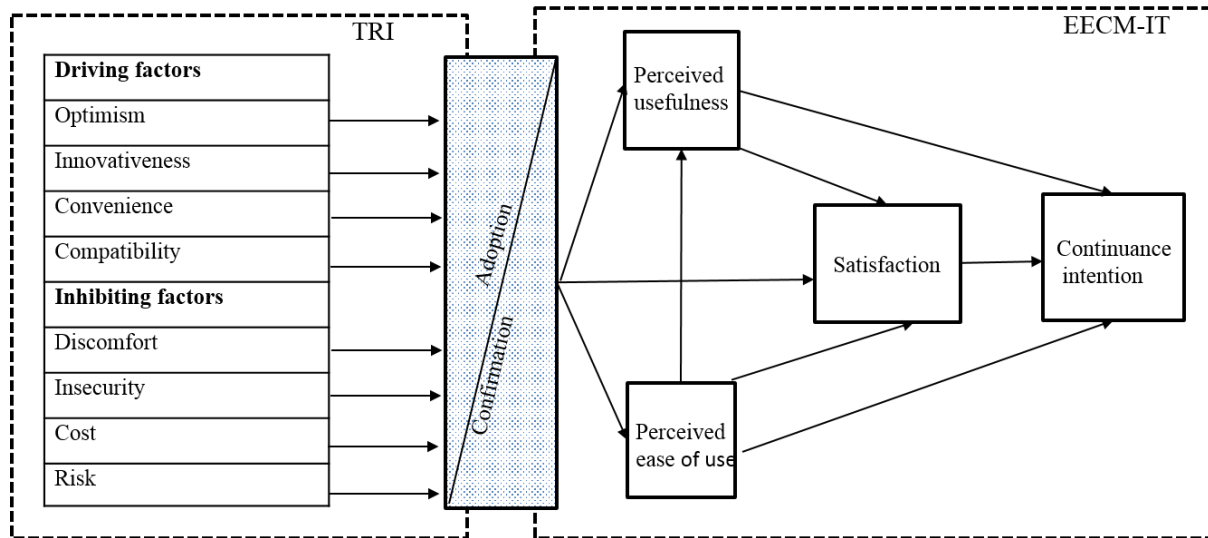
adoption and continued use of mobile payment services, thus using a more holistic approach.

Technology readiness (TR) refers to people's propensity to embrace and use new technologies to accomplish goals in home life and at work (Parasuraman & Colby 2014:59). The technology readiness index comprises four sub-dimensions: optimism, innovativeness, discomfort, and insecurity (Parasuraman & Colby 2014:60). Optimism and innovativeness are drivers of TR, while discomfort and insecurity are inhibitors (Lin *et al.*, 2007:643). Although the TRI is applicable to this study, empirical findings on the positive impact of users' technology readiness to embrace mobile payment services are scarce (Lin *et al.*, 2007:644). Considering the increasing rate at which companies are turning to technology to streamline how they market to and serve their customers, a thorough assessment of customers' technology readiness is needed (Parasuraman, 2000:317). Thus a study of this nature may provide useful insights into the types of mobile payment systems that are likely to be most appropriate, as well as the type of support needed to assist users who experience problems with mobile payment services (Parasuraman, 2000:317). Furthermore, the available literature does not adequately address the question of whether gender impacts users' technology readiness to embrace mobile payment services. Yet gender is a key variable in moderating consumers' evaluative judgments (Nel, Raubenheimer & Bounagui, 2009:26). Thus the moderating effect of gender will be investigated in this study to determine its influence on the factors that affect adoption of mobile payment services. It is not uncommon for researchers to incorporate other constructs into existing theories to introduce new relationships and make theoretical contributions (Venkatesh *et al.*, 2003). Researchers call for the extension of existing theories to reassess scale statements in tandem with innovative technologies, so as to incorporate the implications of a changing technology environment while making the models more parsimonious (Parasuraman & Colby, 2015:61). This is important, particularly in mobile technology, which is characterised by rapid changes, where new issues emerge constantly, such that there is need to streamline and update existing theories to capture contemporary technology-related themes to ensure their continued relevance (Parasuraman & Colby, 2015:61). In the same vein, this study borrowed additional constructs from the literature that are relevant to the adoption of mobile technology. These constructs are convenience, compatibility, perceived cost, and

perceived risk, all of which have been reported in previous studies to have significant influence on the adoption of new technologies (Lin *et al.*, 2007).

The integrated model is based on several motivations. First, and in line with the primary objective of the study, the integration is intended to build a theoretical framework to explain factors that influence both adoption and continued use of mobile payment services. Second, prior research has suggested that continued use is not simply an extension of the adoption decision, and that these two behaviours are not necessarily affected by the same factors (Setterstrom *et al.*, 2013:1141). Therefore, this study will deepen the understanding of the relationship between factors that influence adoption and continued use of new technologies. Third, several studies have reported that perceived usefulness and perceived ease of use significantly influence continued use of technology-based services (Thong *et al.*, 2006:801; Hong *et al.*, 2006:1822; Kim *et al.*, 2010:7037; Eriksson & Nielsson, 2007:164). The EECM-IT model incorporates these two constructs, thereby making the proposed framework relevant for this study. As reported by Thong *et al.* (2006:802), the inclusion of perceived ease of use in the ECM enables a better understanding of the role of complex nature of IT as a boundary condition in explaining user behaviour in the continued IT usage context. Thus an integrated TRI and EECM-IT model is presented to further the understanding of adoption and continued use of mobile payment services among mobile payment enabled consumers, in the context of an emerging economy, as depicted in Figure 4. As previously noted, before the two models were integrated, the TRI was employed to measure consumer adoption, while the E-ECM-IT examined continuance intention, from both of which the moderating effect of gender was examined. After investigating the two models separately, they were integrated to provide a novel perspective to measure adoption and continuance intention to use mobile payment services in a single study.

Figure 4: Technology readiness extended expectation-confirmation model in the context of IT (TREECM-IT).



1.8 THEORETICAL CONTEXT

1.8.1 Drivers of technology readiness

1.8.1.1 Optimism

Optimism is defined as a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives (Parasuraman & Colby, 2014:60). Optimists use more active coping strategies than pessimists, and these strategies are more effective in achieving positive outcomes (Walczuch *et al.*, 2007:207). These authors further contend that optimists are less likely to focus on negative events, and thus confront technology more openly. Therefore, consumers' optimism about mobile payment services will lead to more positive attitudes and will help to bring out more positive attitudes towards technology (Walczuch *et al.*, 2007:208; Lin *et al.*, 2007:653).

1.8.1.2 Innovativeness

The personal innovativeness of individuals influences their acceptance attitude toward information system services (Lee *et al.*, 2012:1593). Personal innovativeness is explained as the inclination of an individual to try out any new information system, and has a significant positive effect on the adoption of the system, referred to in this study as 'mobile payment services' (Kim *et al.*, 2010:313). Personal innovativeness is considered a trait, and a relatively stable descriptor of an individual that is invariant

across situations (uninfluenced by environmental or internal variables) (Walczuch *et al.*, 2007:208). As the mobile payment service is an innovative technology in the mobile market that is likely to be a worldwide trend in a few years, it is possible that personal innovativeness could affect the intended use of mobile payment services (Liébana-Cabanillas *et al.*, 2015:5). This assumption is justified by previous studies that have reported that individuals with high levels of personal innovativeness in information technology develop more positive perceptions about the innovation (Yang *et al.*, 2012:129-142; Wang, Jung, Kang & Chung, 2014:1048-1064).

Because the study focuses on factors influencing individual adoption of a new technology, two additional factors indicating individual characteristics will be explored. These factors are perceived convenience of mobile payment services and perceived compatibility. The inclusion of these factors is in line with previous studies that have adapted and selected different constructs to broaden the scope of user behaviour within different IT contexts (Thong *et al.*, 2006:800). A further investigation of these factors is worthwhile, because the few studies that have investigated them have reported their significant influences on the adoption of mobile payment services (Kim *et al.*, 2010:313; Mallat, 2007:416).

1.8.1.3 Convenience

Convenience has been reported in the literature to be one of the important factors predicting the success of mobile payments. Users' convenience can result from their ability to use mobile phones when paying for goods and services, whether on foot or in cars, planes, or trains, and to authorise transactions on the remote servers of banks, brokerages, and merchants (Herzberg, 2003:54). According to Kim *et al.* (2010:314), consumers believe in the benefits of technology when the technology makes their lives easier and ameliorates the difficulty of performing common tasks. Convenience can also be described as an important characteristic of the mobile device, which stores data, is always at hand, and is increasingly easy to use (Obe & Balogun, 2007:449). This assertion is supported by Teo, Tan, Ooi, Hew and Yew (2015:315), who reported that the convenience of having a single payment device to replace multiple payment alternatives contributes to the benefits of mobile payments. Convenience of mobile payments is also enhanced by the fast internet connectivity to a mobile phone that is characteristic of many countries (Obe & Balogun, 2007:449) such as South Africa.

Many studies have reported significant positive relationships between convenience and adoption of mobile payment services; thus the construct was included in this study as a driving variable.

1.8.1.4 Compatibility

In the adoption of new technologies, compatibility has been defined as the consistency between an innovation and the values, experiences, and needs of potential adopters (Rogers, 1995). Scholars who have previously empirically tested the predictability of this construct have found compatibility to be an important predictor for the adoption of mobile payment apps (Liebana-Cabanillas *et al.*, 2015; Mallat, 2007). In this study, compatibility is included in the model of consumer readiness as a driver of mobile payment services adoption. According to Mallat (2007:416), consumers' ability to integrate mobile payment services into their daily lives for their purchase transactions and habits is an important determinant of their willingness to adopt mobile payment services. As suggested by Liébana-Cabanillas *et al.* (2015:5), the compatibility variable includes coherence of an innovation with the values, behaviour patterns, and experiences of an individual. Thus compatibility is included in the model as an important explanation behind mobile payment adoption, particularly if the technology is new (Ramos-de-Luna, Montoro-Rios & Liébana-Cabanillas, 2015:8).

1.8.2 Inhibitors of technology readiness

1.8.2.1 Discomfort

Discomfort is described as a perceived lack of control over technology and a feeling of being overwhelmed by it (Parasuraman & Colby, 2014:60). Users who score high on the discomfort scale suffer from a perceived lack of control and a sense of being overwhelmed by the technology (Walczuch *et al.*, 2007:209); thus they will perceive technology as more complex. These findings have been corroborated in prior studies that reported that high levels of discomfort with technology lead to negative attitudes towards it (Walczuch *et al.*, 2007:209; Parasuraman & Colby, 2014:63). In the same vein, if consumers feel overwhelmed by the use of mobile payment services, the adoption process will be negatively affected.

1.8.2.2 Insecurity

One of the major barriers to the use of mobile payments is the feeling of insecurity. It is necessary to establish new security systems for mobile payment methods to ensure the security of customer transactions and generate confidence, thereby improving attitudes toward them (Ramos-de-Luna *et al.*, 2015:7). This is because security threats in mobile devices are more challenging than those in personal computers, as mobile devices are easily lost or stolen (Liu, 2015:3). Insecurity is described by Parasuraman and Colby (2014:60) as a distrust of technology, stemming from scepticism about its ability to work properly and from concerns about its potentially harmful consequences. Insecurity is also described by Al-Jabri and Sohail (2012:382) as perceived risk, to refer to the doubts related to the degree of inconsistency between consumers' judgment and real behaviour, and technology failing to deliver the anticipated benefits. Users fear that hackers may obtain data through Bluetooth or radio frequency identification (RFID) or the mobile device may be infected by malware through downloading and scanning QR codes (Liu, 2015:3). In a study of merchant adoption of mobile payments conducted by Kalan (2016), it was reported that many customers in South Africa are not confident about the security of most mobile payment apps. Therefore, insecurity is more likely to affect the adoption of mobile payment services negatively.

Additional factors taken from the literature were also included to measure inhibitors of mobile payment services. These included perceived cost and perceived risk. For example, costs are seldom studied in research, yet they become apparent when consumers begin to embrace the technology.

1.8.2.3 Perceived cost

In a study by Mallat (2007:429), the pricing of mobile payments had a significant negative impact on consumer adoption willingness. The results of her study indicated that mobile payments that pass on the transaction costs to consumers are not likely to succeed unless they are able to provide superior advantage. In a similar study by Lu, Yang, Chau and Cao (2011:396), 60% of their respondents were concerned with the cost of using mobile payment services. Chong *et al.* (2012:37) also found that cost has a significant and negative relationship with Malaysian consumer decisions to adopt mobile payment services. Since the use of credit cards attracts a relatively high cost

of transaction fees in South Africa, cost may deter consumers from adopting mobile payment services. Based on the above findings, this study intends to investigate perceived cost as a potential inhibitor in the adopting mobile payment services among mobile payment enabled consumers in South Africa.

1.8.2.4 Perceived risk

Due to the higher levels of uncertainty that are associated with provision of services, services are considered to be more risky than tangible products (Pham & Ho, 2015:166). Prior studies have considered the perception of risk as a deterrent to mobile payment adoption (Mallat, 2007; Pham & Ho, 2015; Yang *et al.*, 2012). Perceived risk refers to the subjective expectation of a loss or sacrifice in using a risky technology (Pham & Ho, 2015:4). Mallat (2007:424) identified several dimensions of risk. Participants in her study identified risks associated with the possibility that someone would not be able to pay with their mobile phone if the device was lost. Other participants in her study identified risk in terms of the possibility of the lack of transaction records and documentation owing to the difficulty of making follow-ups on mobile payments; while some participants were sceptical about possible errors in payment transactions. Compromising privacy was also perceived as a risk by some participants who were reluctant to disclose their information to mobile payment service providers. Carrying cash in South Africa raises risk and security concerns, as many robberies occur when people are on their way to deposit cash or when they have withdrawn cash from automated teller machines (Banking Association of South Africa, 2017). Based on the above, perceived risk was included as an additional dimension in studying factors that have the propensity to inhibit the adoption of mobile payment services in the South African market.

1.8.3 Adoption vis-à-vis confirmation

Adoption theory explains how an individual accepts or rejects an innovation (Straub, 2009). In a study by Osah and Kyobe (2017), they found that a user's level of M-pesa (a mobile payment app) use can be enhanced if the user has identified a feature of the service that at least matches his or her task requirement. In the same vein, users will adopt mobile payment apps if they enhance the accomplishment of their tasks. If a consumer encounters obstacles such as cost, risk, insecurity, or discomfort in mobile payment app transactions, it could lead to disappointment, and in turn to the rejection

of the mobile payment app. Adoption thus takes place if the mobile payment app is appropriate for the task at hand in terms of convenience and compatibility with their values, beliefs, and lifestyle, and if their pre-use expectations are met or confirmed.

In a similar fashion, confirmation of expectations is realised if the product meets or exceeds consumers' prior expectations; but when the product or service falls short of expectations, there will be negative disconfirmation, leading to rejection of the product or service (Oliver, 1980). This study describes confirmation as the perception of consistency between the drivers and inhibitors in using the mobile payment app and the actual adoption. From the above, it can be observed that the conceptualisations between confirmation (the performance of the product as expected) (Bhattacharjee, 2001) and adoption (a choice to accept or reject an innovation) (Straub, 2009) suggest that confirmation and adoption are terms that can be used interchangeably, because both measure consumers' experience after using a new technology. In other words, both adoption and confirmation take into account the actual experience of using the mobile payment app to confirm/adopt or refute the initial expectations of the service.

1.8.4 Predictors of continuance intention

1.8.4.1 Perceived usefulness

Davis (1989:320) defines perceived usefulness as the degree to which a person believes that using a particular system would enhance his or her job performance. Although the construct was initially meant to measure perceived usefulness within an organisational context, numerous studies of new technology continuance intention have suggested that continuance intentions are represented by perceived usefulness (Kim, 2010:7034). In the context of our proposed model, perceived usefulness represents the practical benefits that an individual experiences in using mobile payment services. Hong *et al.* (2006:1821) reported that the users' perceived usefulness of a new technology (i.e., post-adoption expectation) is a key determinant of satisfaction and continuance intentions. Based on the above, perceived usefulness is included in the proposed model to measure consumers' intentions to continue using mobile payment applications to purchase products and services.

1.8.4.2 Perceived ease of use

Perceived ease of use is considered to be one of the most influential attributes in the continuance intention to use new technology (Ramos-de-Luna *et al.*, 2015:6). As previously alluded to, perceived ease of use refers to an individual's perception that using a particular system is effortless or easy to do (Davis, 1989:320). Given that user satisfaction is a type of affect, perceived ease of use is expected to have a positive influence on users' level of satisfaction with new technologies (Thong *et al.*, 2006:802). Thong *et al.* (2006:803) and Hong *et al.* (2006:1824) found that perceived ease of use is an important factor influencing users' continued usage intention. Based on the above, perceived ease of use is included in the proposed model to investigate consumers' intentions to continue using mobile payment services to purchase products or services.

1.8.4.3 Satisfaction

Researchers agree with the premise that consumers want to be satisfied. Satisfaction is defined as the whole psychological state that results when the emotion about disconfirmed expectations is coupled with consumers' prior feelings about the consumption experience (Bhattacharjee, 2001:354). Kotler and Keller (2009) define satisfaction as a person's feeling of pleasure or disappointment that results from comparing a product's perceived performance (or outcome) with his/her expectations. The above definitions underscore a psychological or affective state that is related to, and results from, a cognitive appraisal of the expectation-performance discrepancy (confirmation) (Bhattacharjee, 2001:354). Lower expectation and/or higher performance lead to greater confirmation, which in turn positively influences customer satisfaction. Previous studies have demonstrated that satisfaction is the primary motivation for continued use (Eriksson & Nilsson, 2007:160; Mouakket & Bettayeb, 2015:4; Thong *et al.*, 2006:805). Satisfied customers will repeat the purchase, are brand loyal, and convey positive word-of-mouth advertising; and all of these will enhance sales (Almossawi, 2012:142).

1.8.4.4 Continuance intention

Consumers' continuance intention is also described as 'repurchase intention' because both decisions (1) follow an initial (acceptance or purchase) decision, (2) are

influenced by the initial use of an information technology or service experience, and (3) potentially lead to a reversal of the initial decision (Bhattachajee, 2001:355). Therefore, continuance intention is the degree to which an individual currently using a mobile phone to purchase products or services has developed conscious plans to keep using it in the future (Setterstrom *et al.*, 2013:1142). Consumers' continuance intention is determined by their satisfaction with prior use – an association that has been corroborated in previous studies (Chen, Yen & Hwang, 2012; Kim, 2010; Hong *et al.*, 2006).

Buyers' continued use is central to the survival of mobile payments (Eriksson & Nilsson, 2007:160). These authors agree with Bhattachajee (2001:352), who reported that the market share and revenue of a firm depends on both the number of initial adopters and the number of continued users. Understanding consumers' continuance intention is paramount, therefore, as it indicates consumers' levels of satisfaction with the product or service, and satisfaction is an important antecedent to continuance intention.

1.9 RESEARCH METHODOLOGY

Leedy and Ormrod (2010:12) describe 'research methodology' as the general approach the researcher takes in conducting the research project, which in turn dictates the tools to be selected and used in the project. The research methodology adopted for this study enables the researcher quantitatively to assess and evaluate the predictors of adoption and continuance intention to use mobile payment services in the context of an emerging economy. Consequently, the research methodology will further the understanding of new mobile technology adoption and continuance intention.

1.9.1 Research design

A research design is the framework that directs marketing research efforts (Wiid & Diggins, 2009:33), specifying the methods and procedures for collecting, processing, and analysing data. For this study, empirical investigation is carried out by means of a survey. Leedy and Ormrod (2010:108) describe survey research as a study designed to determine the incidence, frequency, and distribution of certain characteristics in a population. Through a survey, this study will acquire data from a sample of

respondents about their characteristics and experiences with mobile payment services. This approach, which is termed 'descriptive' (Leedy & Ormrod, 2010:187), is appropriate for this study in answering the who, what, where, when, and how questions about adoption and continuance intention to use mobile payment services.

According to McGivern (2009:51), the type of data researchers can collect is either qualitative or quantitative. Quantitative research involves collecting data from relatively large samples, usually presented numerically. Qualitative research, on the other hand, involves relatively small sample sizes for research techniques such as in-depth interviews, focus groups, and observation. This study employs a quantitative approach to collecting data, using an online self-administered questionnaire from a consumer panel. The study applies a cross-sectional research design, as respondents were only asked to complete the questionnaire on one occasion at a specific moment in time. The cross-sectional design was deemed appropriate because the purpose of the study was not to determine changes in respondents' behaviour over time, as is the case with longitudinal studies.

As this study employs a quantitative approach, a positivist research paradigm is followed to assess the hypothesised paths depicted in Figure 4. McGivern (2009:146) defines positivism as an epistemological view in which knowledge is acquired from empirical reality. A positivist approach is applied because information is collected from users of mobile payment services, on the basis that they have the needed information and that it can be extracted through the survey. Thus a positivist paradigm aims to give effect to the objective of the study by assessing the predictors of adoption and continuance intention to use mobile payment services in South Africa.

1.9.2 Sampling plan

Sampling refers to the steps that are employed in obtaining information from a subset (sample) of a larger group of people (McDaniel & Gates, 2010:326). Since it is practically impossible to survey all consumers who own mobile payment enabled mobile phones in South Africa, a sample is drawn from the population.

The target population is defined in terms of elements, sampling units, extent, and time (Yin, 2011:83). For the purpose of this study, the target population are users of mobile payment services who own mobile payment enabled mobile phones, who are aged 18

years or older, and who live in one of South Africa's nine provinces. In addition, the target population are consumers who own a valid credit card, cheque card, or any mobile payment enabled bank card offered by financial institutions in South Africa. Furthermore, the sample comprises consumers who have downloaded any mobile payment app on their mobile phones, regardless of whether or not they have used the app thereafter.

When deciding on the sample size to use, it is often a case of using one's judgment rather than precise calculation (Wiid & Diggines, 2009:210). This assertion is echoed by Maholtra (2007:328), who reported that, with sample size, the researcher needs to decide on how many elements to include in the research study. In fact, according to these authors, the researcher must choose a sample size that is big enough to yield a relatively precise estimate of the population values, but that at the same time is small enough to be executed economically and practically. Since this study proposes to employ structural equation modelling (SEM) to analyse the data, a number of issues need to be considered in determining the sample size. According to Hair, Black, Babin, Anderson and Tatham (2006:740), these issues include the distributional properties of the data, the estimation method, and model complexity. Considering these factors, a sample size of 450 sampling elements from adult consumers (aged 18 years or older) is targeted. In the absence of a sampling frame, a non-probability sampling method using the convenience sampling technique is employed to collect data from respondents. Convenience sampling involves drawing a sample from a selection of the population that is readily accessible or available to the researcher (Wiid & Diggines, 2009:200).

The advantages and limitations of non-probability sampling – and specifically of convenience sampling – should be taken into consideration when conducting a study. Convenience sampling is advantageous in that it is a convenient way to obtain a large number of completed questionnaires quickly and economically (Zikmund, 2003:298). Although a large number of responses can be obtained fairly quickly at a low cost, there is the possibility of influences beyond the control of the researcher, as well as a chance of sampling error because there is also a chance that the recruited respondents may not all be appropriate to the study. For these reasons, results cannot be generalised to a wider population.

1.9.3 Scale development

The questionnaire for this study comprises eleven constructs to measure the entire framework. All measurement items are drawn from existing literature and adapted to reflect the context of the study. The scales measuring optimism, innovativeness, discomfort, and insecurity are all adapted from Parasuraman and Colby (2015). Scales measuring convenience and perceived ease of use were adopted from Kim *et al.* (2010); perceived cost scales are from Kim (2010); compatibility scales are from Schierz *et al.* (2010); and perceived risk scales are from Ramos-de-Luna *et al.* (2015). The scales measuring adoption, continuance intentions, and perceived usefulness are adopted from Bhattacharjee (2001), while satisfaction scales are taken from Susanto *et al.* (2016). The reliability of the scales used in prior studies and reported in this study is shown in Table 4. The questionnaire was pre-tested before it was fielded. The research constructs used in the study are shown in Appendix A.

Table 4: Reliability of the scales reported in prior studies used in this study

| Construct | Cronbach's Alpha | Number of scale items |
|-----------------------|-------------------------|------------------------------|
| Optimism | 0.80 | 4 |
| Innovativeness | 0.83 | 4 |
| Discomfort | 0.70 | 4 |
| Insecurity | 0.86 | 4 |
| Convenience | 0.89 | 4 |
| Compatibility | 0.91 | 3 |
| Perceived cost | 0.71 | 4 |
| Perceived risk | 0.80 | 3 |
| Adoption/confirmation | 0.77 | 3 |
| Perceived usefulness | 0.88 | 4 |
| Perceived ease of use | 0.91 | 5 |
| Satisfaction | 0.94 | 4 |
| Continuance intention | 0.83 | 3 |

The questionnaire used in the study started by stating the purpose and goal of the survey. A definition of 'mobile payment service' was also provided in the introduction, along with examples of mobile payment apps for the purpose of clarity. The duration of the survey was highlighted, and participants were assured of their confidentiality

and anonymity in completing the survey. Two screening questions were used to identify suitable respondents: (a) Are you 18 years of age or older? (b) Have you downloaded any mobile payment application on your mobile phone?

The questionnaire comprises three sections. Section A asks respondents' knowledge about the various mobile payment apps that are currently available in South Africa. The purpose of this section is to measure the extent to which respondents are aware of these mobile payment apps. Thus, this section asks questions relating to the mobile payment apps the respondent has downloaded, the type of app used, frequency of use, and the type of products or services previously bought with the apps.

Section B contains statements measuring predictors of consumers' mobile payment readiness, and their continuance intentions to use mobile payment services. This section employs a seven-point Likert response type format to measure the attitude statements, with scale points ranging from 1 ('strongly disagree') to 7 ('strongly agree').

Section C measures the demographic profile of respondents with respect to age, gender, education level, ethnicity, industry in which respondents work, residence of respondents by province, and household income. The thirteen constructs measured in this study are contained in the questionnaire, which is given in Appendix B.

1.9.4 Pre-testing

The questionnaire used in this study was pre-tested among 30 respondents from the study population. Pre-testing is undertaken to assess the reliability of the measurement scales and the unidimensionality of each scale (Nel, 2013:12). A requirement for a pre-test is that the sample selected for the pre-test should be similar to the final sample to be selected for the proposed study (Hair *et al.*, 2006). The respondents in the pre-test should therefore respond in a similar way to the users of mobile payment services. During the pre-testing phase, respondents were informed that the completion of the questionnaire was part of a pre-testing and refinement process (Cooper & Schindler, 2006:396). The following aspects were considered during the pre-testing process, as cited by Cooper and Schindler (2006:396):

- *Participant interest* – The pre-test helped to determine whether the questionnaire was stimulating or not.

- *Meaning* – In pre-testing the questionnaire, it was observed that the questions were clear to respondents.
- *Continuity and flow* – Continuity and flow in the entire questionnaire were considered during the pre-testing period.
- *Variability* – This aspect was assessed to ensure that the question alternatives covered the widest possible range of answer options.
- *Length and timing* – In this case, the time that it takes respondents to answer the entire questionnaire was tested.

Based on the above assessment, no major changes worth reporting were made to the original questionnaire. After pre-testing the questionnaire, ethical clearance was obtained from the University of Pretoria's ethical committee, and data collection began.

1.9.5 Data collection

Data was collected using an online self-completion questionnaire administered in all nine provinces in South Africa. The study proposed participant recruitment through a market research firm, using their consumer panel database. A consumer panel is a group of participants who have indicated their willingness to participate in research studies (Cooper & Schindler, 2006:759). Participants were incentivised by the market research firm's standard practices. The questionnaire was hosted on the market research firm's online server.

Prior to completing a survey, ethical procedures require researchers to ask potential participants to give informed consent, indicating that they wish to participate in the survey voluntarily. Upon registration, consumer panel members gave consent to participate in the survey. Every panel member went through a double opt-in process, in which the respondents agree twice that they are prepared to answer the questionnaire, and also have the option to withdraw from the panel before being added to the database. Thus, panel members gave 'overall' consent to participate in the survey, which implies that consent was given by all panel members to participate in the current study.

All surveys require a description of the purpose of the survey and the type of information required of respondents. Such information is provided in a covering letter. The covering letter that the research company sent to respondents via email invited panel members to participate in the survey, and explained the purpose of the survey.

It is important, however, to consider the advantages and disadvantages of consumer panels. On the positive side, sampling from an online consumer panel yields a high response rate because panel members have already agreed to cooperate with the research firm (Zikmund, 2003:307). More often, members of the a consumer panel are created on the basis of their interest or purchasing behaviour with specific products or services, so that targeting them in surveys usually yields better results.

Online consumer panels are not without limitations. Panel members can drop out, and replacing them with new members who possess similar characteristics is usually a mammoth task (Bradley, 2010:275). Furthermore, consumer panel research is expensive primarily because of the need continually to build up and maintain the panel. It is also argued that, if panel members become biased over time due to their experience in participating in surveys, they may provide inaccurate and unreliable information (Bradley, 2010:275). The research firm exercised caution in this regard, and respondents whose answers were inconsistent were removed from further analyses.

1.9.6 Data analysis

The Statistical Program for Social Scientists (SPSS) Version 23 was used to analyse the data. Data were checked for accuracy, completeness, and validity before entering them into SPSS programme (Maholtra, 2007:436).

Recent editorial work has stressed the potential problem of common method bias, which describes the measurement error that occurs when variations in responses are caused by the instrument rather than by the predispositions of the respondents that the instrument attempts to uncover. In other words, the instrument introduces a bias, giving rise to variances (Chang, van Witteloostuijn & Eden, 2010:178). Consequently, the results are contaminated by the 'noise' stemming from the biased instrument (Chang *et al.*, 2010:179). According to Podsakoff *et al.* (2003), common method bias may be caused by several problems such as the social desirability of answers, the consistency motif of respondents, self-reporting errors, or scale length.

Podsakoff *et al.* (2003) suggest two methods to control for common method bias: the design of the study procedures, and statistical controls. Although the study included preventative measures in the design process such as ensuring the respondents'

anonymity, obtaining measurements of the predictor and criteria variables from different sources, and defining unfamiliar and ambiguous terms such as 'mobile apps', not all common method bias could be prevented. The study collected data on both the independent and the dependent variables from the same respondents at one point in time, thus raising potential common method variance, as false internal consistency might be present in the data.

Therefore the study also used statistical controls to test whether common method bias might be a concern. The Harman's single factor score, in which all items (measuring latent variables) are loaded into one common factor, was used. If the total variance for a single factor is less than 50%, it suggests that common method bias does not affect the data (Wu, 2013:171). The widely used Harman one-factor test was subsequently employed in this study (Wu, 2013:171). The results of the Harman's single factor test indicated that the total variance for a single factor was 31.87%, thus suggesting that there was no common method bias in this study.

The scales used in the study were subjected to reliability and validity tests. Reliability of scales measures the extent to which a set of variables is consistent in what it is intended to measure, while validity measures the extent to which a set of measures correctly represents the concept being studied (Hair *et al.*, 2006). The reliability of the measurement instrument was considered by assessing the Cronbach's Alpha values and composite reliability (CR) scales, in which values greater than 0.7 are acceptable (Pallant, 2016). Composite reliability (CR) results are also reported because researchers believe that Cronbach's Alpha values generally underestimate internal consistency reliability (Nunnally, 1978).

Construct validity was assessed to determine the accuracy of the measurement items. Evidence of construct validity provides confidence that item measures taken from a sample represent the true score that exists in the population (Hair *et al.*, 2006:776). Because construct validity is based on the sound theoretical underpinning of the construct and its relation to other constructs, it addresses the concern of whether the scale measures what it is supposed to measure (Maholtra, 2007:436). Confirmatory factor analyses were performed to determine construct validity for predictors of adoption and continuance intention to use mobile payment services. Since the constructs measuring consumer adoption of mobile payment services were

categorised as drivers and inhibitors, this study investigated whether a second-order factor could be generated and used instead of the first-order factors. The purpose was to determine whether latent constructs can be derived that appropriately represent the drivers and inhibitors. The target coefficients were calculated for both second-order factor models. This is done by calculating the target coefficients, which according to Hair *et al.* (2006) should fall between 0.9 and 1. Values below the threshold would indicate no statistical reason to use the second order factors.

Discriminant validity was performed to determine the extent to which a construct is truly distinct from other constructs (Hair *et al.*, 2006:771). Discriminant validity was assessed using the criterion of Fornell and Larcker (1981), in which the square root of the average variance extracted (AVE) should be greater than all the correlations between each pair of constructs. Any pair of constructs that showed weak discriminant validities were subjected to further testing, as suggested by Bagozzi and Phillips (1982), Bagozzi, Yi and Phillips (1991), and Hair, Anderson, Tatham and Black (1998). The Bagozzi and Phillips (1982) test entails examining the differences in Chi-square value between the unconstrained CFA model and the nested CFA model to determine whether a pair of constructs are distinct. A resultant Chi-square value must be greater than 3.84 to indicate that the two constructs are unique. The procedure proposed by Bagozzi *et al.* (1991) examines the confidence intervals for the estimated correlations between pairs of constructs. A 95% confidence interval for the correlations between a pair of constructs that do not contain unity indicates that the two constructs are indeed unique. Furthermore, if the confidence interval contains zero, then one can assert that the pair of constructs are distinct, or nearly so (Bagozzi *et al.*, 1991:436). The criterion of Hair *et al.* (1998) stipulates that the correlation coefficients between a pair of constructs that is less than 0.9 indicate discriminant validity. The study used the confidence interval of 95% (significance level of 0.05) for all data analyses. However, the probability of achieving statistical significance is based not only on statistical considerations, but also on the actual magnitude of the effect of interest, such as the correlation between variables (Hair *et al.*, 2006:10).

The study performed the following data analyses:

- Descriptive statistics using frequency tables and cross-tabulations were analysed. These descriptive statistics entailed the number of questionnaires analysed, the

demographic profiles of the respondents, the type and frequency of app usage, and the type of products bought with the app. The distribution of the results was interpreted to determine whether the results for each scale were normally distributed (Pallant, 2010:57).

- To assess reliability, Cronbach’s Alpha and composite reliability (CR) were assessed. To assess validity, confirmatory factor analysis (CFA) was conducted (Pallant, 2010), using AMOS Version 24 software.
- Structural equation modelling (SEM) was employed to test both the relationships and the overall fitness of the research model (Hair *et al.*, 2006) in addressing the research questions. The hypothesised paths were tested using SEM, due its ability to test both the relationships and the overall fitness of the research model (Hair *et al.*, 2006). The goodness-of-fit of the models was estimated for the χ^2 /Degrees of freedom, the Tucker-Lewis Index (TLI), the normed fit index (NFI), the incremental fit index (IFI), and the root mean square error of approximation (RMSEA). The cut-off points for the above indices are indicated in Table 5 below.

Table 5: CFA fit indices

| Fit indicators | Recommended thresholds | Recommending authors |
|----------------|------------------------|-----------------------------|
| χ^2/df | ≤ 5.00 | Hooper <i>et al.</i> (2008) |
| CFI | ≥ 0.90 | Hair <i>et al.</i> (2006) |
| TLI | ≥ 0.90 | Hair <i>et al.</i> (2006) |
| IFI | ≥ 0.90 | Hair <i>et al.</i> (2006) |
| RMSEA | ≤ 0.06 | Hu and Bentler (1999) |

- Multiple regression analysis was performed to investigate the adoption of mobile payment services and the moderating effect of gender. The coefficients of the regression model were investigated, using the unstandardised regression coefficients or *beta values*, which represent the contribution of each predictor variable. The *t-tests* associated with the beta values were also examined. The *t-tests* demonstrate the statistical significance of the beta values. To be significant, the p-value should be smaller than 0.05 (Pallant, 2010).
- Partial least squares structural equation modelling (PLS-SEM) was performed to test the structural model of the EECM-IT that would measure continuance intention to use mobile payment services in the context of an emerging economy. Smart

PLS3 software was employed to represent and test the model. Partial least squares structural equation modelling (PLS-SEM) is also known as 'variance-based SEM', and it allows the use of variance-based structural equation modelling instead of a covariance-based SEM method. The PLS-SEM was analysed in two stages. First, the measurement model (outer model) was analysed to confirm that it was valid and reliable. Before the structural model can be assessed, the presence of multicollinearity needs to be investigated. To assess whether multicollinearity was present, the variance inflation factor (VIF) values were calculated for all the constructs in the model. VIF values that exceed 5 indicate the presence of multicollinearity (Hair, Ringle & Sarstedt, 2011:145). Second, the structural model (inner model) was evaluated by estimating the statistical significance paths between the constructs by t-values (Groß, 2016:115), using the bootstrapping option (5000 resample), and also assessing the level of the R^2 values and the f^2 effect sizes. The effect size for each path can be established by calculating Cohen's f^2 (Hair, Sarstedt, Hopkins & Kuppelwieser, 2014:114). According to these authors, the criterion to determine the effect size is that 0.02, 0.15 and 0.35 represent small, medium, and strong effects respectively.

1.10 CONTRIBUTION OF THE STUDY

This research attempts to make both theoretical and practical contributions to the field of study in terms of both adoption and continuance intention to use mobile payment services.

1.10.1 Theoretical contributions

Previous international studies on mobile payments have primarily focused on the adoption of mobile payment services (Dahlberg *et al.*, 2015:1-20; Chong *et al.*, 2012:34-43; Mallat, 2007:413-432; Schierz *et al.*, 2010:209-216), without focusing on continued use intentions. This study is the first in South Africa empirically to test the determinants of both consumer adoption and continuance intentions concurrently in the same model.

The model developed for this study is based on two theoretical frameworks that are relevant to consumer adoption and continuance intentions to use mobile payment services. The study builds on and extends the TRI model presented by Parasuraman

(2000), and combines it with the EECM-IT developed by Hong *et al.* (2006) to fit specific mobile payment services offered by service providers in South Africa. The combination of these two models, designed to measure different aspects of user perceptions, is expected to provide a more complete understanding of adoption and continuance intentions to use mobile payment services (Hong *et al.*, 2006:1823). Since the TRI is an individual-level construct, examining its structural stability and invariance across different environmental contexts (e.g., countries with different cultures and technology infrastructures) is important for generalisation purposes (Parasuraman & Colby, 2014:73). The available local reports on the adoption of mobile payments are based on anecdotal studies that are not well coordinated.

Before the two models were combined, the TRI was examined to determine its applicability to predicting adoption of mobile payment services. Second, the EECM-IT was examined to determine its predictive ability to measure continuance intention to use mobile payment services. Third, the two models were eventually integrated to determine whether the combined model would be applicable to measuring both adoption and continuance intention in a single study. To the best knowledge of the authors, this is the first study to integrate the TRI and the EECM-IT in a developing country context to measure adoption and continued use.

The research model developed for this study specifies key factors of consumer adoption and continuance intention to use mobile payment services across various industries. Thus its theoretical contribution is that it develops an additional insight into the theoretical foundation, and may be generic enough to provide understanding in a wide variety of mobile payment situations (Chen *et al.*, 2012:939). Furthermore, the integration of two models may provide an initial blueprint for the further integration of other theoretical adoption and continuance intention models that can be applied to the South African new technology contexts (Lee, 2010:514). In addition, the academic literature about the effect of demographic factors on the adoption of mobile payment services space is still scarce and limited – and the few available studies report conflicting results. Some studies have proposed that socio-demographic factors are not significant (Karjaluoto *et al.*, 2006:5), which conflicts with other studies such as that of Nittala (2011:48), who reported that differing demographic characteristics

significantly influence adoption of new technologies. The lack of clarity on the issue indicates the need for further research – a gap that this study attempts to bridge.

1.10.2 Practical contributions

From a practical perspective, understanding factors that influence adoption of mobile payment services will assist service providers to achieve competitive advantage (Kim *et al.*, 2010:311). Of particular importance to managers of mobile payment services is how effectively to boost the number of users. The results of the study may help service providers to invest appropriate time, effort, and money in the development and provisions of mobile payment services (Kim *et al.*, 2010:320). Understanding the influence of demographic factors is important because researchers agree that different user groups may perceive mobile payment advantages differently. This study will provide useful pointers to service providers to classify the market into different segments, and to customise, promote, and offer services to suit the specific needs of consumers (Pham & Ho, 2015:12).

On the other hand, a major goal of the service provider of a new technology should be to devise strategies that will help to increase users' satisfaction and to manage their expectation about the innovation (Thong *et al.*, 2006:808). The results of this study may enable service providers not only to attract users, but also to retain existing ones and increase their usage. Satisfied customers can provide not only an effective conduit to bring in new users via word-of-mouth promotions (Thong *et al.*, 2006:888), but can also act as a stable revenue source via repeat business (Hong *et al.*, 2006:1831).

1.11 **OUTLINE OF THE STUDY**

The study is presented over five chapters. An overview of each chapter is presented below.

1.11.1 Chapter 1: Background of the study

Chapter 1 provides a contextual overview of the study and the rationale for conducting it. The research problem is contextualised, the research objectives are outlined, and the research methodology is clarified. The proposed models for the study are indicated in the chapter, together with the motivation for each model. A combination of two models, and the reasoning behind the integration, is given. First, consumer adoption of mobile payment services is investigated based on drivers and inhibitors grounded

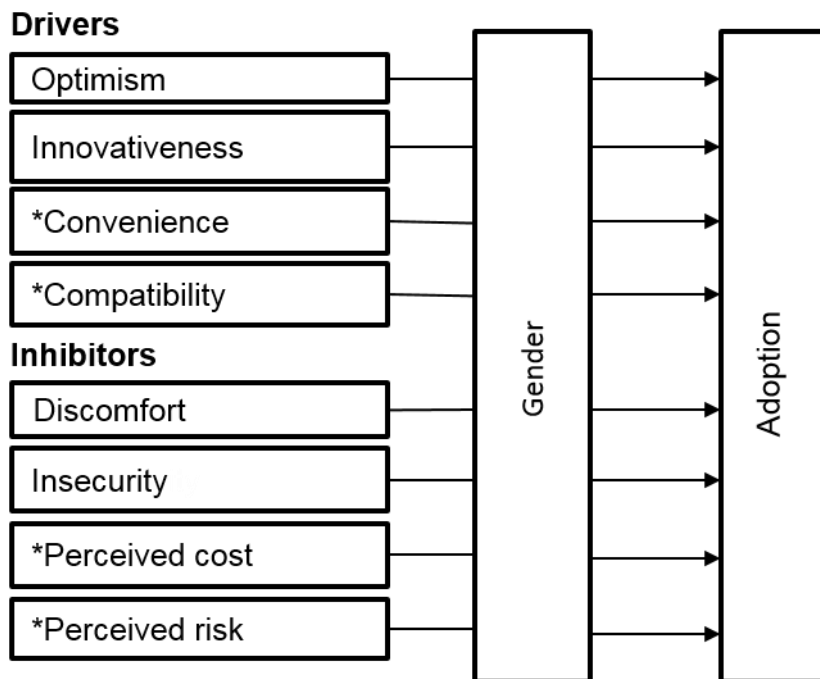
in the TRI, and then continuance intention to use mobile payment services and grounded in the EECM-IT is investigated. The first part of the model is examined in Chapter 2, while the second part of the model is examined in Chapter 3. The contribution of the combined model is expanded from both the theoretical and the practical implications discussed in Chapter 4.

1.11.2 Chapter 2: Article 1. Determinants of consumer readiness to adopt mobile payment services

Chapter 2 presents the first article, which focused on the determinants of consumers' readiness to embrace mobile payment services in the context of an emerging economy. The purpose of the article is to extend the body of academic knowledge on the adoption of mobile payment services, using an updated technology readiness index (Parasuraman, 2000) as the theoretical underpinning. Additional constructs taken from the literature – namely convenience, compatibility, perceived cost, and perceived risk – are included in the model to make an academic contribution. The constructs are divided into four drivers – optimism, innovativeness, convenience, and compatibility – and four inhibitors – discomfort, insecurity, perceived cost, and perceived risk. The role of gender as a moderator is also examined. The article was submitted to the *Journal of African Business* (JAB).

The **primary objectives** of Article 1 were to determine the factors that drive or inhibit the adoption of mobile payment services among users, and to determine the moderating effect of gender on the predictors. Figure 5 depicts the extended TRI that forms the first part of the integrated model that grounds the adoption of mobile payment services.

Figure 5: Extended technology readiness index (TRI) in mobile payment adoption context



*Constructs added to extend the original TRI

Method of analysis: Multiple regression analysis (MRA) is employed to measure the extent to which the above factors predict the adoption of mobile payment services. MRA is applicable for two reasons: (a) it is used to test how well a set of variables is able to predict a particular outcome, and (b) it allows one to test whether adding a variable contributes to the predictive ability of the model over and above those variables already included in the model (Pallant, 2010:148). In this study, four variables – convenience, compatibility, perceived cost, and perceived risk – have been included in the TRI to predict the adoption of mobile payment services.

1.11.3 Chapter 3: Article 2. Predicting continuance intention to use mobile payment services: A partial least squares modelling approach

Article 2 is presented in Chapter 3. The article is based on the extended expectation confirmation model in the context of information technology (EECM-IT) as developed by Thong *et al.* (2006). The choice of the model is motivated, and the purpose is to test the predictive ability of the model and its applicability in an African context. The constructs measuring continuance intention are confirmation, perceived ease of use,

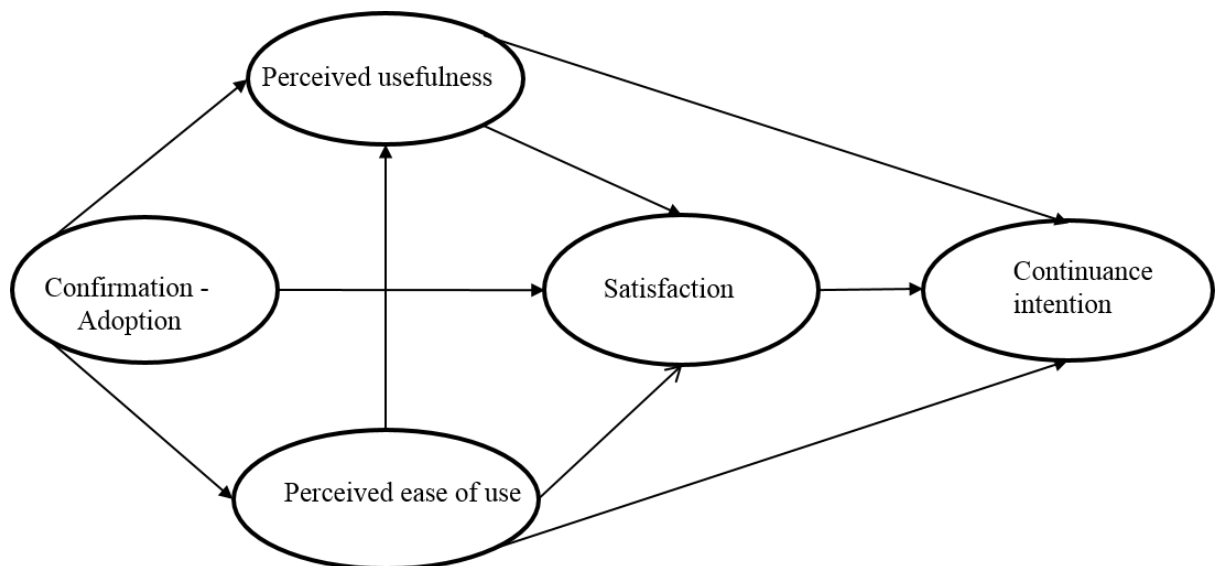
perceived usefulness, and satisfaction. The article was submitted to the *African Journal of Economic and Management Studies* (AJEMS).

The **primary objectives** of Article 2 were to predict the factors that influence continuance intentions following consumers' experience with mobile payment services, and to determine the moderating effect of gender, as depicted in Figure 6.

Method of analysis: Partial least squares structural equation modelling (PLS-SEM).

Confirmatory factor analyses were performed to assess validity. The PLS-SEM was deemed appropriate for analysis of the results of this article because researchers recommend it in studies of a predictive nature (Groß, 2016:114) as well as for cause-effect-relationship models that are complex (Hair et al., 2011). Because this study focuses primarily on predicting continuance intentions to use mobile payments, the PLS-SEM was deemed applicable. Figure 6 indicates the proposed EECM-IT in which the moderating effect of gender on the predictors of continuance intention is also assessed.

Figure 6: The proposed extended expectation confirmation IT model



1.11.4 Chapter 4: Article 3. An integrated framework for adoption and continuance intentions to use mobile payment services

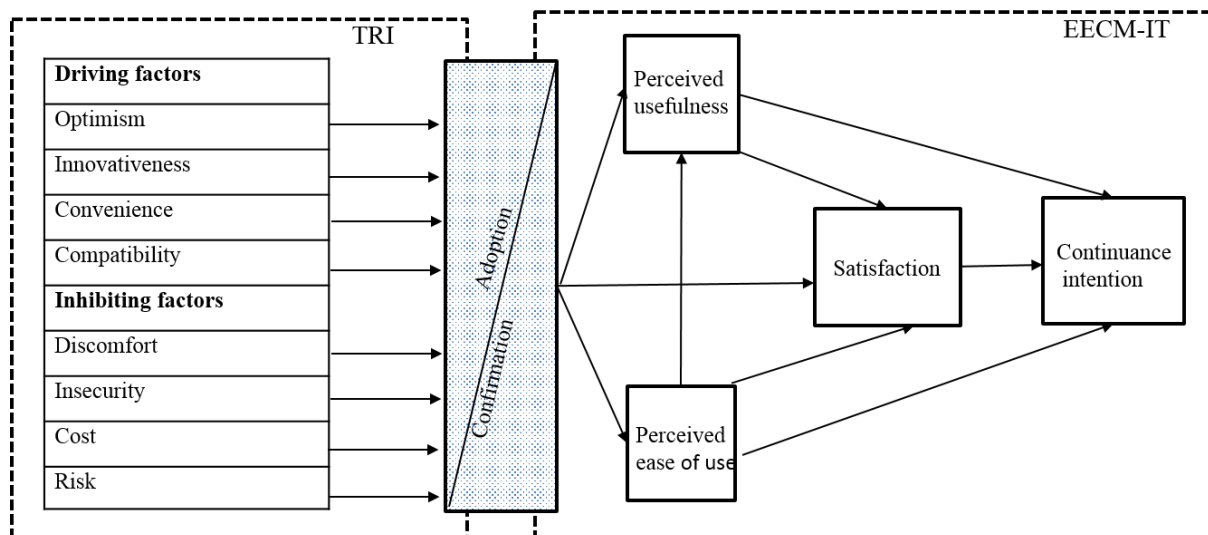
Chapter 4 presents the third article, which reflects the integrated model. The article was submitted to the *International Journal of Emerging Markets* (IJEM).

The **primary objective** of Article 3 was to develop and test a proposed model that simultaneously explains the adoption and continuance intention to use mobile payment apps. The proposed model was constructed via a three-step approach, already alluded to earlier in this report. The TRI was used as the theoretical underpinning to measure consumer adoption, after which the EECM-IT was tested to measure continuance intentions. After the two models had been found adequate, they were combined to measure both adoption and continuance intention in a single study.

Method of analysis: Structural equation modelling.

Confirmatory factor analysis (CFA) was performed in order to validate the factor structure of the measurement items, followed by structural equation modelling (SEM) to test the hypothesised paths and to validate the proposed model. Due its ability to test both the relationships and the overall fitness of the research model, SEM was used to test the proposed model and the hypothesised paths shown in Figure 7. Discriminant validity was assessed by using the Fornell and Larcker (1981) criterion. Constructs that showed weak discriminant validities were subjected to further testing according to criteria proposed by Bagozzi and Phillips (1982), Bagozzi *et al.* (1991), and Hair *et al.* (1998), to confirm discriminant validity between the constructs.

Figure 7: Technology readiness extended expectation confirmation model in the context of mobile payments



1.11.5 Chapter 5: Conclusion and recommendations

Chapter 5 concludes with a summary of the main findings of the study, providing its theoretical and practical implications, the contributions of the study, recommendations, and lastly, its limitations and possible avenues for future research.

LIST OF REFERENCES

- Al-Jabri, I.M. & Sohail, S. 2012. Mobile banking adoption: Application of diffusion of innovation theory. *Journal of Electronic Commerce Research*, 13(4): 379-391.
- Almossawi, M.M. 2012. Customer satisfaction in the mobile telecom industry in Bahrain: Antecedents and consequences. *International Journal of Marketing Studies*, 4(6): 139-156.
- Ajzen, I. 2011. The theory of planned behaviour: Reactions and reflections. *Psychology & Health*, 26(9): 1113-1127.
- Ajzen, I. 1991. The theory of planned behaviour. *Organisational Behaviour and Human Decision Processes*, 50(2): 179-211.
- Ajzen, I. & Fishbein, M. 1973. Attitudinal and normative variables as predictors of specific behaviour. *Journal of Personality & Social Psychology*, 27: 41-57.
- Bagozzi, R.P. & Phillips, L.W. 1982. Representing and testing organizational theories: A holistic construal. *Administrative Science Quarterly*, 27: 459-89.
- Bagozzi, R.P., Yi, Y. & Phillips, L.W. 1991. Assessing construct validity in organizational research. *Administrative Science Quarterly*, 36: 421-458.
- Banking Association of South Africa. 2017. *Consumer information*. (<http://www.banking.org.za/consumer-information/bank-crime/cash-theft>) [Accessed 01 September 2017].
- Bhattacharjee, A. 2001. Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3): 351-370.
- Bradley, N. 2010. *Marketing Research Tools and Techniques*. 2nd ed. New York: Oxford University Press.
- Cape Digital Foundation. 2017. *Global Digital Overview 2017 – Facts and Figures*. (<http://www.digitalfoundation.org.za/2017/03/global-digital-overview-2017-facts-figures/>) [Accessed 01 September 2017].

- Chang, S.J., van Witteloostuijn, A. & Eden, L. 2010. Common method variance in international business research. *Journal of International Business Studies*, 41(2): 178-184.
- Chen, W., Hancke, G.P., Meyes, K.E., Lien, Y. & Chiu, J.H. 2010. NFC mobile transactions and authentication based on GSM network. *Proceedings of the Second International Workshop on Near Field Communication*, Monaco, 83-89.
- Chen, S.C., Yen, D. & Hwang, M.I. 2012. Factors influencing the continuance intention to the usage of Web 2.0: An empirical study. *Computers in Human Behaviour*, 28: 933-941.
- Cho, J. 2016. The impact of post-adoption beliefs on continued use of health apps. *International Journal of Medical Informatics*, 87: 75-83.
- Chong, A.Y.L., Chan, F.T.S. & Ooi, K.B. 2012. Predicting consumer decisions to adopt mobile commerce: Cross country empirical examination between China and Malaysia. *Decision Support Systems*, 53: 34-43.
- Conner, M. & Armitage, C.J. 1998. Extending the theory of planned behaviour: A review and avenues for further research. *Journal of Applied Social Psychology*, 28(15): 1429-1464.
- Cooper, D.R. & Schindler, P.S. 2006. *Marketing Research*. New York: McGraw Hill International Edition.
- Dahlberg, T., Guo, J. & Ondrus, J. 2015. A critical review of mobile payment research. *Electronic Commerce Research & Applications*, 14(5): 265-284.
- Dahlberg, T., Mallat, N., Ondrus, J. & Zmijewska, A. 2008. Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research & Applications*, 7: 165-181.
- Davis, F.D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3): 319-340.
- DeLone, W.H. & McLean, E.R. 1992. Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1): 60-95.

- DeLone, W.H. & McLean, E.R. 2004. Measuring e-commerce success: Applying the DeLone & McLean information systems success model. *International Journal of Electronic Commerce*, 9(1): 31-47.
- De Reuver, M., Verschuur, E., Nikayin, F., Cerpa, N. & Bouwman, H. 2014. Collective action for mobile payment platforms: A case study on collaboration issues between banks and telecom operators. *Electronic Commerce Research & Applications*, 14(5): 1-14.
- Duh, H. 2015. Testing three materialism life-course theories in South Africa. *International Journal of Emerging Markets*, 10(4): 747-764.
- Eriksson, K. & Nilsson, D. 2007. Determinants of the continued use of self-service technology: The case of internet banking. *Technovation*, 27: 159-167.
- Fornell, C. & Larcker, D.F. 1981. Structural equation models with observable variables and measurement errors. *Journal of Marketing Research*, 18(1): 39-50.
- Fripp, C. 2014. *South Africa's mobile penetration is 133%*. (<http://www.htxt.co.za/2014/10/23/south-africas-mobile-penetration-is-133/>) [Accessed: 23 October, 2015].
- Gaur, A. & Ondrus, J. 2012. The role of banks in mobile payment ecosystem: A strategic asset perspective. *International Conference on Electronic Commerce: Singapore Management University*, 7-8.
- Groß, M. 2016. Impediments to mobile shopping continued usage intention: A trust-risk-relationship. *Journal of Retailing & Consumer Services*, 33: 109-119.
- GSMA. 2015. *Mobile Insurance, Savings and Credit*. (<http://www.gsmamobileeconomy.com/>) [Accessed 16 July 2015].
- GSMA. 2017. *The Mobile Economy Sub-Saharan Africa 2017*. (<https://www.gsmaintelligence.com/research/?file=7bf3592e6d750144e58d9dcfac6a6dfab&download>) [Accessed 21 July 2017].
- Hair Jr, J.F., Anderson, R.E., Tatham, R.L. & Black, W.C. 1998. *Multivariate Data Analysis*. 5th ed. Upper Saddle River: New Jersey: Prentice Hall.

- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. & Tatham, R.L. 2006. *Multivariate data analysis*. 6th ed. Upper Saddle River, New Jersey: Prentice Hall.
- Hair, J.F., Ringle, C.M. & Sarstedt, M. 2011. PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2): 139-152.
- Hair, J.F., Sarstedt, M., Hopkins, I. & Kuppelwieser, V.G. 2014. Partial least squares structural equation modelling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(2): 106-121.
- Herzberg, M. 2003. Payments and banking with mobile personal devices. *Communications of the ACM*, 46(5): 53-58.
- Hong, S.J., Thong, J.Y.L. & Tam, K.Y. 2006. Understanding continued information technology usage behaviour: A comparison of three models in the context of mobile internet. *Decision Support Systems*, 42: 1819-1834.
- Hsieh, J.J.P.A., Rai, A. & Keil, M. 2008. Understanding digital inequality: Comparing continued use behavioural models of the socio-economically advantaged and disadvantaged. *MIS Quarterly*, 32(1): 97-126.
- Hu, L.T. & Bentler, P.M. 1999. Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modelling: A Multidisciplinary Journal*, 6(1): 1-55.
- International Telecommunications Union. 2011. *ICT Facts and figures: The world in 2011*. (<https://www.itu.int/ITU-D/ict/facts/2011/material/ICTFactsFigures2011.pdf>) [Accessed February 2015].
- International Telecommunications Union. 2014. *State of the industry 2014 – Mobile financial services for the unbanked*. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/03/SOTIR_2014.pdf) [Accessed 21 August 2015].
- Jia, L., Hall, D. & Sun, S. 2014. The effect of technology usage habits on consumers' intention to continue use mobile payments. *Twentieth American Conference on Information Systems*: Savannah, 1-12.

- Kalan, A. 2016. *Understanding merchant adoption of m-payments in South Africa*. Thesis presented in partial fulfilment for the degree of M.Sc. Information Technology, Department of Computer Science, University of Cape Town.
- Karjaluoto, H., Leppaniemi, M., Standing, C., Kajalo, S., Merisavo, M., Virtanen, V. & Salmenkivi, S. 2006. Individual differences in the use of mobile services among Finnish consumers. *International Journal of Mobile Marketing*, 1(2): 4-10.
- Kim, B. 2010. An empirical investigation of mobile data service continuance: Incorporating the theory of planned behaviour into the expectation-confirmation model. *Expert Systems with Applications*, 37: 7033-7039.
- Kim, C., Mirusmonov, M. & Lee, I. 2010. An empirical examination of factors influencing the intention to use mobile payment. *Computers in Human Behaviour*, 26(3): 310-322.
- Kim, Y. & Crowston, K. 2011. Technology adoption and use theory review for studying scientists' continued use of cyber-infrastructure. *Proceedings of the Association for Information Science and Technology*: New Orleans, LA, 48(1): 1-10.
- Kimloglu, H., Nasir, V.A. & Nasir, S. 2010. Discovering behavioural segments in the mobile phone market. *Journal of Consumer Marketing*, 27(5): 401-413.
- Kiwanuka, A. 2015. Acceptance process: The missing link between UTAUT and diffusion of innovation theory. *American Journal of Information Systems*, 3(2): 40-44.
- Kotler, P. & Keller, K. 2009. *Marketing Management*. 13th ed. London: Prentice Hall.
- Lee, M.C. 2010. Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation-confirmation model. *Computers & Education*, 54(2): 506-516.
- Lee, Y.K., Park, J.H., Chung, N. & Blakeney, A. 2012. A unified perspective on the factors influencing usage intention toward mobile financial services. *Journal of Business Research*, 65(11): 1590-1599.
- Leedy, P.D. & Ormrod, J.E. 2010. *Practical Research: Planning and design*. 9th ed. Upper Saddle River, New Jersey: Pearson Education International.

- Liébana-Cabanillas, F., de Luna, I.R. & Montoro-Rios, F.J. 2015. User behaviour in QR mobile payment system: The QR payment acceptance model. *Technology Analysis & Strategic Management*, 27(9): 1-19.
- Liébana-Cabanillas, F., Sánchez-Fernández, J. & Muñoz-Leiva, F. 2014. Antecedents of the adoption of the new mobile payment systems: The moderating effect of age. *Computers in Human Behaviour*, 35: 464-478.
- Lin, C.H., Shih, H.Y. & Sher, P.J. 2007. Integrating technology readiness into technology acceptance: The TRAM model. *Psychology & Marketing*, 24(7): 641-657.
- Liu, Y. 2015. Consumer protection in mobile payments in China: A critical analysis of Alipay's service agreement. *Computer Law & Security Review*, 31(5): 679-688.
- Lu, J., Yu, C.S., Liu, C. & Yao, J.E. 2003. Technology acceptance model for wireless internet. *Electronic Networking Applications and Policy*, 13(3): 206-222.
- Lu, Y., Yang, S., Chau, P.Y.K. & Cao, Y. 2011. Dynamics between the trust transfer process and intention to use mobile payment services: A cross-environment perspective. *Information & Management*, 48: 393-403.
- Malhotra, N.K. 2007. *Marketing research: An applied orientation*. 5th ed. Upper Saddle River, New Jersey: Pearson.
- Mallat, N. 2007. Exploring consumer adoption of mobile payments: A qualitative study. *Journal of Strategic Information Systems*, 16(4): 413-432.
- McDaniel, C. & Gates, R. 2010. *Marketing research*. 6th ed. Hoboken, New Jersey: John Wiley & Sons Inc.
- McGivern, Y. 2009. *The Practice of Market Research: An introduction*. 4th ed. United Kingdom: Pearson.
- Milosevic, F. 2014. *Welcome to the new frontier in consumer banking in South Africa*. (<http://www.itnewsafrika.com/2014/10/welcome-to-the-new-frontier-in-consumer-banking-in-south-africa/>) [Accessed 15 March 2015].

Moodycliffe, H. 2014. *Knowing your audience's behaviour is key to mobile marketing*. (<http://www.mmsa.org/index.do?PageID=6553&PN=2&IX=46859&Sel=1&SellID=129627&DCID=&id=59889>) [Accessed 12 April 2015].

Mouakket, S. & Bettayeb, A.M. 2015. Investigating the factors influencing continuance usage intention of learning management systems by university instructors: The Blackboard system case. *International Journal of Web Information Systems*, 11(4): 1-24.

Mpinganjira, M., Dos Santos, M.A.O., Botha, E., Du Toit, D., Erasmus, A.C., Maree, T. & Mugobo, V.V. 2013. *Consumer Behaviour: A South African Psychology and Marketing Applications*. Cape Town: Oxford University Press.

Mukherjee, J. 2012. Exploring the demographic differences in adoption of mobile marketing in India. *Management & Change*, 6(1&2): 61-78.

Nel, J. 2013. Cellphone banking adoption and continuance of use in an internet banking context: *A study of consumers' cross-channel cognitive evaluations*. Thesis submitted for the degree of Doctor of Philosophy, Faculty of Economic and Management Sciences, Stellenbosch University, 1-265.

Niehaves, B. & Plattfaut, R. 2014. Internet adoption by the elderly: Employing IS technology acceptance theories for understanding the age-related digital divide. *European Journal of Information Systems*, 23(6): 708-726.

Nittala, R. 2011. Registering for incentivized mobile advertising: discriminant analysis of mobile users. *International Journal of Mobile Marketing*, 6(1): 42-53.

Nunnally, J.C. 1978. *Psychometric theory*. 2nd ed. New York: McGraw-Hill.

Obe, O.O. & Balogun, V.F. 2007. Practice, trends and challenges of mobile commerce in Nigeria. *Information Technology Journal*, 6(3): 448-456.

Oliver, R.L. 1980. A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(4): 460-469.

Osah, O. & Kyobe, M. 2017. Predicting user continuance intention towards M-pesa in Kenya. *African Journal of Economic and Management Studies*, 8(1): 36-50.

- Pallant, J. 2010. *SPSS Survival manual: A step by step guide to data analysis using SPSS program*. 4th ed. Crows Nest, NSW: Allen & Unwin.
- Parasuraman, A. 2000. Technology readiness index (TRI): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4): 307-320.
- Parasuraman, A. & Colby, C.L. 2014. An updated and streamlined technology readiness index: TR 2.0. *Journal of Service Research*, 18(1): 59-74.
- Pham, T.T.T. & Ho, J.C. 2015. The effects of product-related, personal-related factors and attractiveness of alternatives on consumer adoption of NFC-based mobile payments. *Technology in Society*, 43: 159-172.
- Pinpathomrat, N. 2015. *A model of e-learning uptake and continuance in higher educational institutions*. Thesis submitted for the degree of Doctor of Philosophy, Faculty of Physical Sciences and Engineering Electronics and Computer Science, University of Southampton, April, 2015.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. & Podsakoff, N.P. 2003. Common method biases in behavioural research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, 88: 879-903.
- Qasim, H. & Abu-Shanab, E. 2015. Drivers of mobile payment acceptance: The impact of network externalities. *Information Systems Frontiers*, 18(5): 1-14.
- Ramos-de-Luna, I., Montoro-Rios F. & Liébana-Cabanillas, F. 2015. Determinants of intention to use NFC technology as a payment system: An acceptance model approach. *Information Systems E-Business Management*, 14(2): 1-22.
- Rampton, J. 2016. The evolution of the mobile payment. (<https://techcrunch.com/2016/06/17the-evolution-of-the-mobile-payment/> [Accessed 3 February 2018]).
- Rogers, E.M. 2003. *Diffusion of innovations*. 5th ed. New York: Free Press.
- Setterstrom, A.J., Pearson, J.M. & Orwig, R.A. 2013. Web-enabled wireless technology: An exploratory study of adoption and continued use intentions. *Behaviour & Information Technology*, 32(11): 1139-1154.

- Schierz, P.G., Schilke, O. & Wirtz, B.W. 2010. Understanding consumer acceptance of mobile payment services: An empirical analysis. *Electronic Commerce Research and Applications*, 9(3): 209-216.
- Schuster, L., Proudfoot, J. & Drennan, J. 2015. Understanding consumer loyalty to technology-based self-services with credence qualities. *Journal of Services Marketing*, 29(6-7): 1-35.
- Shrier, D., Canale, G & Pentland, A. 2016. *Mobile money & payments : technology trends*. Massachusetts Institute of Technology. (https://www.getsmarter.com/career-advice/wp-content/uploads/2017/07/mit_mobile_and_money_payments_report.pdf) [Accessed 5 February 2018].
- Slade, E.L., Williams, M.D. & Dwivedi, Y.K. 2014. Devising research model to examine adoption of mobile payments: An extension of UTAUT2. *The Marketing Review*, 14(3): 311-336.
- Sniehotta, F.F., Presseau, J. & Araujo-Soares, V. 2014. Time to retire the theory of planned behaviour. *Health Psychology Review*, 8(1): 1-7.
- Statistics South Africa. 2016. *Mid-year population estimates*. (<https://www.statssa.gov.za/publications/P0302/P03022016.pdf>) [Accessed 12 August 2017].
- Stone, R.W. & Baker-Eveleth, L. 2013. Students' expectation, confirmation, and continuance intention to use electronic textbooks. *Computers in Human Behaviour*, 29(3): 984-990.
- Straub, E.T. 2009. Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research*, 79(2): 625-649.
- Sun, J.C.Y. 2014. Influences of polling technologies on student engagement: An analysis of student motivation, academic performance, and brainwave data. *Computers & Education*, 72: 80-89.

- Susanto, A., Chang, Y. & Ha, Y. 2016. Determinants of continuance intention to use the smartphone banking services: An extension to the expectation-confirmation model. *Industrial Management & Data Systems*, 116(3): 1-8.
- Teo, A.C., Tan, G.W.H., Ooi, K.B., Hew, T.S. & Yew, K.T. 2015. The effects of convenience and speed in m-payment. *Industrial Management & Data Systems*, 115(2): 311-331.
- Thong, J.Y.L., Hong, S.J. & Tam, K.Y. 2006. The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance. *International Journal of Human-Computer Studies*, 64(9): 799-810.
- Vance, A., Elie-Dit-Cosaque C. & Straub, D.W. 2008. Examining trust in information technology artifacts: The effects of system quality and culture. *Journal of Management Information Systems*, 24(4): 73-100.
- Venkatesh, V. 2000. Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, 11(4): 342-365.
- 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.
- Vodacom South Africa. 2015. *M-Pesa*. (<http://www.vodacom.co.za/vodacom/services/financial-solutions/m-pesa>) [Accessed 23 May 2014].
- Walczuch, R., Lemmink, J. & Streukens, S. 2007. The effect of service employees' technology readiness on technology acceptance. *Information & Management*, 44(2): 206-215.
- Wang, T., Jung, C.H., Kang, M.H. & Chung, Y.S. 2014. Exploring determinants of adoption intentions towards Enterprise 2.0 applications: An empirical study. *Behaviour & Information Technology*, 33(10): 1048-1064.
- Wiid, J. & Diggins, C. 2009. *Marketing Research*. Cape Town: Juta.

World Wide Worx. 2014. The snapscan effect: How mobile payments made QR codes relevant in South Africa. (<http://memeburn.com/2015/05/the-snapscan-effect-how-mobile-payments-made-qr-codes-relevant-in-south-africa>) [Accessed 2 July 2015].

Wu, I.L. 2013. The antecedents of customer satisfaction and its link to complaint intentions in online shopping: An integration of justice, technology, and trust. *International Journal of Information Management*, 33(1): 166-176.

Wu, M., Jayawardhena, C. & Hamilton, R. 2014. A comprehensive examination of internet banking user behaviour: Evidence from customers yet to adopt, currently using and stopped using. *Journal of Marketing Management*, 30(9-10): 1006-1038.

Yang, S., Lu, Y., Gupta, S., Cao, Y. & Zhang, R. 2012. Mobile payment services adoption across time: An empirical study of the effects of behavioural beliefs, social influences, and personal traits. *Computers in Human Behaviour*, 28(1): 129-142.

Yin, R.K. 2011. *Applications of Case Study Research*. 3rd ed. California, USA: SAGE Publications.

Zhou, T. 2013. An empirical examination of continuance intention of mobile payment services. *Decision Support Systems*, 54(2): 1085-1091.

Zikmund, W.G. 2003. *Essentials of Marketing Research*. 2nd ed. South-Western, Ohio: Thomson.

CHAPTER 2: ARTICLE 1

DETERMINANTS OF CONSUMERS' READINESS TO ADOPT MOBILE PAYMENT SERVICES

Chapter 2 presents the first article of this study, which focuses on determining consumers' readiness to embrace mobile payment services in the context of an emerging economy, and grounded in the technology readiness index. The moderating effect of gender on the predictors of mobile payment services was tested, and the results are reported in the article. The article was submitted to and accepted for publication in the *Journal of African Business (JAB)*, which is on the Scopus list of accredited journals. The article presented in this chapter is in the original format, as submitted to the *Journal of African Business (JAB)*, before reviewers' comments were addressed. The journal welcomes theoretical, conceptual, and empirical contributions that address any relevant aspect of the impact of mobile technologies on inclusive development in Africa. Because our article focuses on factors that drive or inhibit the adoption of mobile payment services in South Africa, and how gender could moderate the effect on the adoption process, the JAB was deemed appropriate.

The editorial guidelines for the authors wishing to publish in the JAB are available at:

- <http://www.tandfonline.com/action/authorSubmission?journalCode=wjab20&page=instructions>.

A copy of the editorial guidelines for authors and the acceptance letter are in Appendix C (i) and C (ii) respectively.

DETERMINANTS OF CONSUMERS' READINESS TO ADOPT MOBILE PAYMENT SERVICES

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ABSTRACT

The Technology Readiness Index was applied in this study to determine consumers' readiness to adopt mobile payment services. The data were collected from a convenience sample by using a consumer panel, resulting in a sample of 416 respondents. The results of the regression analysis indicate that convenience and compatibility drive consumers' adoption of mobile payments while the perceived risk, cost and insecurity are inhibitors. Furthermore, gender moderates only the relationship between convenience and the adoption of mobile payment services. The results could aid managers in developing effective strategies to increase the adoption rate of mobile payment services.

KEYWORDS

Adoption, technology readiness index (TRI), drivers, inhibitors, mobile payment services, gender.

1 INTRODUCTION

The rapid adoption of mobile phones and their role in the development of personal and professional activities has been one of the most important technological events in recent decades (Liebana-Cabanillas, de Luna & Montoro-Rios, 2015). Global statistics indicate that mobile subscriptions worldwide have passed the 7 billion mark, of which

about 770 million are estimated to be in Africa alone (ITU, 2016). The above figure of seven billion indicates the number of SIM cards in a country expressed as a percentage of the country's population.

In conjunction with this development, merchants, financial institutions and telecommunication operators are focusing their efforts on increasing the number of mobile-enabled services available to mobile phone users. These advances in mobile technology are having a profound impact on people's daily lives, and they are beginning to offer interesting advantageous new services (Kim, Mirusmonov & Lee, 2010). One area that is experiencing exponential growth is the mobile payment service (Liebana-Cabanillas et al., 2015), which enables users to pay for goods and services by using their mobile phones wherever they go (Kim et al., 2010).

Mobile payment services are now available in 61% of the world's developing countries, and about 53% of active global mobile payment services are in Sub-Saharan Africa (GSMA, 2014). Forecasts suggest that global mobile payment services will have 450 million users and \$721 billion in transaction value by 2017 (Slade, Williams & Dwivedi, 2014). Due to this expected growth, it is suggested that mobile payments will change lives and ways of conducting business, since consumers and mobile devices have become inseparable (Lee, Park, Chung & Blakeney, 2012).

South Africa has the highest rate of smartphone and mobile penetration in Africa, representing 51% of smartphones and 133% mobile penetration, followed by Kenya with 31% of smartphones and 70% mobile penetration, and then, Nigeria with 29% and 72%, respectively (Fripp, 2014). Based on these statistics, it can be said that South Africans are prolific users of mobile phones, thus making South Africa a prime market for mobile payment services. Considering this state of affairs, it is surprising to

note that by the end of 2014 only 2.1 million South Africans were using QR code-based mobile payment applications to perform transactions of various kinds (World Wide Worx, 2014).

While service providers such as merchants, banks and mobile network operators are actively promoting mobile payment services, the intention to adopt mobile payment services is still low (Chong, Chan & Ooi, 2012). The key question faced by the service providers is how to transfer the potential mobile payment service into financial profits. Thus, the research question addressed in this study is: What are the salient motivations that drive or inhibit consumers from adopting mobile payment services? The answer to this question is important as service providers cannot recover their investments, or tailor-make and adapt their marketing strategies accordingly unless consumers do adopt and use mobile payment services (Jia, Hall & Sun, 2014).

Gender has been identified as a key variable in the adoption and use of mobile technology (Chong et al., 2012; Kabata, 2015). Therefore, gender is included in this study as a moderating variable to determine its influence on the adoption of mobile payment services.

Although the local media in South Africa continuously create a buzz to signal the continued use of mobile-payment services, little is known about the factors that drive the adoption of such mobile payment services. The high mobile penetration rates in South Africa of 133% (Fripp, 2014) do not tally with the real transactions and payments. Such a situation calls for more research to identify the factors that influence adoption (Zhou, 2013). There is abundant international research focusing primarily on the factors that influence the adoption of mobile payment services (Chong et al., 2012; Mallat, 2007; Pham & Ho, 2015), however, evidence is almost non-existent to suggest

that similar studies have been conducted in an emerging market such as that of South Africa.

Because of the differences in consumer profiles in different parts of the world, it may be prudent to deal with consumer related issues differently. A study of this nature is important, particularly in South Africa where consumers use their smartphones for an average of 127 minutes per day, with tablets taking up 63 minutes per day on average (Business Tech, 2014). Marketers in developing countries are keen to know the factors that influence the rate of adoption of new technologies because that information determines the marketing effort and the allocation of resources to support the launch of the new technology (Mpinganjira, Dos Santos, Botha, Du Toit, Erasmus, Maree, & Mugobo, 2013).

This study investigates those factors that influence the adoption of mobile payment services in order to suggest recommendations to increase the adoption levels. Understanding the adoption of mobile phone payment and the moderating effects of gender could greatly benefit service providers, such as the retail industry, the banking industry and telecommunication operators in growing their businesses (Kim et al., 2010).

This study makes two contributions to theory and practice. Firstly, the factors that drive and inhibit the adoption of mobile payment services are investigated using an updated framework of the technology readiness index (Parasuraman, 2000) in order to complement earlier international mobile payment adoption studies, and to validate the determinants of mobile payment adoption in the context of an emerging economy. To realise this theoretical contribution, the study builds on the less-applied TRI in mobile payment adoption studies (Lin, Shih & Sher, 2007) and adding other constructs that

have been reported in the literature to have a significant influence on consumers' adoption of mobile payment services.

Secondly, from a practical perspective, understanding the factors that influence the adoption of mobile payment services would assist service providers to achieve a competitive advantage (Kim et al., 2010). Of particular importance to managers of mobile payment services is how effectively to boost the number of users. The results of the study should help service providers more effectively to invest the appropriate time, effort and money in the development, provisions and marketing of mobile payment services (Kim et al., 2010).

2 BACKGROUND

2.1 Mobile payments

The first example of mobile payments came in 1997 when Coca Cola introduced a limited number of vending machines, from which the consumer could make a mobile purchase. The consumer would send a text message to the vending machine to set up payment and the machine would then release the product (Dahlberg, Guo & Ondrus, 2015). Mobile payment research started soon after the first mobile payment transaction in 1997 (Dahlberg et al., 2015). Since then, mobile payments have been subject to different conceptualisations.

According to Liebana-Cabanillas, Sanchez-Fernandez and Munoz-Leiva (2014), mobile payment can be defined as any type of individual or business activity involving an electronic device with a connection to a mobile network, enabling the successful completion of an economic transaction. Mallat (2007) defines mobile payments as the use of a mobile device to conduct a payment transaction, in which money or funds are transferred from the payer to the receiver via an intermediary, or directly, without an

intermediary. Despite these conceptualisations, the mobile phone is emphasised as the key characteristic distinguishing mobile payments from other forms of payments (Schierz, Schilke & Wirtz, 2010).

The above mobile payment definitions refer to some kind of monetary value transfer with three main entities: the mobile service provider (e.g., Standard Bank's SnapScan), the mobile payment vendor (e.g., the merchant), and the mobile technology in use (e.g., 3G network) (Qasim & Abu-Shanab, 2015). For the purpose of this study, mobile payment is defined as the ability of a mobile phone user to initiate, authorise, and complete a financial transaction, in which money or funds are transferred over the mobile network, or via the wireless communication technologies to the receiver through the use of a mobile device (Slade et al., 2014).

This definition is suitable for this study because it refers mainly to the completion of payments and transactions between three main parties (banks, mobile network service providers and retailers) in a fast, convenient, safe, and simple way, at anytime and anywhere, using a mobile device.

Mobile payments can be categorised into various ways. According to Zhou (2013), mobile payments are categorised into remote payments and proximity payment options. Remote payments require the users to connect with the remote payment servers, in order to conduct payment, such as mobile banking and the mobile internet payment service. Proximity payments, on the other hand, require the users to conduct payment via their mobile phones without connecting to the remote server, such as paying bus fares, meals at restaurants, as well as other services (Zhou, 2013). Proximity payments are also referred to as mobile point-of-sale (mPOS) payments to represent payments that take place when the customer is in close proximity to the

merchant (GSMA, 2015). In this type of payment, the credentials of the transaction are stored on the mobile phone and exchanged within a small distance by using barcode scanning or radio frequency identification (RFID) technology (Qasim & Abu-Shanab, 2015).

The above chosen definition for this study encompasses both proximity and remote mobile payments services for daily purchases, as well as the payment of accounts, applied in the context of an emerging economy.

3 DEVELOPMENT OF THE THEORETICAL MODEL

3.1 Theoretical background

Extant literature has drawn on a number of information technology theories to explain the adoption of new technology. These include the technology-acceptance model (TAM) (Davis, 1989), universal technology adoption and use theory (UTAUT) (Venkatesh & Davis, 2000), the theory of reasoned action (TRA) (Ajzen, 1991), the theory of planned behaviour (TPB) (Ajzen, 1991), the diffusion of an innovation theory (IDT) (Rogers, 1995), as well as the technology readiness index (TRI) (Parasuraman, 2000) models which have prominently been instrumental in explaining the adoption of new technology in a variety of contexts. This study is based on the technology readiness index (TRI).

Technology readiness refers to people's propensity to embrace and use new technologies for accomplishing goals at home, in life, and at work (Parasuraman & Colby, 2014). The TRI was chosen to ground this study for several reasons. Firstly, the TRI considers individual differences to explain consumers' intention to adopt a new technology (Parasuraman, 2000). The TRI is individual-specific, as opposed to other models, such as the TAM, which is system-specific (Parasuraman, 2000). Since the

traits differ among people, so are their beliefs about the various aspects of technology; and the relative strength of each trait indicates a person's openness to technology (Walczuch, Lemmink & Streukens, 2007).

Secondly, the TR index differentiates between the drivers and the inhibitors of technology adoption (Parasuraman, 2000), which is in line with the objectives of this study that is aimed to investigate the drivers and the inhibitors of mobile payment services.

Thirdly, the TRI has been updated and streamlined in terms of content, structure and psychometric properties to reflect significant changes in the technology landscape (Parasuraman & Colby, 2014). The original TRI comprised 36-item scales, which have been streamlined down to 16-item scale items. Finally, the research indicates that the success of a technology innovation implementation depends as much on individual differences as on the technology itself (Lu, Yu, Liu & Yao, 2003).

The TR construct can be viewed as an overall mind-set resulting from a combination of mental drivers and inhibitors that collectively determine a person's predisposition to use new technologies (Parasuraman, 2000). Thus, it was considered applicable to be employed to measure the adoption of mobile payment services in this study. The TRI comprises four sub-dimensions: optimism, innovativeness, discomfort, and insecurity (Parasuraman & Colby, 2014). Optimism and innovativeness are drivers of TR while discomfort and insecurity are inhibitors thereof (Lin et al., 2007).

To recognise the differences in individual consumer's adoption of mobile payment services, and the widening scope of the elements of new technology adoption studies (Yang, Lu, Gupta, Cao & Zhang., 2012), this study incorporates other variables from prior studies that have been reported as significant drivers and inhibitors of consumers'

readiness to adopt mobile payment services. The additional drivers include: convenience (Obe & Balogun, 2007; Kim et al., 2010; Teo, Tan, Ooi, Hew & Yao, 2015), and compatibility (Mallat, 2007; Liebanna-Cabanillas et al., 2015) while additional inhibitors included in the framework are the perceived cost (Mallat, 2007; Lu, Yang, Chan & Cao, 2011; Chong et al., 2012) and the perceived risk (Mallat, 2007; Yang et al., 2012; Pham & Ho, 2015), as discussed below.

These factors require further investigation not only because a number of studies have reported them as significant predictors, but also to investigate their predictability in the South African context.

3.2 Conceptual framework and hypotheses

Figure 1 shows the conceptual framework of the drivers and the inhibitors of consumers' readiness to embrace mobile payment technologies. To assist managers in developing appropriate gender-segmentation strategies, this study investigates the adoption of mobile payment services by investigating the moderating effects of gender.

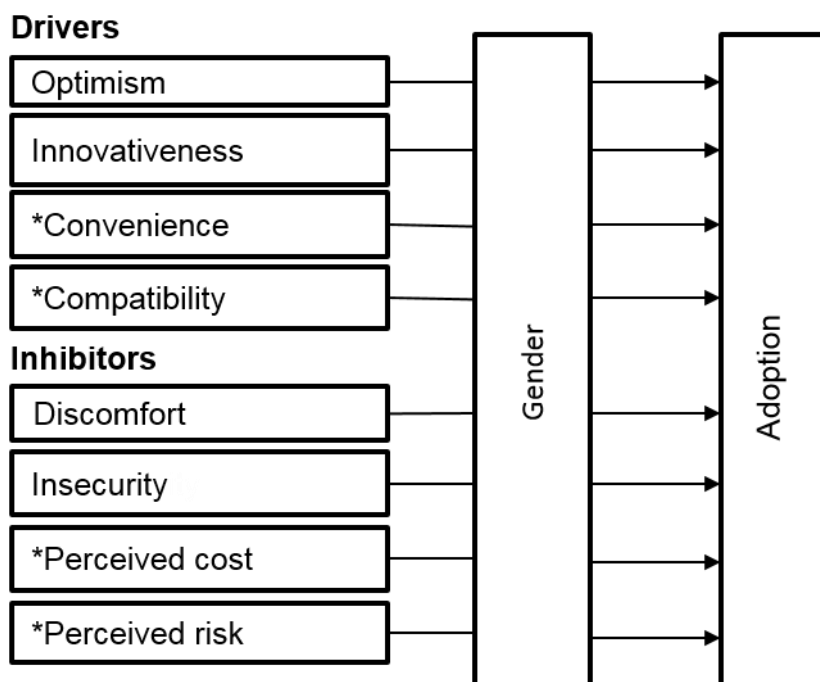


Figure 1: Technology-readiness framework

The adoption of mobile payment services has been widely studied (Mallat, 2007; Lin et al., 2007; Liebana-Cabanillas et al., 2014). Rogers (1995) considered the adoption process as a learning process that is influenced by a group of dynamics involving four processes: the awareness stage, the evaluation stage, the trial stage, and the adoption stage. According to Straub (2009:629), consumer adoption refers to the individual's decision whether to integrate an innovation into his or her life, while Kiwanuka (2015) defines adoption as the use of a technology for the first time. These definitions given by various authors show that there is no universally accepted definition and usage of the term. However, the above definitions indicate the propensity to accept new information technology and they can serve as the viewpoint from which to examine users' adoption of mobile payment services (Kiwanuka, 2015).

For the purpose of this study, adoption is defined as the mental process an individual passes from first hearing about an innovation (mobile payment app) to the final adoption thereof (downloading the app) (Rogers, 1995). Downloading an app is an important initial step but it is important to dwell on the sparsely researched area of the adoption of mobile payment services after an initial downloading. The following section discusses the factors that influence the adoption of mobile payment services.

3.3 Optimism

Optimism is defined as a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives (Parasuraman & Colby, 2014). Optimists use more active coping strategies than pessimists and these strategies are more effective in achieving positive outcomes (Walczych et al., 2007). These authors further contend that optimists are less likely to focus on the negative events and thus, they confront technology more openly. Previous studies have reported that optimism

leads to more positive attitudes and it would help bring out more positive attitudes towards technology (Walczuch et al., 2007; Lin et al., 2007).

Based on the above, it can be hypothesised that:

H₁: Consumers' optimism regarding mobile payments positively influences the adoption of mobile payment services.

3.4 Innovativeness

The personal innovativeness of individuals influences their acceptance attitude towards mobile services (Lee et al., 2012). Personal innovativeness is explained as the inclination of an individual to try out any new information systems and it has a significant and positive effect on mobile payment services (Kim et al., 2010). Personal innovativeness is considered to be a trait and a relatively stable descriptor of an individual and invariant across situations (uninfluenced by environmental or internal variables (Walczuch et al., 2007). As mobile payment is an innovative technology in the mobile market that is likely to be a worldwide trend in a few years, it is possible that personal innovativeness could affect the intended use of mobile payment services (Liebana-Cabanillas et al., 2015).

This assumption is justified based on previous studies that reported that individuals with high levels of personal innovativeness in information technology develop more positive perceptions about the innovation (Yang et al., 2012). Therefore, it can be hypothesised that:

H₂: Consumer innovativeness regarding mobile payments positively influences the adoption of mobile payment services.

3.5 Convenience

Convenience has been reported in the literature, as one of the important factors predicting the success of mobile payments. According to Kim et al. (2010), consumers believe in the benefits of technology when the technology makes people's lives easier and it ameliorates the difficulty of performing common tasks. Convenience can also be described as an important characteristic of the mobile device. These devices store data and they are always at hand, and they are increasingly becoming easy to use (Obe & Balogun, 2007). This assertion is supported by Teo et al. (2015), who reported that the convenience of having a single payment device to substitute multiple payment alternatives contributes to the benefits of mobile payments. Convenience of mobile payments is also enhanced by the fast internet connectivity to a mobile phone characteristic of many countries (Obe & Balogun, 2007).

Thus, many studies (Obe & Balogun, 2007; Liao, Shi & Wong, 2012; de Kerviler, Demoulin & Zidda, 2016) have reported significant positive relationships between convenience and the adoption of mobile payment services, hence, the construct was included in this study as a driving variable. In the light of the above, the following hypothesis was formulated:

H₃: Consumer's perceptions of convenience regarding mobile payments positively influences the adoption of mobile payment services

3.6 Compatibility

In the adoption of new technologies, compatibility has been defined as the consistency between an innovation and its values, experiences and the needs of potential adopters (Rogers, 1995). Previous scholars have found compatibility to be an important predictor for the adoption of mobile payment apps (Liebana-Cabanillas et al., 2015;

Mallat, 2007), particularly if the technology is new (Ramos-de-Luna, Montoro-Rios & Liébana-Cabanillas, 2015), such as is the case with mobile payment apps. According to Mallat (2007), the consumers' ability to integrate mobile payment apps into their daily lives in terms of purchase transactions and habits is an important determinant of consumers' willingness to adopt mobile payment services.

As suggested by Liébana-Cabanillas (2015), the compatibility variable includes the coherence of an innovation with the values, behaviour patterns and experiences of an individual. Based on the above, it can be hypothesised that:

H₄: Consumers' perceptions of compatibility regarding mobile payments positively influence the adoption of mobile payment services.

3.7 Insecurity

One of the major barriers to the use of mobile payments is the feeling of insecurity. It is necessary to establish new security systems for mobile payment methods to ensure the security of customer transactions and to generate confidence thereby improving attitudes toward them (Ramos-de-Luna et al., 2015). This is so because security threats in mobile devices are more challenging than those in personal computers as mobile devices are easily lost or stolen (Liu, 2015). Insecurity is described by Parasuraman and Colby (2014) as the distrust of technology stemming from scepticism about its ability to work properly and concerns about its potentially harmful consequences. Users fear that hackers may obtain data through Bluetooth or radio frequency identification (RFID) or alternatively, the mobile device may be infected by malware through the downloading and scanning of QR-codes (Liu, 2015). Therefore, insecurity is more likely to negatively affect the adoption of mobile-payment services.

Therefore, the following hypothesis was formulated:

H₅: Consumers' perceptions of insecurity regarding mobile payments negatively influence their adoption of mobile payment services

3.8 Discomfort

Discomfort is described as a perceived lack of control over technology and a feeling of being overwhelmed by it (Parasuraman & Colby, 2014). Users who score highly on the discomfort scale suffer from a perceived lack of control and a sense of being overwhelmed by technology (Walczuch et al., 2007). Hence, they will perceive technology as more complex. These findings have been corroborated in prior studies that reported that high levels of discomfort with regard to technology can lead to negative attitudes towards the technology (Walczuch et al., 2007; Parasuraman & Colby, 2014). Based on the above, the following hypothesis was formulated:

H₆: Consumers' perceptions of discomfort regarding mobile payments negatively influence their adoption of mobile payment services.

3.9 Perceived cost

In a study by Mallat (2007), the pricing of mobile payments had a significant negative impact on consumer adoption willingness. The results of their study indicated that mobile payments that pass on the transaction costs to consumers are not likely to succeed unless they are able to provide superior advantages. In a similar study by Lu et al. (2011), 60% of their respondents were concerned with the costs of using mobile payment services. Chong et al. (2012) also found that cost has a significant and negative relationship on Malaysian consumer decisions to adopt mobile payment services. Based on the above, it can be hypothesised that:

H₇: Consumers' perceived the cost regarding mobile payments negatively influences their adoption of mobile payment services.

3.10 Perceived risk

Due to the higher levels of uncertainty that are associated with services, services are considered to be riskier than products (Pham & Ho, 2015). Prior studies have considered the perception of risk as a deterrent to the adoption of mobile payments (Mallat, 2007; Pham & Ho, 2015; Yang et al., 2012). Perceived risk refers to the subjective expectation of a loss or sacrifice in using a risky technology (Pham & Ho, 2015). Mallat (2007) identified several dimensions of risk. Participants in her study identified the risks associated with the possibility that someone would be able to pay with their mobile phone if the device was lost. Other participants identified risk in terms of the possibility of lack of a transaction record and documentation owing to the difficulty of making follow-ups on mobile payments while some participants were sceptical about the possible errors in payment transactions.

Compromising privacy was also perceived as a risk by some participants in Mallat's (2007) study, who were reluctant to disclose their information to mobile payment service providers. Based on the above, perceived risk was included as an additional dimension in studying factors that have the propensity to inhibit the adoption of mobile payment services. Therefore, it can be hypothesised that:

H₈: Consumers' perceived risk regarding mobile payments negatively influences their adoption of mobile payment services.

3.11 The moderating effects of gender

There seems to be a general consensus among researchers that demographic differences should be taken into account, when planning mobile marketing strategies (Mukherjee, 2012; Karjaluoto, Leppaniemi, Standing, Kajalo, Merisavo, Virtanen & Salmenkivi, 2006), including mobile payment services. Despite growing research

efforts to determine the effect of gender on the adoption of new and self-service technologies, there have been conflicting results. Some studies suggest that men are more predisposed to accepting technological innovations than women are (Ferreira, da Rocha & da Silva, 2014) while other studies have found no significant influence in mobile technology (Jaradat & Al Rababaa, 2013; Kabata, 2015). To the best knowledge of the authors, there are no empirical studies to report the moderating effects of gender on the various factors that influence the adoption of mobile payment services in South Africa, where mobile payment services are experiencing rapid growth.

Understanding the effect of gender differences is important in market segmentation as is also the understanding of buyer behaviour and the development of potential new product opportunities (Kimloglu, Nasir & Nasir, 2010). Thus, this study concurs with many scholars that have proposed that there is a need for more rigorous studies that could yield a deeper understanding of consumer behaviour in general as well as any differences in user characteristics (Karjaluoto et al., 2006).

4 METHODOLOGY

4.1 Sampling and data collection

The target population for this study consisted of adult (18+) South African mobile phone users who have downloaded a mobile payment application. The data were collected by using an online self-completion questionnaire administered in all nine provinces in South Africa. Participant recruitment for the study was done through a market research firm using convenience sampling from their consumer panel. The participants were incentivised by the market research firm's standard practices. The questionnaire was hosted on the market research firm's online server.

Prior to completing a survey, ethical procedures require researchers to ask the potential participants to give informed consent indicating that they voluntarily wish to participate in the survey. Upon registration, consumer panel members give their consent to participate in the surveys. The potential panel member goes through a double opt-in process which means that the respondent agrees twice that they are prepared to answer surveys and they also have the option to withdraw from the panel before being added to the database.

4.2 Sample profile

Table 1 represents the demographic profile of the participants. A sample of 416 was realised; and it comprised almost an equal split between males and females.

Table 1. Sample and population characteristics

| Sample characteristic | Frequency | Percent (%) |
|------------------------------|------------------|--------------------|
| Gender | | |
| Male | 213 | 51.2 |
| Female | 203 | 48.8 |
| Age | | |
| 18-21 | 74 | 17.8 |
| 22-29 | 149 | 35.8 |
| 30-39 | 126 | 30.3 |
| 40-49 | 44 | 10.6 |
| 50+ | 23 | 5.5 |
| Level of education | | |
| High school | 68 | 16.3 |
| Degree/Certificate/Diploma | 258 | 62.1 |
| Postgraduate qualification | 90 | 21.6 |
| Monthly income | | |
| <R 15 000 | 139 | 33.4 |
| R16 000 – R25 999 | 88 | 21.2 |
| R26 000 – R35 999 | 58 | 13.9 |
| R36 000 – 45 999 | 31 | 7.5 |
| R46 000 – R55 999 | 19 | 4.6 |
| R56 000+ | 23 | 5.5 |
| Prefer not to answer | 58 | 13.9 |

The majority of respondents were aged between 22 and 29 years, which is similar to the South African youth population of 36.2% (Statistics SA, 2016). Of the 416

participants, 62% have either a college degree, certificate or diploma qualification while approximately 33% earned a monthly income before interest and tax of less than R15 000 (approximately \$1100).

Respondents mainly used their apps to buy restaurant meals, followed by take-away meals, groceries, purchasing of electronic products, paying bills, as well as purchasing food and beverages in food markets.

The most used mobile payment application was the SnapScan (44%), followed by Zapper with 22.8%. Approximately 34% of the respondents indicated that they use their payment app every month while 25% use the app weekly, followed by 7% of the participants who indicated that they use their payment app daily.

4.3 Instrument design and measurements

The previously validated measures used in this study were sourced from the literature and they were adapted to reflect the context of the study. The self-administered online questionnaire comprised three sections. Section A provided the introduction to the study, screening questions, and questions relating to respondents' knowledge about the various mobile payment apps that are currently available in South Africa. This section also asked the respondents to identify the products and the mobile payment apps that they had used before. Section B contained statements measuring consumers' readiness to adopt mobile payment services. The constructs included optimism, innovativeness, convenience, compatibility, discomfort, insecurity, perceived cost, perceived risk and the adoption of mobile payment services. A 7-point Likert type response format was used and the scale points ranged from 1 (strongly disagree) to 7 (strongly agree). Section C measured the demographic profile of the

respondents with respect to age, gender, educational level, occupation and household income.

The questionnaire was pre-tested among 30 respondents from the study population in order to assess the reliability of the measurement scales. Based on the feedback received, minor changes were made to the wording of some scales in order to better reflect the context of the study, after which the questionnaire was fielded.

5 DATA ANALYSIS AND RESULTS

5.1 First and second order factors

The original TRI has four factors: optimism and innovativeness as drivers; and discomfort and insecurity, as potential inhibitors. The two additional potential drivers: convenience and compatibility, and the two additional potential inhibitors from the literature, namely perceived risk and cost were included in the TRI model, in order to measure the adoption of mobile payment services. Confirmatory factor analysis (CFA) was done on all the drivers and inhibitors. Bearing in mind that the constructs were categorised into drivers and inhibitors, it was investigated to see whether second-order factor models exist that could be more appropriate than the first-order factor model. The purpose of the test was to see whether latent constructs could be derived that represent the four drivers and the four inhibitors.

Ideally, the target coefficient value should fall between 0.9 and 1 (Hair, Black, Babin, Anderson & Tatham, 2006). The target coefficients that were calculated for both the second-order factor models, were 0.82 and 0.80 respectively, indicating no adequate statistical reasoning to use the second-order factor models. Therefore, the first-order presentation was maintained.

5.1 Scale reliability and validity

5.1.1 Convergent validity

Confirmatory factor analysis (CFA) was performed to assess the convergent and discriminant validity of the scales. Table 2 contains the results of the CFA and Cronbach's Alpha values. Convergent validity was evaluated based on the significance of the factor loadings as suggested by Fornell and Larker (1981). Items C1 for optimism and C16 for insecurity constructs were eliminated from further analysis because the factor loadings were below the rule-of-thumb specifying values equal to or greater than 0.5, as acceptable (Hair et al., 2006). All the other items were retained as they exceeded the cut-off point of 0.5, resulting in constructs demonstrating convergent validity. The composite reliability index and the Cronbach's alpha coefficients (internal consistency) exceeded the cut-off point of 0.7 level for each construct, as suggested by Zikmund, Babin, Carr and Griffin (2010), thereby indicating good reliabilities of the scales. However, in the case of the discomfort construct, the AVE is 0.48; and we acknowledge that this is slightly below the stated cut-off point of 0.5 (Zikmund et al., 2010). However, according to Nunnally (1978) a Cronbach's Alpha above 0.7 implies convergent validity and as all the factor loadings for discomfort were also above 0.5, hence, the construct was retained.

Table 2. Results of the measurement model

| Construct | Items | Factor loadings | Cronbach's Alpha | CR | AVE |
|----------------|-------------|-----------------|------------------|------|------|
| Innovativeness | Innov. C6 | 0.72 | 0.76 | 0.76 | 0.50 |
| | Innov. C5 | 0.63 | | | |
| | Innov. C7 | 0.60 | | | |
| | Innov. C8 | 0.76 | | | |
| Convenience | Conven. C24 | 0.70 | 0.84 | 0.79 | 0.50 |
| | Conven. C22 | 0.76 | | | |
| | Conven. C21 | 0.74 | | | |
| | Conven. C23 | 0.62 | | | |
| Compatibility | Compat. C27 | 0.74 | 0.84 | 0.83 | 0.62 |

| | | | | | |
|------------|-------------|------|------|------|------|
| | Compat. C26 | 0.78 | | | |
| | Compat. C25 | 0.85 | | | |
| Optimism | Optim. C4 | 0.58 | 0.77 | 0.75 | 0.52 |
| | Optim. C2 | 0.77 | | | |
| | Optim. C3 | 0.79 | | | |
| Discomfort | Discom. C12 | 0.65 | 0.75 | 0.76 | 0.48 |
| | Discom. C11 | 0.68 | | | |
| | Discom. C10 | 0.75 | | | |
| | Discom. C9 | 0.58 | | | |
| Insecurity | Insec. C15 | 0.72 | 0.76 | 0.78 | 0.52 |
| | Insec. C14 | 0.79 | | | |
| | Insec. C13 | 0.64 | | | |
| Cost | Cost C30 | 0.85 | 0.87 | 0.85 | 0.65 |
| | Cost C29 | 0.88 | | | |
| | Cost C28 | 0.67 | | | |
| Risk | Risk C33 | 0.84 | 0.77 | 0.87 | 0.69 |
| | Risk C32 | 0.89 | | | |
| | Risk C31 | 0.76 | | | |

5.1.2 Discriminant validity

The discriminant validity of the scales was assessed by considering the square roots of the AVE scores and the cross loading criterion as recommended by Fornell and Larcker (1981). According to these authors, the square root of the AVE should be greater than all the correlations between each pair of constructs. From Table 3, it is evident that the AVE for all factors was greater than the corresponding cross loadings to demonstrate adequate discriminant validity with the exception of convenience. The square root of the AVE for convenience (0.71) is not higher than the correlation between compatibility and convenience (0.72). Therefore, it was decided to use a Chi-squared difference test between the unconstrained and the constrained model as suggested by Shiu, Pervan, Bove and Beatty (2009), in order to confirm whether convenience and compatibility are two separate constructs.

A chi-square difference value of greater than 3.84, with 1 degree of freedom (Shiu et al., 2009) allows for the rejection of the null hypothesis at the 5% significance level.

The difference in the calculated Chi-square values between compatibility and convenience was 51.265 ($df = 1$) ($113.717 - 62,452 = 51.265 > 3.84$), which is greater than the cut-off point of 0.384 (Shiu et al., 2009). The difference in the Chi-square values and the bias-corrected confidence interval for the correlation (BBCI Lower = 0.769, BBCI Upper = 0.912) was therefore confirming discriminant validity, and this indicates that convenience and compatibility are indeed two unique constructs.

Table 3. Discriminant validity of the factors

| | Innov. | Conven. | Compat. | Optim. | Discom. | Insec. | Cost | Risk |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Innov. | 0.700 | | | | | | | |
| Conven | 0.193 | 0.710 | | | | | | |
| Compat | 0.263 | 0.723 | 0.790 | | | | | |
| Optim, | 0.177 | 0.445 | 0.339 | 0.720 | | | | |
| Discom | 0.007 | 0.000 | 0.001 | 0.004 | 0.690 | | | |
| Insec, | 0.014 | 0.013 | 0.026 | 0.092 | 0.184 | 0.720 | | |
| Cost | 0.107 | 0.118 | 0.157 | 0.059 | 0.037 | 0.013 | 0.810 | |
| Risk | 0.114 | 0.153 | 0.171 | 0.183 | 0.000 | 0.022 | 0.154 | 0.830 |

Note: The square root of the AVE (Average Variance Extracted) is shown on the diagonal of the matrix in bold

To measure the goodness-of-fit of the model, estimates for the χ^2/df , IFI, TLI and RMSEA were measured as recommended by Hair et al. (2006). It is recommended that the χ^2/df should be less than 3 and the values for CFI and IFI should be greater than 0.9 while an RMSEA value below 0.08 indicates a good fit (Hooper, Coughlan & Mullen, 2008). Thus, the results of the measurement model correspond to a good fit (Hooper et al., 2008). Table 4 reports the model fit indices of the CFA results. The fit indices were $\chi^2/\text{Degree of freedom} = 2.291$; CFI = 0.908; IFI = 0.909; RMSEA = 0.056.

Table 4: CFA fit statistics

| Fit indices | Overall model |
|-------------|---------------|
| Chi square | 801.811 |
| <i>P</i> | 0.000 |
| <i>Df</i> | 350 |
| χ^2/df | 2.291 |
| CFI | 0.908 |
| IFI | 0.909 |
| RMSEA | 0.056 |

From Table 4, it is evident that there is an adequate model fit.

5.1.3 Multiple-regression analysis and hypotheses testing

Multiple-regression analysis (MRA) was used to determine the influence of the identified drivers and inhibitors in consumers' adoption of mobile payment services. As in many other studies, the researchers checked for outliers, data normality, linearity, homoscedasticity and the independence of the residuals. Normality tests were conducted by visual inspection of the Probability-Plot (P-P) of the Regression Standardised Residual and the scatter plot (Pallant, 2016) while multicollinearity was assessed by considering the variance inflation factors (VIF) and the tolerance values. None of the assumptions for normality, linearity, homoscedasticity and the independence of residuals were violated. The regression model explains 53% and an adjusted R^2 of 52% of the variance in consumers' adoption of mobile payment services.

The results of the model in Table 5 indicate that the factors 'perceived cost', 'perceived risk' and 'insecurity' are significant inhibitors while 'convenience' and 'compatibility' are significant drivers in the adoption of mobile-payment services. However, convenience and perceived cost makes the strongest unique contribution (Beta = 0.248, followed by compatibility (Beta = 0.205), perceived risk (Beta = 0.160), and insecurity which makes a negative unique contribution of (Beta = -1.05).

Table 5. Drivers and inhibitors of mobile-payment adoption

| Model | Standardized Coefficients | T | p-value |
|-------------------------------|---------------------------|-------|---------------|
| | Beta | | |
| (Constant: drivers) | | 4.679 | 0.000 |
| Total optimism | 0.058 | 1.359 | 0.175 |
| Total innovativeness | 0.063 | 1.625 | 0.105 |
| Total convenience | 0.248 | 5.047 | 0.000* |
| Total compatibility | 0.210 | 4.244 | 0.000* |
| (Constant: inhibitors) | | | |

| | | | |
|------------------|--------|--------|---------------|
| Total insecurity | -0.096 | -2.619 | 0.009* |
| Total discomfort | -0.006 | -0.159 | 0.874 |
| Total cost | -0.248 | 6.469 | 0.000* |
| Total risk | -0.164 | 4.205 | 0.000* |

The results show that optimism and innovativeness are not significant in influencing consumers to adopt mobile payment services; while discomfort is not a significant inhibitor. To test the statistical significance of the results, an ANOVA test was conducted (Pallant, 2016). The p-value of 0.000 indicates that the model is statistically significant for the overall data. The results of the hypotheses testing are shown in Table 6.

Table 6. The results of the hypotheses testing

| Alternative hypotheses | Result |
|--|------------------------------|
| H ₁ : Consumers' optimism regarding mobile payments positively influences the adoption of mobile-payment services. | H ₁ Not supported |
| H ₂ : Consumer innovativeness regarding mobile payments positively influences the adoption of mobile-payment services. | H ₂ Not supported |
| H ₃ : Consumers' perceptions of convenience regarding mobile payments positively influences the adoption of mobile-payment services. | H ₃ Supported |
| H ₄ : Consumers' perceptions of compatibility regarding mobile payments positively influence the adoption of mobile-payment services. | H ₄ Supported |
| H ₅ : Consumers' perceptions of insecurity regarding mobile payments negatively influence their adoption of mobile-payment services. | H ₅ Supported |
| H ₆ : Consumers' perceptions of discomfort regarding mobile payments negatively influence their adoption of mobile-payment services. | H ₆ Not supported |
| H ₇ : Consumers' perceived cost regarding mobile payments negatively influences their adoption of mobile-payment services. | H ₇ Supported |
| H ₈ : Consumers' perceived risk regarding mobile payments negatively influences their adoption of mobile-payment services. | H ₈ Supported |

5.1.4 Moderating effects of gender

To investigate whether gender moderates the relationship between the factors (drivers and inhibitors) and the adoption of mobile payment services, hierarchical regression was used. Firstly, the effects of each predictor and the moderator variables were interpreted. As indicated in Table 7, Model 1 explained 53.1% of variance in which

insecurity, convenience, compatibility, cost and the perceived risk constructs were significant predictors. Secondly, the significance of the moderator effect was tested and the resulting Model 2 explained 54.9% of the variance as a result of the interaction of gender as a moderator on the drivers and inhibitors of mobile payment services. The R² value improved from Model 1 (0.531) to Model 2 (0.549) while the significant F change confirms the moderating effect.

Table 7: The effects of predictor and moderator variables

| Model | R Squared | F Change | Sig. F Change |
|---|-----------|----------|---------------|
| 1 ^a | 0.531 | 51.166 | .000 |
| 2 ^b | 0.549 | 2.216 | .032 |
| a. Predictors: (Constant), Total risk, Total discomfort, Gender, Total Convenience, Total insecurity, Total cost, Total Innovativeness, Total optimism, Total compatibility | | | |
| b. Predictors: (Constant), Total risk, Total discomfort, Gender, Total Convenience, Total insecurity, Total cost, Total Innovativeness, Total optimism, Total compatibility, Int. Disc._G, Int. Cost_G, Int. Insec._G, Int. Risk_G, Int. Conven._G, Int. Innov._G, Int. Compat._G, Int. Opt._G. | | | |

The results indicated in Table 8 of Model 2 show that gender moderates only the effects of convenience on the adoption of mobile-payment services. There are no interaction effects of gender on the other seven factors tested in this study. On closer inspection, it emerged that males ($M= 6.038$) put more emphasis on the convenience derived from the use of mobile payments than do their female counterparts ($M= 5.906$).

Table 8: The significance of the moderating effect

| Model | Beta In | T | Sig. |
|----------------------------|---------|--------|-------|
| Model 1^a | | | |
| Optm._G | 0.063 | 1.462 | 0.145 |
| Innov._G | 0.047 | 1.195 | 0.233 |
| Disc._G | 0.005 | .146 | 0.884 |
| Insec._G | -0.100 | -2.602 | 0.010 |
| Conven._G | 0.249 | 5.067 | 0.000 |
| Compat._G | 0.208 | 4.194 | 0.000 |
| Cost_G | 0.245 | 6.385 | 0.000 |
| Risk_G | 0.161 | 4.106 | 0.000 |
| Model 2^b | | | |

| | | | |
|---|--------|--------|--------------|
| Optm._G | 0.045 | 1.039 | 0.300 |
| Innov._G | 0.208 | 1.458 | 0.146 |
| Disc._G | -0.064 | -.564 | 0.573 |
| Insec._G | -0.172 | -1.460 | 0.145 |
| Conven._G | -0.203 | -1.339 | 0.181 |
| Compat._G | 0.363 | 2.328 | 0.020 |
| Cost_G | 0.095 | .8140 | 0.416 |
| Risk_G | 0.171 | 1.438 | 0.151 |
| Int. Optm._G | 0.950 | 0.631 | 0.528 |
| Int. Innov._G | -0.025 | -0.20 | 0.842 |
| Int. Disc._G | 0.089 | 0.858 | 0.391 |
| Int. Insec._G | 0.096 | 0.890 | 0.374 |
| Int. Conven._G | 0.354 | 3.100 | 0.002 |
| Int. Compat._G | 0.123 | 1.087 | 0.278 |
| Int. Cost_G | 0.177 | 1.659 | 0.098 |
| Int. Risk_G | 0.089 | 0.813 | 0.417 |
| a. Dependent Variable: Total adoption Predictors in the Model: (Constant), Total risk, Total discomfort, Gender, Total Convenience, Total insecurity, Total cost, Total Innovativeness, Total optimism, Total compatibility | | | |
| b. Dependent Variable: Total adoption Predictors: (Constant), Total risk, Total discomfort, Gender, Total Convenience, Total insecurity, Total cost, Total Innovativeness, Total optimism, Total compatibility, Int. Disc._G, Int. Cost_G, Int. Insec._G, Int. Risk_G, Int. Conven._G, Int. Innov._G, Int. Compat._G, Int. and Optm._G | | | |

6 DISCUSSION AND IMPLICATIONS

This empirical study analysed consumers' readiness to embrace mobile payment services. To further the understanding of consumers' adoption behaviour, the technology-readiness index (TRI) was used to ground the study in which the factors were categorised into drivers and inhibitors and the moderating effect of gender was investigated. Contrary to the existing literature (Yang et al., 2012; Parasuraman & Colby, 2014) consumers' levels of optimism and innovativeness were found to be insignificant drivers while discomfort emerged as an insignificant inhibitor of consumers' readiness to adopt mobile payment services. These results cast a shadow on the robustness of the TRI applied in new mobile technology in an emerging market

context but they show support for what several other researchers alluded to that there might be additional and apparently even better factors that could drive or inhibit the adoption of mobile payment services.

However, the results have significant managerial implications. To enhance the adoption of mobile payment services, service providers should focus on promoting the benefits of mobile payment services that consumers view as important rather than promoting only the features of the application. The primary features that garner more attention in advertisements of mobile payments include the design features, specifications and form, rather than the underlying benefits to the end consumers. For example, a reduction in cash handling may reduce losses that may arise from theft and fraud such that promoting a cashless society may enhance consumers' optimism levels towards new mobile payment services.

The results also indicate that consumers' perceived convenience and compatibility are significant drivers while insecurity, perceived cost and perceived risk significantly inhibit the adoption of mobile payment services. These findings are particularly important because these significant drivers and inhibitors are not part of the original TRI except for insecurity. Although the results are consistent with those of previous studies (Herzberg, 2003; Obe & Balogun, 2007), it is important to discuss the implications of these drivers and inhibitors to enhance managerial decision-making.

One way to provide convenience as a benefit is to develop mobile payment apps that are compatible with one another within the mobile payment space. For instance, South Africa's commonly used apps, FlickPay, SnapScan and Zapper are available for both iOS and Android devices which creates a platform for interlinking different applications across technological functionalities (Barnajee & Wigginton, 2016). However, these payment apps can only be linked to users' credit, Visa or Master Cards. Service

providers should endeavour to develop mobile payment apps that can be linked to debit cards, which are more prevalent in South Africa.

Mobile payment service providers must also invest in payment applications that are compatible not only with mobile payments, but also with users' lifestyle. The challenge facing service providers is to develop and communicate mobile payment services that inspire consumers in a way that attracts even the less interested consumers to start regarding mobile payments as suited to their purchase behaviours. Consumers will seek out those new innovations which offer the best value for money and those about which they are educated (Pham & Ho, 2015). Hence, for the adoption of mobile payment services, it is necessary that service providers make consumers aware of the availability of mobile payment applications; and explain how they add value.

Given the moderating effect of gender, companies should initiate advertising campaigns targeting women opinion leaders in advertisements, which can in turn encourage and educate other women to enjoy the convenience of mobile payments. This can be done successfully through social networks, blogs, and websites, in order to capitalise on social influence.

The diversity and fragmentation of mobile payments requires consumers to store their credentials on a variety of mobile payment platforms which makes consumers more susceptible to hackers and other fraudsters. Unless and until service providers manage to collaborate, consumers will continue to feel insecure to enter their personal information multiple times into mobile payment apps owned by different service providers.

The banks are important players in the mobile payment services since mobile payments are linked to users' bank cards. Available reports indicate that banks are

experiencing potential risks of information security breaches which now cost the global corporate sector in excess of \$388 billion annually (Jacob & Antony, 2016). Security violations in banks emanate from both within (employees entrusted with safeguarding consumers' financial assets) and outside (threats of hackers, spyware and virus attacks) and this has led to the low adoption of mobile payment services. It is therefore important for service providers to work together and re-think information security in order to mitigate the threats of both inside and external attacks on mobile payments.

The results suggests that the costing of mobile payment transactions should be transparent and free from any hidden costs that may inhibit the adoption of the payment app. Mobile payment apps such as SnapScan, Zapper and FlickPay are purportedly free to download. The notion that downloads are free is tantamount to insincerity on the part of service providers because the users require internet connection for any download and this costs consumers in data charges. To increase adoption, mobile payment service providers should not pass the transaction costs on to the consumers, rather, they should focus on increasing the benefits while keeping the transaction costs to a minimum.

7 LIMITATIONS AND FUTURE RESEARCH

As in any other study, this study has limitations but these limitations could provide direction for future research. Firstly, despite the fact that the empirical data were collected from all the nine provinces of South Africa, a limitation exists since the data were collected from one country only. Further studies are therefore required to test and validate the results of this study in other emerging countries.

Secondly, this study investigated only the moderating effect of gender on the adoption of mobile payment services. Other demographic factors such as age, household

income, or education may require further investigation. Lastly, the results of the study indicate that optimism and innovativeness are not significant drivers while discomfort is an insignificant inhibitor to the adoption of mobile payments. These findings are surprising and incongruent with prior research. Ongoing research is needed to further explore the impact of these three factors on the adoption of mobile payment services.

8 CONCLUSIONS

This study does not only contribute to the applicability of the TRI to new contexts, but it also suggests various additional drivers and inhibitors that need to be considered in the adoption of mobile payment applications as well as offering various practical insights. Overall, the success of mobile payments hinges on consumers trusting the new payment methods. Perhaps it is important to initially create a trustworthy brand for service providers before offering mobile payment services. Brand image is extremely important and it is vital that a positive image be maintained in the minds of the consumers. Furthermore, the significance of critical mass should not be underestimated. Suffice it to say that consumers' intention to adopt mobile payment services is influenced by the number of participating merchants, which in turn determines the opportunities available to consumers to use the mobile payment services. It may also be prudent for service providers to focus on promoting mobile payments in areas characterised by a large consumer base such as the retail and public transportation (Mallat, 2007) before venturing into other application areas.

Mobile-payment apps in emerging countries, such as South Africa may still be in their infancy but with adequate investment in infrastructure and effective promotion, they could become mainstream and they could significantly change the way people pay and get paid.

LIST OF REFERENCES

Ajzen, I. (1991). The theory of planned behaviour. *Organisational Behaviour and Human Decision Processes*, 50(2), 179-211.

Barnajee, P. M. & Wigginton, C. (2016). Mobile payment and mobile point of sale. Retrieved from <http://dupress.deloitte.com/dup-us-en/industry/retail-distribution/mpayments-mobile-pos-system-in-retail.html?id=us:2el:3dc:tmttrends:eng:abt:053016>

Business Tech. (2014). *Number of smartphones in South Africa*. Retrieved from <http://businesstech.co.za/news/mobile/59175/the-number-of-smartphone-users-in-sa/>.

Chong, A. Y. L., Chan, F. T. S. & Ooi, K. B. (2012). Predicting consumer decisions to adopt mobile commerce: Cross-country empirical examination between China and Malaysia. *Decision Support Systems*, 53, 34-43.

Dahlberg, T., Guo, J. & Ondrus, J. (2015). A critical review of mobile-payment research. *Electronic Commerce Research and Applications*, 14(5), 265-284.

Davis F. D. (1989) Perceived usefulness, perceived ease-of-use, and user acceptance of information technology. *MIS Quarterly* 13(3), 319-340.

De Kerviler, G., Demoulin, N. T. M. & Zidda, P. (2016). Adoption of in-store mobile payment: Are perceived risk and convenience the only drivers? *Journal of Retailing and Consumer Services*, 1-39.

Ferreira, J. B., da Rocha, A. & da Silva, J. F. (2014). Impacts of technology readiness on emotions and cognition in Brazil. *Journal of Business Research*, 67(5), 865–873.

Fripp, C. (2014). South Africa's mobile penetration is 133%. Retrieved from <http://www.htxt.co.za/2014/10/23/south-africas-mobile-penetration-is-133/>.

Fornell, C. & Larcker, D. F. (1981). Structural equation models with observable variables and measurement errors. *Journal of Marketing Research*, 18(1), 39-50.

GSMA. (2014). *State of the Industry 2014 – Mobile Financial Services for the Unbanked*. Retrieved from <http://www.gsmamobileeconomy.com/>.

Hair, F. H., Black, W. C., Babin, B. J., Anderson, R. E. & Tatham, R. L. (2006). *Multivariate data analysis*, 6th edn. Pearson-Prentice Hall.

Hooper, D., Coughlan, J. & Mullen, M. (2008) Structural-equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6(1), 53–60.

ITU. (2016). *Key ICT indicators for developed and developing countries and the world (totals and penetration rates)*. Retrieved from <http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>.

Jacob, N. A. & Antony, G. V. (2016). A critical review of information-security threats faced by Indian banks. *International Journal of Advanced Research in Computer Science and Management Studies*, 4(9), 7-13.

Jia, L., Hall, D. & Sun, S. (2014). The effect of technology usage habits on consumers' intention to continue to use mobile payments. *Twentieth Americans Conference on Information Systems*, Savannah: 1-12.

Jaradat, M. I. R. M. & Al Rababaa, M. S. (2013). Assessing key factors that have an influence on the acceptance of mobile commerce, based on modified UTAUT. *International Journal of Business and Management*, 8(23), 102-112.

- Kabata, D. (2015). Determinants of mobile payment use by consumers in Kenya. *International Journal of Computer Applications & Information Technology*, 8(1), 152-159.
- Karjaluoto, H., Leppaniemi, M., Standing, C., Kajalo, S., Merisavo, M., Virtanen, V. & Salmenkivi, S. (2006). Individual differences in the use of mobile services among Finnish consumers. *International Journal of Mobile Marketing*, 1(2), 4-10.
- Kim, C., Mirusmonov, M. & Lee, I. (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in Human Behaviour*, 26, 310-322.
- Kimloglu, H., Nasir, V. A. & Nasir, S. (2010). Discovering behavioural segments in the mobile phone market. *Journal of Consumer Marketing*, 27(5), 401-413.
- Kiwanuka, A. (2015). Acceptance process: The missing link between UTAUT and diffusion of innovation theory. *American Journal of Information Systems*, 3(2), 40-44.
- Lee, Y. K., Park, J. H., Chung, N. & Blakeney, A. (2012). A unified perspective on the factors influencing usage intention towards mobile-financial services. *Journal of Business Research*, 65, 1590-1599.
- Liao, Z., Shi, X. & Wong, W. K. (2012). Consumer perceptions of the smartcard in retailing: An empirical study. *Journal of International Consumer Marketing*, 24(4), 252-262.
- Liebana-Cabanillas, F., de Luna, I. R. & Montoro-Rios, F. J. (2015). User behaviour in QR mobile-payment system: the QR payment acceptance model. *Technology Analysis & Strategic Management*, 27(9), 1031-1049.

- Liebana-Cabanillas, F., Sanchez-Fernandez, J. & Munov-Leiva, F. (2014). Antecedents of the adoption of the new mobile-payment systems: the moderating effect of age. *Computers in Human Behaviour*, 35, 464-478.
- Lin, C. H., Shih, H. Y. & Sher, P. J. (2007). Integrating technology readiness into technology acceptance: the TRAM model. *Psychology & Marketing*, 24(7), 641-657.
- Liu, Y. (2015). Consumer protection in mobile payments in China: A critical analysis of Alipay's service agreement. *Computer Law & Security Review*, 1-10.
- Lu, J., Yu, C. S., Liu, C. & Yao, J. E. (2003). Technology acceptance model for wireless internet. *Electronic Networking Applications and Policy*, 13(3), 206-222.
- Lu, Y., Yang, S., Chau, P. Y. K. & Cao, Y. (2011). Dynamics between the trust-transfer process and intention to use mobile-payment services: A cross-environment perspective. *Information & Management*, 48, 393-418.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments: a qualitative study. *Journal of Strategic Information Systems*, 16, 413-432.
- Mpinganjira, M., Dos Santos, M. A. O., Botha, E., Du Toit, D., Erasmus, A. C., Maree, T. & Mugobo, V. V. (2013). *Consumer Behaviour: A South African Psychology and Marketing Applications*, Oxford University Press: Southern Africa.
- Mukherjee, J. (2012). Exploring the demographic differences in the adoption of mobile-marketing in India. *Management & Change*, 6(1&2), 61-78.
- Nunnally, J. C. (1978). *Psychometric theory*, 2nd edn. New York: McGraw-Hill.
- Obe, O. O. & Balogun, V. F. (2007). Practice, trends and challenges of mobile commerce in Nigeria. *Information Technology Journal*, 6(3), 448-456.

- Pallant, J. (2016). *SPSS Survival manual: A step-by-step guide to data analysis using the SPSS program*, 4th edn. Crow's Nest, NSW: Allen & Unwin.
- Parasuraman, A. (2000). Technology readiness index (TRI): a multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4), 307-320.
- Parasuraman, A. & Colby, C. L. (2014). An updated and streamlined technology readiness index: TR 2.0. *Journal of Service Research*, 18(1), 59-74.
- Peter, P. J. (1981). Construct validity: A review of basic issues and marketing practices. *Journal of Marketing Research*, 18(2), 133-145.
- Pham, T. T. T. & Ho, J. C. (2015). The effects of product-related, personal-related factors and attractiveness of alternatives on consumer adoption of NFC-based mobile payments. *Technology in Society*, 1-16.
- Qasim, H. & Abu-Shanab, E. (2015). Drivers of mobile payment acceptance: the impact of network externalities. *Information Systems Frontiers*, 1-14.
- Ramos-de-Luna, I., Montoro-Rios, F. & Liebana-Cabanillas, F. (2015). Determinants of intention to use NFC technology as a payment system: an acceptance-model approach. *Information Systems E-Business Management*, 1-22.
- Rogers, E. M. (1995). *Diffusion of innovations*, 4th edn. New York: Free Press.
- Schierz, P. G., Schilke, O. & Wirtz, B. W. (2010). Understanding consumer acceptance of mobile payment services: an empirical analysis. *Electronic Commerce Research and Applications*, 9, 209-216.

Slade, E. L., Williams, M. D. & Dwivedi, Y. K. (2014). Devising a research model to examine the adoption of mobile payments: an extension of UTAUT2. *The Marketing Review*, 14(3), 311-336.

Statistics SA. (2016). *The population of South Africa*. Retrieved from <http://cs2016.statssa.gov.za/>

Straub, E. T. (2009). Understanding technology adoption: theory and future directions for informal learning. *Review of Educational Research*, 79(2), 625-649.

Teo, A. C., Tan, G. W. H., Ooi, K.B., Hew, T. S. & Yew, K. T. (2015). The effects of convenience and speed in m-payment. *Industrial Management & Data Systems*, 115(2), 311-331.

Venkatesh, V. & Davis, F. (2000). A theoretical extension of the technology-acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.

Walczuch, R., Lemmink, J. & Streukens, S. (2007). The effect of service employees' technology readiness on technology acceptance. *Information & Management*, 44, 206-215.

World Wide Worx. (2014). *The SnapScan effect: how mobile payments made QR codes relevant in South Africa*. Retrieved from <http://memeburn.com/2015/05/the-snapscan-effect-how-mobile-payments-made-qr-codes-relevant-in-south-africa>.

Yang, S., Lu, Y., Gupta, S., Cao, Y. & Zhang, R. (2012). Mobile payment services' adoption across time: an empirical study of the effects of behavioural beliefs, social influences, and personal traits. *Computers in Human Behaviour*, 28, 129-142.

Zhou, T. (2013). An empirical examination of continuance intention of mobile-payment services. *Decision Support Systems*, 54, 1085-1091.

Zikmund, W. G., Babin, B. J., Carr, J. C. & Griffin, M. (2010). *Business research methods*, 8th edn. Mason, OH: South-Western, CENGAGE Learning.

CHAPTER 3: ARTICLE 2

PREDICTING THE CONTINUANCE INTENTION TO USE MOBILE PAYMENT SERVICES: A PARTIAL LEAST SQUARE (PLS) PATH MODELLING APPROACH

Chapter 3 presents the second article, in which a partial least squares structural equation modelling approach (PLS-SEM) was used to test the predictive ability of the extended expectation confirmation model in the context of IT (EECM-IT). The moderating effect of gender was tested, but due to lack of evidence (non-significant results) to support the moderating role on the factors influencing continuance intention, it was excluded for publication purposes from Article 2. The results of the moderation are, however, included in Appendix F. The article was submitted to the *Journal of Economic and Management Studies (AJEMS)*. The article presented in this chapter is in the original format as submitted to the *Journal of Economic and Management Sciences*, observant of the journal's technical requirements. The journal emphasises that African managers and policy makers are constantly searching for performance-enhancing management practices. As a result, *AJEMS* places management and leadership at the centre-stage of business and organisational research in Africa, while emphasising an understanding of how theories and models support management practices. Because this study is based on empirical research and provides both theoretical and practical implications for how business decisions in the African context can be made about continuance use of mobile payment services, the journal was deemed appropriate.

The author guidelines for the *AJEMS* can be found at:

- http://www.emeraldgrouppublishing.com/products/journals/author_guidelines.htm?id=ajems

A copy of the editorial guidelines for authors is in Appendix D.

PREDICTING THE CONTINUANCE INTENTION TO USE MOBILE PAYMENT SERVICES: A PARTIAL LEAST SQUARE (PLS) PATH MODELLING APPROACH

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ABSTRACT

Purpose – The purpose of this study is to explore the predictive power of the E-ECM-IT in the mobile payment context and in a developing economy. The E-ECM-IT has previously been applied to predict the continued use of differing technologies, but there is a paucity of research on applying the model to additional new technology contexts, such as mobile payment services.

Design/methodology - A quantitative survey research method was employed to collect data from 426 users of mobile payment services across South Africa. A partial least squares - structural equation modelling (SEM) - (“PLS-SEM”) modelling approach was performed to examine the measurement and structural model of the study.

Findings – Contrary to most prior reports, the study revealed that ease of use does not significantly influence continuance intention to use mobile payment services. Users’ satisfaction and perceived usefulness remain significant predictors of continued intentions.

Originality/value – The study suggests that the expectation confirmation model in the context of information technology (ECM-IT) could be a more appropriate model to measure new technology continuance intentions in an African context, compared to the extended expectation confirmation model.

Keywords - mobile payment services, partial least squares path modelling (PLS), expectation confirmation, continuance intention, emerging economies.

Paper type - Research paper

1 INTRODUCTION

Mobile payment technology is one of the fastest growing evolutions in modern history, accounting for dramatic changes in the way service providers create and deliver their services. Factors such as advances in mobile technology, socio-economic conditions, and the high smartphone penetration rate are the driving forces behind mobile payments in emerging markets (Kshetri and Acharya, 2012). It is estimated that about 74% of the global mobile phone users appreciate the need for being connected anywhere and at any time, while 70% agree that the mobile phone has made life better (Nielson Global Survey, 2016). This need for constant connectivity has changed the way people communicate, shop, bank, get paid and pay for goods and services.

Mobile payments have been a key driver of socio-economic development in emerging markets (Kshetri and Acharya, 2012). The world's gross transaction value of mobile payments exceeded \$300 billion in 2013 (Kim *et al.*, 2010), and it is now expected to reach \$930 billion by 2018 (NFC, 2017). In harmony with this occurrence, mobile payments have now become a prominent feature of daily living (Schierz *et al.*, 2010).

The mobility of modern society has rendered mobile payment most ideal because of its ubiquitous nature and pervasiveness (Groß, 2016). However, as reported by Yang *et al.* (2012), the anticipated returns from investments in mobile payment services depends not only on their initial adoption but also on their continuing use by the

consumer. Individuals who use mobile payment services regularly will benefit from this method of payment, and companies would recoup their investments if consumers adopt and use their services continuously (Setterstrom *et al.*, 2013). In support of this assertion, Alshurideh (2016) reported that retaining customers by a mere 5% can lead to a 75% increase in profitability. Therefore, understanding factors that lead to users' continued use of mobile payments services is crucial for unlocking shareholder value.

Of the estimated world's two billion five-hundred million people who do not have a bank account at any financial institution, about 56% are adults in developing economies (World Bank, 2017). These unbanked populations cite not only poverty as the main cause, but also costs, travel distance and the amount of paperwork involved (World Bank, 2017). In countries such as Zimbabwe, Uganda and Côte d'Ivoire, an increasing number of adults use a mobile payment account instead of a traditional bank account (World Bank, 2017). South Africa is reflective of other developing economies because it is estimated that 7 million people in South Africa are on payrolls yet they do not own any bank account (Vodacom, 2015). With this sizeable unbanked population that depend on cash, mobile payments are expected to fill an important gap.

Despite the risks of carrying cash, the regular users of mobile payments are surprisingly low. Of the one million registered users for M-Pesa (one of the mobile payment apps in South Africa) since its inception in 2010, only 76 000 consumers were actively using the service by the end of 2016 (van Zyl, 2016). Of the estimated 20 million people who owned smartphones in South Africa in 2014, only an estimated 2.1 million people were reportedly using QR-code based mobile payment apps (World Wide Worx, 2014). Other examples exist in Africa, for example, in Nigeria, of the total number of people who know about mobile payment services, only 29% were actively using mobile payments in 2013 (Phillips Consulting, 2013). Thus, more research is

needed to know why mobile payments are not always used continuously by consumers particularly in emerging economies where the local market factors support mobile payments (Fichardt, 2015). For instance, in South Africa, both banks and non-banks are allowed to provide mobile payment services and there is an increasing number of merchants signing up for various mobile payment options. Furthermore, mobile payment apps can be linked to a wide range of VISA, MasterCard, cheque card and mobile payment enabled debit cards. Despite these inviting conditions, the use of mobile payment services are still rather sluggish.

A central element in the survival of many firms in the mobile-technology industry is users' continued use of that technology (Vedadi and Warkentin, 2016). However, little attention has been given to understanding the continuance intention in the mobile payment environment, where consumers decide whether to continue or discontinue using the services (Thong *et al.*, 2006). Consumer adoption is an important initial step, but the sustainability of mobile payments depends largely on users' continued use (Thong *et al.*, 2006).

As suggested by several studies (Thong *et al.*, 2006; Bhattacharjee, 2001), meeting customers' needs and expectations is the cornerstone in gaining customer commitment. Therefore, to bridge this research gap and to aid service providers to understand consumers' continued use intentions, this study examines the predictors of continuing use intentions of mobile payment services, grounded in the extended expectation confirmation model in the context of information technology (E-ECM-IT) (Thong *et al.*, 2006).

This study contributes to both theory and practice. Theoretically, through and the use of partial least squares-structural equation modelling (PLS-SEM), we explore the

predictive power of the E-ECM-IT in the mobile payment context and in a developing economy. The E-ECM-IT has previously been applied to predict the continued use of differing technologies, but there is a paucity of research on applying the model to additional new technology contexts, such as mobile payment services.

As reported by Cho (2016, p. 76), psychological models applied in the social sciences are bound by the specific technology characteristics of that chosen technology. Therefore, the application of the E-ECM-IT with a focus in mobile payments would further validate the predictive power of the model. Furthermore, the model has been widely used as a theoretical underpinning in developed countries, but due to the differences in cultural, social, and economic factors, these models would not necessarily be applied uniformly in different contexts (Cho, 2016, p. 76).

Therefore, the application of the E-ECM-IT in the context of an emerging economy would not only validate its predictive utility but it would also further expand the theoretical scope of the model. Practically, the study examines the factors that predict the continued use of mobile payment services, in order to suggest strategies that would increase their usage.

2 THEORETICAL FRAMEWORK AND THE DEVELOPMENT OF HYPOTHESES

2.1 Mobile payments in context

Mobile payment can be described as payments made for goods, services and retail accounts by using a mobile phone, with the wave being transmitted by radio (Dahlberg *et al.*, 2008). This definition is suitable because it indicates some of the useful features of mobile payment services. Firstly, mobile payment services are ever-present, allowing consumers to make payments whenever they need to do so (Jia *et al.*, 2014).

Secondly, mobile phones are regarded as personal gadgets that can easily be used as a payment instrument (Mallat, 2007). Thirdly, because consumers are already conditioned to using their mobile phones to purchase digital products, such as ring tones, music and videos clips, this suggests that they can easily use their mobile phones to pay for tangible goods as well (Dahlberg *et al.*, 2008).

Mobile payment services available in South Africa can be categorised on the basis of firstly, the industry (for example, retail, banking and telecommunications) where the mobile payment options are prevalent, and secondly, on the method used to execute such payments.

The methods used to execute such payments are primarily proximity and remote mobile payments. Proximity mobile payments are mainly mobile points of sale (mPOS) and Quick Response (QR) code-based, while remote payments comprise payments that are conducted via a mobile web browser or a smartphone application (Qasim and Abu-Shanab, 2015).

Mobile payments offer benefits to all the partners. From the consumers' point of view, mobile payments mitigate the risk of carrying cash, and they can be used for small value purchases, such as paying for restaurant meals, courier and beauty services, in an easy, safe and convenient way. Retailers on the other hand can reliably transact with the use of relatively cheap POS terminals. However, to reap the benefits, consumers' need to adapt but more importantly continue to use these mobile payment services.

Setterstrom *et al.* (2013) refers to continuance intention by describing how an individual consumer develops a need to continually use mobile payment services in the future. Consumers' continuance intention is also described as repurchase

intention, because both decisions (1) are as a result of an initial decision to adopt a product or service, (2) they are impacted by the initial product or service experience, and (3) they can result in an abrupt discontinued use thereafter (Bhattacharjee, 2001).

To maximise the financial investment in mobile payment services, service providers ought to ascertain that customers will use their services continuously (Susanto *et al.*, 2016). Extant literature indicates that there are several theories that have been employed to describe the factors predicting the intention to continue using new technologies. These theories include the expectation-confirmation model (ECM) (Oliver, 1980), the expectation-confirmation model in the context of IT (ECM-IT) (Bhattacharjee, 2001), the extended expectation-confirmation model, also in the context of IT (E-ECM-IT) (Thong *et al.*, 2006), the information systems success model (DeLone and McLean, 2004), the technology acceptance model (TAM) (Davis, 1989), and the theory of planned behaviour (TPB) (Ajzen, 1991), to name but a few.

These theories have been applied in different contexts, such as internet banking continuing use (Eshraghi, 2016), electronic-commerce success (DeLone and McLean, 2004) and continued online behaviour (Hsu *et al.*, 2006). However, none of these studies have investigated the continued use in the context of mobile payment services, characterised by the possibility of risks that may deter the continued use after the initial experience (Zhou, 2013).

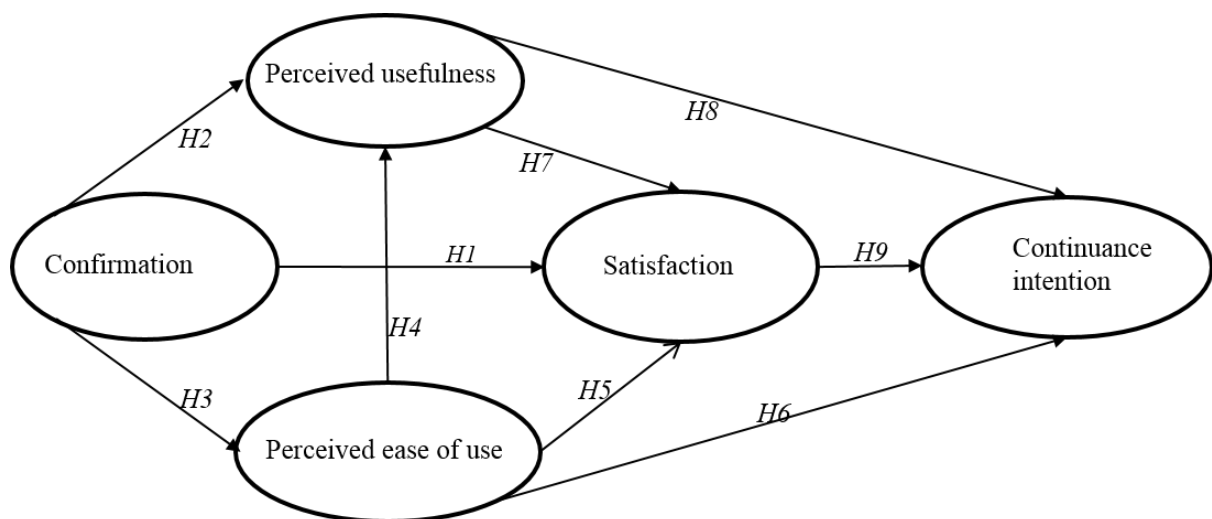
2.2 The Extended ECM-IT (E-ECM-IT)

After considering the continuance intention models, this study adopts the perspective of the E-ECM-IT to measure consumers' intentions to continue using mobile payment services. The E-ECM-IT model is an extension of the ECM model and it encapsulates variables such as ease of use and usefulness that are reflected in TAM as important

antecedents to behavioural intention. The choice of the hybrid model was further based on a study conducted by Hong *et al.* (2006) examining the utility of three models for understanding IT usage behaviour, namely the ECM-IT, the TAM and the E-ECM-IT amongst 1826 consumers. The E-ECM-IT emerged as having the highest explanatory power for consumers' continued IT use intentions. Thirdly, being a newer model, there are only a few available studies that have investigated consumers' continued intentions in contexts, such as the continued use of health apps (Cho, 2016), the continued use of information systems (Bhattacharjee, 2001) and the continued use of learning-management systems (Mouakket and Bettayeb, 2015), none of which were on mobile payment services. Therefore, the E-ECM-IT needs to be statistically validated in varying contexts so that the results can be generalised (Hong *et al.*, 2006).

Hence, this study determines the predictive utility of this newer hybrid model to measure users' continuance intentions of using mobile payment services in an emerging market context. The theoretical underpinning for the proposed conceptual framework and the hypothesised relationships to be tested and discussed below and depicted in Figure 1.

Figure 1: The proposed extended expectation-confirmation-IT model



2.2.1 The effect of confirmation on satisfaction, perceived usefulness and perceived ease of use

Users of mobile payment services normally have expectations before use. After using the service, consumers would compare the performance of the product or service against their expectations before adopting its use. If the expectations are met, this results in confirmation, and the lack thereof results in discontinuance of the service. In the same vein, prior to use of mobile payment services, users have expectations which they use as a benchmark with their experience after using the service for a period of time (Bhattacharjee, 2001). In this study, if the experiences in using the mobile payment services are better than initially expected, it can be viewed that the user's expectations have been positively confirmed. Thus, confirmation is therefore described in this study as sense of verification in the affirmative, of one's prior expectation following the use of the mobile payment service. Empirical studies have shown that confirmation directly influences consumer satisfaction in various contexts (Bhattacharjee, 2001; Schierz *et al.*, 2010; Osah and Kyobe, 2017).

Studies related to the expectation confirmation model have reported positive correlations between confirmation and perceived usefulness (Hung *et al.*, 2012; Chong, 2013). Bhattacharjee (2001) noted that consumer confirmation with online banking positively influences usefulness and satisfaction. Chong (2013) also confirmed empirically that satisfaction is depended upon user confirmation in the mobile commerce context, while Hung *et al.* (2012) consistently showed that confirmation positively affects satisfaction regarding mobile shopping continuance. In light of the above, the following hypotheses were formulated:

H₁: Confirmation of mobile payment services has a positive effect on satisfaction.

H₂: Confirmation of mobile payment services has a positive effect on perceived usefulness.

The relationship between perceived ease of use and confirmation was long ago confirmed by Davis (1989, p. 320) who described ease of use as the extent to which an individual perceives that using a particular system is effortless. Thong *et al.* (2006) reported that the experience gained during the use of an IT would enhance users' perceptions of ease of use. In this study, we reckon that the beliefs of ease of use of mobile payment services can be enhanced after a positive first-hand experience with the payment service. Based on the above, we hypothesise that:

H₃: Confirmation of mobile payment services has a positive effect on perceived ease of use.

2.2.2 The effect of perceived ease of use on perceived usefulness

The E-ECM-IT incorporates perceived ease of use which has been lauded by researchers (Venkatesh, 2000; Thong *et al.*, 2006, p. 802) because it allows for a better understanding of the role of seemingly complex technology, such as mobile payment services. Prior research has established the direct effect of perceived ease of use on perceived usefulness (Shierz *et al.*, 2010; Thong *et al.*, 2006). Davis (1989) argued that perceived usefulness of a technology depends on how easy users perceive it to be. In other words, the easier it is for individuals to initiate and complete transactions using their mobile phones, the more they regard it as being useful (Natarajan *et al.*, 2017). Thus, usefulness is theorised to be influenced by the perceived ease of use, leading to the following hypothesis:

H₄: Perceived ease of use of mobile payment services has a positive effect on perceived usefulness.

2.2.3 The effect of perceived ease of use on satisfaction and continuance intentions

The effect of perceived ease of use on consumers' satisfaction and their intentions to continue using a technology has long been confirmed. Oliver (1980) defined satisfaction as an emotional or psychological state resulting from a cognitive assessment of the gap between the expectations and the actual purchase. Because satisfaction is an emotion of feeling, consumers' perception of how easily the new technology can be used would positively influence their satisfaction with the new technology (Thong *et al.*, 2006).

Thong *et al.* (2006) and Hong *et al.* (2006) also found that the perceived ease of use is crucial in influencing consumers' intention to continue using information technology, referred to as mobile payment services in this study. Given the limited visual space of the mobile phones, consumers' perceptions of ease of use becomes an important antecedent to their continued use intentions (Venkatesh, 2000). According to these authors, ease of use relating to mobile payments includes straightforward symbols and keys, simpler and fewer step-by-step payment instructions, and accurate quick payment confirmations. Therefore, the functionality of the mobile payment services can greatly affect users' satisfaction and their ultimate continued use. Thus, it is hypothesised that:

H₅: Perceived ease of use of mobile payment services has a positive effect on satisfaction.

H₆: Perceived ease of use of mobile payment services has a positive effect on continuance intentions.

2.2.4 The effect of perceived usefulness on satisfaction and continuance intention

Consumers' perception of usefulness in this study describes how a consumer believes that using mobile payment services would improve their purchase decisions. This implies that consumers can use mobile payment services to access useful information, make price comparisons, and expedite purchases and payments in a safe and convenient way.

Previous research has established that perceived usefulness influences both satisfaction and continued use (Mouakket and Bettayeb, 2015). Although the construct was initially meant to measure perceived usefulness within an organisational context, several studies pertaining to new technology continuance intentions have suggested that both satisfaction and continuance intentions are represented by perceived usefulness (Kim, 2010; Hsiao and Chang, 2014; Osah and Kyobe, 2017). In the context of our proposed model, perceived usefulness represents the practical benefits that an individual experiences by using mobile payment services. Therefore, in this study, it can be theorised that if the use of mobile payment services can contribute to a consumer's productivity and better life, it leads to satisfaction and the continued use thereafter. Based on the above, it can be hypothesised that:

H₇: Perceived usefulness of mobile payment services has a positive effect on satisfaction.

H₈: Perceived usefulness of mobile payment services has a positive effect on continuance intention.

2.2.5 The effect of satisfaction on continuance intention

Previous studies have demonstrated that satisfaction positively impacts on the continued use in various contexts, such as the electronic banking service

(Bhattacharjee, 2001) and learning management systems (Mouakket and Bettayeb, 2015). This study draws from these past studies to suggest that consumers who are satisfied with the use of mobile payment services would develop a greater propensity to continue using the services. Continuance intention is therefore operationalised in this study to reflect an individual's intention to continue using mobile payment services to purchase goods and services. Consequently, retailers, banks and mobile network operators should improve their customer satisfaction levels by meeting and exceeding the customers' expectations. Thus, it can be hypothesised that:

H₉: Satisfaction with the use of mobile payment services has a positive effect on continuance intentions.

3 THE RESEARCH METHOD AND DATA ANALYSIS

This study was designed to collect empirical data from adult (18 years and older) consumers already accustomed to using mobile payment services. A market research firm was appointed to administer the online survey. From a single round of data collection, the final convenience sample consisted of 426 usable responses, collected from the research firm's consumer panel base across South Africa. The participants were screened to ensure that they had downloaded and used a mobile payment services before, and owned a credit, debit or any mobile payment enabled bank card.

Before the questionnaire was fielded, it was pre-tested among 30 consumers from the study population, and no concerns were identified. The questionnaire consisted of questions relating to the consumer use of mobile payment services, statements measuring the various constructs of the E-ECM-IT model related to mobile payment services, and the demographic profile of the respondents. The pre-validated measurement items were drawn from the literature as follows: adoption, continuance

intention and perceived usefulness scales were taken from Bhattacharjee (2001), satisfaction scales were adapted from Susanto *et al.* (2016), and perceived ease of use scales were taken from Kim *et al.* (2010). A 7-point Likert type response format was used to measure the items with scale points from 1 (Strongly disagree) to 7 (Strongly agree).

Smart PLS3 software was employed to represent and test the model. The PLS-SEM, also known as variance based SEM, allows the use of a variance based structural equation modelling instead of a covariance based SEM method. It is furthermore less restrictive than other software in terms of sample size, distributional assumption and model complexity (Hair *et al.*, 2013). Therefore, it is highly recommended in studies relating to marketing and consumer behaviour (Henseler, 2010; Hair *et al.*, 2011) and its use is expanding in marketing (Madupalli and Poddar, 2014; Sattler *et al.*, 2010) and in information systems research (Lin *et al.*, 2014).

The PLS-SEM was deemed appropriate for the analysis of the results because researchers recommend it in studies of a predictive nature, and in cases where the data are not normally distributed (Groß, 2016), as well as for cause-effect-relationship models that are complex (Hair *et al.*, 2011). Because this study focuses primarily on predicting continuance intentions to use mobile payment services, and that the data are not normally distributed, it is appropriate to use PLS-SEM. The PLS-SEM was analysed in two stages. Firstly, the measurement model (outer model) was analysed to confirm whether it was valid and reliable. Before evaluating the structural model, it was assessed for multi-collinearity. Secondly, the structural model (inner model) was evaluated by firstly estimating the statistical significance paths between the constructs by t-values (Groß, 2016), using the bootstrapping option (5000 resample), secondly, the level of the R² values and thirdly, the f² effect sizes were assessed.

4 THE RESULTS

A fairly equal gender distribution was realised, comprising 51.2% males and 48.8% females. The participants had an age distribution of 18-21 years (17.8%), 22-29 years (35.8%), 30-39 years (30.3%), 40-49 years (10.6%), and 50 years and older (5.5%). The age distribution suggests that the sample was slightly skewed towards younger and middle aged respondents. The majority of the participants (62%) had at least a certificate, diploma or a college degree. Although 13.9% of the participants opted not to answer any questions relating to monthly income, 33.4% of the actual respondents earned R15 000 (\$1100 equivalent) or less.

The most downloaded mobile payment app among the participants was SnapScan (35%), followed by Zapper (17%), Masterpass (9%) and FlickPay (5.3%). The respondents used their mobile payment apps to buy restaurant meals, groceries, and electronic products for the most part.

4.1 Evaluation of the outer measurement model

The first step of the two-step analysis is the evaluation of the measurement model. Evaluating the measurement model and the item loadings involved assessing the composite reliabilities (CR), the average variance extracted (AVE) and the Cronbach Alpha values (Gupta and Arora, 2017).

The validity of the instrument was analysed, according to the three main criteria of Fornell and Larcker (1981): The loadings of all items should be >0.5 , the values of the composite reliability (CR) of all constructs should be >0.7 , and the AVE values must be >0.5 . As indicated in Table 1, both CR and Cronbach Alpha's values exceeded the cut-off point of 0.7, and the AVEs were above the suggested threshold of 0.5, thereby indicating adequate internal reliability and convergent validity (Rezaei, 2014).

Table 1: Results of construct validity

| Variables | Items | Standardised loading | α | CR | AVE | VIF |
|-----------------------|--------|----------------------|----------|-------|-------|-------|
| Confirmation | ADPT1 | 0.846 | 0.774 | 0.869 | 0.689 | 0.689 |
| | ADPT2 | 0.841 | | | | |
| | ADPT3 | 0.802 | | | | |
| Continuance intention | CI1 | 0.943 | 0.935 | 0.959 | 0.886 | 0.886 |
| | CI2 | 0.949 | | | | |
| | CI3 | 0.931 | | | | |
| Ease of use | EOU1 | 0.811 | 0.875 | 0.910 | 0.668 | 0.668 |
| | EOU2 | 0.842 | | | | |
| | EOU3 | 0.817 | | | | |
| | EOU4 | 0.855 | | | | |
| | EOU5 | 0.760 | | | | |
| Satisfaction | SATIS1 | 0.897 | 0.908 | 0.936 | 0.785 | 0.785 |
| | SATIS2 | 0.849 | | | | |
| | SATIS3 | 0.900 | | | | |
| | SATIS4 | 0.896 | | | | |
| Usefulness | USE1 | 0.837 | 0.830 | 0.898 | 0.746 | 0.746 |
| | USE2 | 0.899 | | | | |
| | USE3 | 0.853 | | | | |

Discriminant validity was assessed according to Fornell and Larcker's (1981) loading criteria. The assessment verified that each construct has a square root of the AVE greater than the squared correlation between any pair of other different constructs, and the loadings of all the indicators exceeded all their cross loadings as well (Fornell and Larcker, 1981). Hence, the results displayed in Table 2 confirm the establishment of discriminant validity.

Table 2: Discriminant validity

| | Adoption | Continued use | Ease of use | Satisfaction | Usefulness |
|---------------|--------------|---------------|--------------|--------------|--------------|
| Adoption | 0.830 | | | | |
| Continued use | 0.589 | 0.941 | | | |
| Ease of use | 0.509 | 0.502 | 0.818 | | |
| Satisfaction | 0.663 | 0.820 | 0.628 | 0.886 | |
| Usefulness | 0.605 | 0.651 | 0.583 | 0.698 | 0.864 |

* The square roots of the average variance extracted (AVE) are shown in the diagonal elements in bold. Adequate discriminant validity is achieved if the diagonal elements exceed the corresponding off-diagonal elements.

4.2 The Structural model (Inner model)

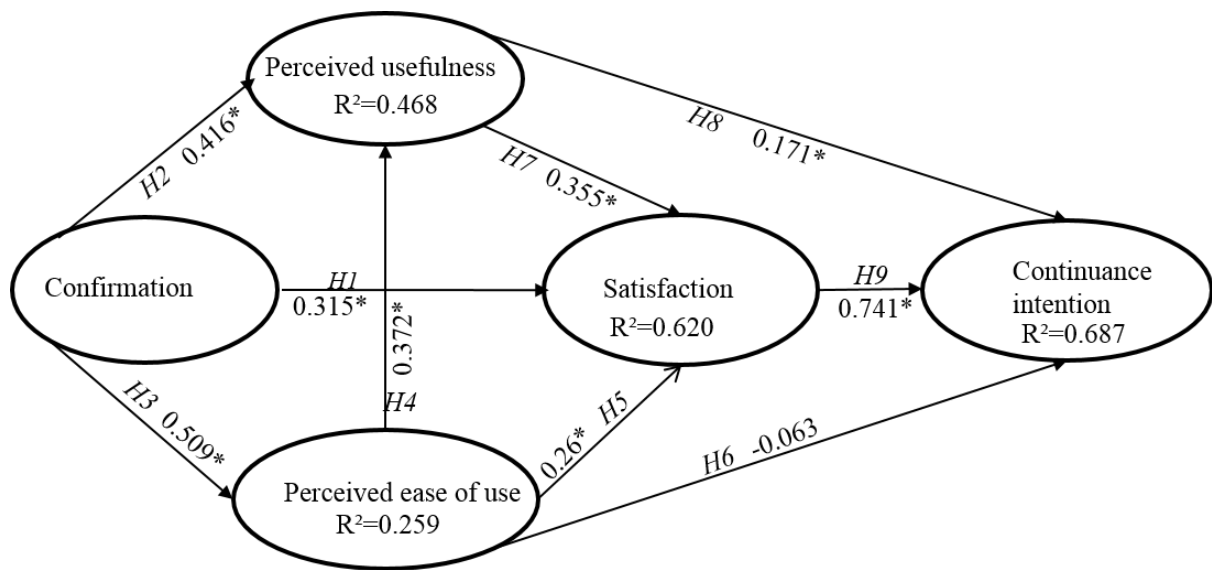
Before the structural model can be assessed, it is important to investigate multicollinearity. To assess whether multicollinearity was present, the variance inflation factor (VIF) values were calculated for all the constructs in the model. The VIF values exceeding 5 indicate the presence of multicollinearity (Hair *et al.*, 2011), and because the VIFs shown in Table 1 did not exceed 3, multicollinearity did not influence the results of this study.

The second step was to assess the structural model. The criteria used to evaluate the structural model are the R^2 measures and the level as well as the significance of the path coefficients. To obtain the results of the significance of the path coefficients, the bootstrapping option (5000 resample) was used, as recommended in the literature (Gupta and Arora, 2017).

The rule-of-thumb regarding the R^2 values are 0.75, 0.50 and 0.25, representing substantial, moderate and weak predictive accuracy levels, respectively (Hair *et al.*, 2011). However, Hair *et al.* (2011) state that the R^2 values of 0.20 are regarded as high in studies relating to consumer behaviour.

Figure 2 shows the standardised path coefficients with the R^2 values. The results show that the model accounted for an R^2 of 0.687, suggesting 68.7% of variance explained in consumers' continuance intentions to use mobile payment services, 25.9% of variance in perceived the ease of use, 62% of variance in satisfaction, and 46.8% variance in the perceived usefulness. The majority of the R^2 values are moderate to substantial, and all the values exceed the threshold of 0.2 recommended for consumer behavioural studies (Hair *et al.*, 2011).

Figure 2: PLS-SEM results of the E-ECM-IT.



*Indicates significant paths.

Figure 2 and Table 3 display the PLS-SEM results from the assessment of the structural model. After verifying whether the relationships specified in the model are significant, it is important to consider the relevance of the significant relationships. According to Hair *et al.* (2014), this step is important but it is often overlooked because although significant, the effect size may be too small to merit managerial attention.

The effect size for each path can be established by means of calculating Cohen's f^2 (Hair *et al.*, 2014). According to these authors, the criterion to determine the effect size is such that 0.02, 0.15 and 0.35 represent small, medium and strong effects, respectively.

Table 3: Results for the hypotheses testing

| Hp | Proposed path | Path coefficient | t-stat | f^2 | Decision |
|----|------------------------------|------------------|---------|-------|-----------|
| H1 | Confirmation -> Satisfaction | 0.315 | 6.272* | 0.156 | Supported |
| H2 | Confirmation -> Usefulness | 0.416 | 6.400* | 0.241 | Supported |
| H3 | Confirmation -> Ease of use | 0.509 | 13.807* | 0.349 | Supported |
| H4 | Ease of use -> Usefulness | 0.372 | 6.294* | 0.192 | Supported |
| H5 | Ease of use -> Satisfaction | 0.260 | 3.953* | 0.111 | Supported |

| | | | | | |
|----|-------------------------------|--------|---------|-------|---------------|
| H6 | Ease of use -> Continued use | -0.063 | 1.109 | 0.007 | Not supported |
| H7 | Usefulness -> Satisfaction | 0.355 | 4.751* | 0.177 | Supported |
| H8 | Usefulness -> Continued use | 0.171 | 3.376* | 0.450 | Supported |
| H9 | Satisfaction -> Continued use | 0.741 | 13.963* | 0.770 | Supported |

^at-values for two-tailed test:

1.65 (sig. level 10%),

1.96* (sig. level 5%),

2.58 (sig. level 1%) (Hair et al., 2011)

From Table 3, it is evident that eight of the nine hypothesised paths in the model were significant, at $p < 0.05$. The data suggest that confirmation has a significant positive effect on satisfaction ($\beta=0.315$, $t=6.272$, $p<0.05$), perceived usefulness ($\beta=0.416$, $t=6.400$, $p<0.05$) and perceived ease of use ($\beta=0.509$, $t=13.807$, $p<0.05$) with medium effect sizes. Thus, there is support for H₁, H₂ and H₃, respectively. Perceived ease of use has a significant and medium positive effect size on usefulness ($\beta=0.372$, $t=6.294$, $p < 0.05$), and satisfaction ($\beta=0.260$, $t=3.953$, $p<0.05$), showing support for H₄ and H₅. Surprisingly, and contrary to previous studies (Thong *et al.*, 2006; Hong *et al.*, 2006), the path between perceived ease of use and continuance intention ($\beta=-0.063$, $t=1.109$, $p<0.05$) was insignificant and negative, with a negligible effect size. Based on these results, H₆ was not supported.

On the other hand, perceived usefulness significantly influences satisfaction, with a medium-effect size ($\beta=0.355$, $t=4.751$, $p<0.05$) and it had a strong, positive effect on continuance intention ($\beta=0.171$, $t=3.376$, $p<0.05$). The results show support for H₇ and H₈. The results reveal that consumers' overall satisfaction with mobile payment services was the best predictor of continuance intention, with a strong positive effect ($\beta=0.741$, $t=13.963$, $p<0.05$), showing support for H₉.

5 DISCUSSION

The aim of this research paper was to appraise empirically the factors that predict consumers' intentions to continue using mobile payment services. Relying on the E-ECM-IT as the theoretical underpinning for the study, nine hypotheses were tested. The findings support the E-ECM-IT's propositions that confirmation of mobile payment services positively influences consumers' usefulness, satisfaction and their perceptions of ease of use with which mobile payments can be used. This implies that if consumers are satisfied with the performance of the mobile payment service, their initial expectations are confirmed and they would regard the service as useful. Confirmation significantly impacts on consumers' post-adoption beliefs, from which consumers can either confirm or disconfirm whether the mobile payment service was useful, easy and gratifying. Therefore, the results of this study suggest that consumers highly regard services that meet or exceed their initial expectations as being useful and satisfying.

Although ease of use of mobile payment services positively influences usefulness and satisfaction, its impact on continued use intention in this study is inverse and therefore insignificant. This finding is inconsistent with prior research (Liao *et al.*, 2014; Venkatesh, 2000; Thong *et al.*, 2006), in which perceived ease of use was found to be a significant predictor of continuance intentions. The results suggest that usefulness exerts a greater influence on consumers' satisfaction with mobile payment services than ease of use, thus, supporting earlier finding by Thong *et al.* (2006). A plausible explanation could be that since the study focused on consumers who had already downloaded certain mobile payment apps, assuming the use them regularly, ease of use becomes less critical in influencing satisfaction and continuance intentions. Another explanation could be that the mobile payment users are already accustomed

to the interface as they buy ringtones, mobile data and airtime, such that mobile payment services could be regarded as the norm. Therefore, service providers should enhance usefulness by increasing the benefits of mobile payment services rather than focusing on the ease of use. However, developers should not disregard the impact that ease of use might have on elderly people, the less literate and the unbanked people in rural communities who might be prime targets for mobile payment services.

Although significant, ease of use (Beta=0.260) is a weaker predictor of satisfaction than perceived usefulness (Beta=0.355). This finding is in line with the findings of previous studies (Thong *et al.*, 2006; Lin and Lekhawipat, 2016) which confirmed that consumers' perception of how easily mobile payment services can be used would decrease over time as the users gain experience. Although mobile payment services are evolving rather rapidly, it could be that the innovations are not too sophisticated to require consumers to expend more effort to use them. Thus, it can be inferred that service providers should bolster satisfaction by developing mobile payment services that make consumer payments quicker and easier, thereby ensuring that they are more productive in their personal lives.

One interesting finding is that consumers' satisfaction with the use of mobile payment services emerged as the strongest predictor of their intention to continue using the services. In the E-ECM-IT, satisfaction is predicted by consumers' confirmation, how easy and useful mobile payment services are, explaining 62% of the satisfaction variance. Since satisfaction is an overall attitude, this implies that if consumers feel positive about using mobile payment services as a result of their expectation being confirmed, their propensity to continue using the services would be enhanced.

6. IMPLICATIONS OF THE STUDY

6.1 Theoretical contributions

The purpose of this study was to test the E-ECM-IT model to determine its applicability in South African context compared to other African countries recording high successes in mobile payment services, such as Kenya. The aim is to understand why mobile payments are not living up to expectations in South Africa compared to their counterpart African countries. This is important because South Africa is different in several ways. For example, South Africa has a much more sophisticated banking system than most African countries (Robb, 2015). There are more people who have access to banking services by default, because employers make it mandatory (Robb, 2015). The number of mobile network operators in South Africa providing mobile payment solutions are greater than network operators in Kenya, where Safaricom was the sole provider during the commercialisation of M-pesa (Robb, 2015, Iraki, 2016). Therefore, this study adds to the body of existing knowledge of new technology continuance intentions.

The results also strengthen the need to validate Western theories in emerging markets due to socio-economic differences. The results of the study indicated empirical support for the majority of hypothesised relationships, with the exception of one; a relationship between ease of use and continuance intention. It follows to reason that the ECM-IT developed by Bhattacharjee (2001) which does not include ease of use, could be better placed to measure new technology continuance intentions in an African context. The Bhattacharjee (2001, pp. 353) model predicts users' intention to continue using an IT with three antecedents (1) user satisfaction with IT, extent of user confirmation, and post-adoption expectations, represented by perceived usefulness. We therefore propose that the ECM-IT may be more appropriate in studying continuance intentions

to use new technologies in emerging countries than the E-ECM-IT. However, perceived ease of use could have a more direct effect via perceived usefulness and satisfaction on continuance intention but needs further confirmation. Hence, the study makes a theoretically interesting difference compared to previous studies. The results also reiterates the need to re-examine Western theories to measure their generalisability in African countries. However, we re-confirmed the role of confirmation on satisfaction, ease of use and usefulness as important the pre-conditions for satisfaction and continuance intentions. Secondly, this study, as one of the first to investigate the factors that predict users' continued use of mobile payment services in South Africa, contribute to the advancement of the knowledge regarding new technology continuance intentions and recognising that consumers are diverse in how they absorb new technologies.

6.2 Managerial implications

The primary objective of managers in the mobile payment space is to foster the continued use, and to reap the expected benefits from their investment. Thus, this paper enunciates the strategic implications to managers of mobile payment services, in order to maximise their returns on investments.

Firstly, the results of this study form the basis upon which customer retention strategies can be formulated. Customer retention is important, not only because it reduces the promotional costs of attracting new customers, but it also helps service providers to move in tandem with the ever changing customer tastes and preferences. This is particularly important in South Africa where an attempt to launch the Vodacom M-pesa mobile payment app, whose sustainability was based on achieving a critical mass of users, was discontinued due to low repeat use.

To retain regular users, service providers should monitor any changes in preferences, demand, expectations and competition in the marketplace, in order to evaluate the existing features of mobile payment services, and to identify new ones that consumers regard highly. The features that seemingly do not add value to consumers can be phased out and they could possibly be replaced by more highly valued features such as effective antivirus software. For instance, Snapscan is the widely recognised mobile payment app but works only in South Africa and is applicable for only small value purchases. Zapper, another common mobile payment app in South Africa is applicable for restaurant merchants only while FlickPay is also applicable for low value transactions at the point of sale. If the service providers can develop payment services applicable to buying high valued goods such as household furniture, and also being usable in other countries, that could trigger a sense of usefulness leading to continuance use.

Secondly, banks, mobile network operators and merchants should take advantage of the new business opportunities presented through mobile payments, since the new technology is expected to contribute to a better life for the regular users. Of particular importance is user satisfaction with mobile payment service experience. In South Africa, the mobile payment industry is saturated with different payment apps. Merchants and consumers may not keep up with the rate of introduction of new mobile payment apps in the market. This may cause confusion among consumers as they may realise that their downloaded app is not accepted as a payment method in certain retail shops of their choice. If strategies can be developed to make mobile payments attractive to different merchants, the mobile payment service could be used continuously.

The study also provides suggestions for long-term co-operation amongst the service providers such as banks, mobile network operators and merchants because they all 'play an integral role in the configuration of the industry architecture of the mobile payment market' (Gaur and Ondrus, 2012, p. 172). To increase market coverage, service providers should develop apps that can be used across all current mobile operating platforms such as Android, iOS, Windows Mobile and Desktop. Currently, the majority of operating platforms in South Africa are Android and iOS only which could attribute to low continued use.

Mobile payment apps that allow multiple bank cards may be more attractive to consumers. In South Africa, available mobile payment apps do not allow debit cards but accepts credit cards only, which could lead to a great loss of customers due to transaction costs associated with use of credit cards.

7 LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Despite the valuable contributions to theory and practice, the study is not without its limitations. Firstly, the study was conducted in one country, which limits the generalisability of the findings. Future studies can be conducted in other emerging economies, in order to provide a more comprehensive picture.

Secondly, the dearth of studies engaging in empirical longitudinal studies needs to be addressed. Our study applied the cross-sectional design and because consumer behaviour is dynamic, future studies should conduct longitudinal studies to track consumer perceptions over time since consumers' perceptions can change during and after the use of a new technology.

Thirdly, only post-adoption beliefs specified in the E-ECM-IT model were used to predict satisfaction and continuance intentions. Future studies could incorporate other

constructs such as perceived enjoyment, perceived quality, value and trust (Thong *et al.*, 2006; Yang *et al.*, 2012; Susanto *et al.*, 2016) to enhance the understanding of satisfaction and continuance intentions to use mobile payment services. Although the E-ECM-IT model explained 69% of variance in continued use, other variables not tested in this study could contribute to explaining the other 31%.

Despite these limitations, this paper provides useful guidelines for the development and provision of mobile payment services from an emerging economy perspective. Based on the findings of this study, it can be recommended that companies should strive to ensure the continuous use of mobile payment services in order to maximise their return on the financial investment.

Africa at large has entered a profound era of mobile payment technology revolution. Mobile payments can be used to address a myriad of social challenges in Africa, including the unbanked population, financial inclusivity and the digital divide. Service providers should take advantage of this huge untapped market and they should use customer satisfaction as the cornerstone for growing their businesses.

LIST OF REFERENCES

Ajzen, I. (1991), "The theory of planned behaviour", *Organizational Behaviour and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.

Alshurideh, M.T. (2016), "Is customer retention beneficial for customers? a conceptual background", *Journal of Research in Marketing*, Vol. 5 No. 3, pp. 382-389.

Bhattacharjee, A. (2001), "Understanding information systems continuance: an expectation-confirmation model", *MIS Quarterly*, Vol 25 No. 3, pp. 351-370.

Chikalipah, S. (2017), "What determines financial inclusion in Sub-Saharan Africa?," *African Journal of Economic and Management Studies*, Vol. 8 No. 1, pp. 8-18.

Cho, J. (2016), "The impact of post-adoption beliefs on continued use of health apps", *International Journal of Medical informatics*, Vol. 87, pp. 75-83.

Dahlberg, T., Mallat, N., Ondrus, J. and Zmijewska, A. (2008), "Past, present and future of mobile payments research: a literature review", *Electronic Commerce & Research Applications*, Vol. 7, pp. 165-181.

Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340.

DeLone, W.H. and McLean, E.R. (2004), "Measuring e-commerce success: applying the DeLone & McLean information systems success model", *International Journal of Electronic Commerce*, Vol. 9 No. 1, pp. 31-47.

Fichardt, C. (2015), "Mobile will inevitably allow South African to ditch their wallets", available at: www.memeburn.com/2015/07/mobile-will-inevitably-allow-south-africans-to-ditch-their-wallets/ (accessed 12 January 2016).

Fornell, C. and Larcker, D.F. (1981), "Structural equation models with observable variables and measurement errors", *Journal of Marketing Research*, Vol. 18 No.1, pp. 39-50.

Gaur, A. and Ondrus, J. (2012), "The role of banks in mobile payment ecosystem: a strategic asset perspective", *International Conference on Electronic Commerce 2012*, August 7-8, Singapore Management University, Singapore.

Groß, M. (2016), "Impediments to mobile shopping continued usage intention: a trust-risk-relationship", *Journal of Retailing & Consumer Services*, Vol. 33, pp. 109-119.

Gupta, A. and Arora, N. (2017), "Understanding determinants and barriers of mobile shopping adoption using behavioural reasoning theory", *Journal of Retailing & Consumer Services*, Vol. 36. pp. 1-7.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011), "PLS-SEM: Indeed a silver bullet", *Journal of Marketing Theory and Practice*, Vol. 19 No. 2, pp. 139-152.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2013), "Editorial - Partial least squares structural equation modelling: Rigorous applications, better results and higher acceptance", *Long Range Planning*, Vol. 46 No. 1-2, pp. 1-12.

Hair, J.F., Sarstedt, M., Hopkins, I. and Kuppelwieser, V.G. (2014), "Partial least squares structural equation modelling (PLS-SEM): an emerging tool in business research", *European Business Review*, Vol. 26 No. 2, pp. 106-121.

Henseler, J. (2010), "On the convergence of the partial least squares path modelling algorithm", *Computational statistics*, Vol. 25 No. 1, pp. 107-120.

Hong, S.J., Thong, J.Y.L. and Tam, K.Y. (2006), "Understanding continued information technology usage behaviour: a comparison of three models in the context of mobile internet", *Decision Support Systems*, Vol. 42, pp. 1819-1834.

Hsu, M.H., Yen, C.H., Chiu, C.M. and Chang, C.M. (2006), "A longitudinal investigation of continued online shopping behaviour: an extension of the theory of planned behaviour", *International Journal of Human-Computer Studies*, Vol. 64 No. 9, pp. 889–904.

Iraki, X.N. (2016), "Five reasons M-Pesa failed in South Africa", available at: www.standardmedia.co.ke/business/article/2000201831/five-reasons-m-pesa-failed-in-south-africa (accessed 18 July 2017).

Jia, L., Hall, D. and Sun, S. (2014), "The effect of technology usage habits on consumers' intention to continue to use mobile payments", *Twentieth Americas Conference on Information Systems, Savannah*, pp. 1-12.

Kim, B. (2010), "An empirical investigation of mobile data service continuance: incorporating the theory of planned behaviour into the expectation-confirmation model", *Expert Systems with Applications*, Vol. 37, pp. 7033-7039.

Kim, C., Mirusmonov, M. and Lee, I. (2010), "An empirical examination of factors influencing the intention to use mobile payment", *Computers in Human Behaviour*, Vol. 26, pp. 310-322.

Kshetri, N. and Acharya, S. (2012), "Mobile payments in emerging markets", *The IEEE computer Society*, pp. 9-13.

Liao, Z., Shi, X. and Wong, W.K. (2014), "Key determinants of sustainable smartcard payment", *Journal of Retailing & Consumer Services*, Vol. 21, pp. 306-313.

Lin, H., Fan, W. and Chau, P.Y.K. (2014), "Determinants of users' continuance of social networking sites: a self-regulation perspective", *Information & Management*, Vol. 51 No. 5, pp. 595-603.

Lin C. and Lekhawipat, W. (2016), "How customer expectations become adjusted after purchase", *International Journal of Electronic Commerce*, Vol. 20 No 4, pp. 443-469.

Madupalli, R.K. and Poddar, A. (2014), "Problematic customers and customer service employee retaliation", *Journal of Services Marketing*, Vol. 28 No. 3, pp. 244-255.

Mallat, N. (2007), "Exploring consumer adoption of mobile payments: a qualitative study", *The Journal of Strategic Information Systems*, Vol. 16, pp. 413-432.

Mouakket, S. and Bettayeb, A.M. (2015), "Investigating the factors influencing continuance usage intention of learning management systems by university instructors", *International Journal of Web Information Systems*, Vol. 11 No. 4, pp. 1-24.

Natarajan, T., Balasubramanian, S.A. and Kasilingam, D.L. (2017), "Understanding the intention to use mobile shopping applications and its influence on price sensitivity", *Journal of Retailing & Consumer Services*, Vol. 37, pp. 8-22.

NFC World Knowledge Centre (2017), "Global mobile payment market to hit \$620bn in 2016", available at: www.nfcworld.com/2016/02/04/341939/global-mobile-payment-revenue-to-hit-620bn-in-2016/ (accessed 05 December 2016).

Nielson Global Survey (2016), "Device and conquer: global consumers let their fingers do the shopping global", available at: www.nielsen.com/eu/en/insights/news/2016/device-and-conquer-global-consumers-let-their-fingers-do-the-shopping.html (accessed 10 December 2016).

Oliver, R.L. (1980), "A cognitive model of the antecedents and consequences of satisfaction decisions", *Journal of Marketing Research*, Vol. 17 No. 4, pp. 460-469.

Osah, O. and Kyobe, M. (2017), "Predicting user continuance intention towards M-pesa in Kenya", *African Journal of Economic and Management Studies*, Vol. 8 No. 1, pp. 36-50.

Phillips Consulting (2013), "Current trends in mobile money in Nigeria", available at: www.phillipsconsulting.net/files/mobile-money-report2013.pdf (accessed 18 March 2017).

Qasim, H. and Abu-Shanab, E. (2015), "Drivers of mobile payment acceptance: the impact of network externalities", *Information System Frontier*, 1-14.

Rezaei, S. (2014), "Segmenting consumer decision-making styles (CDMS) toward marketing practice: a partial least squares (PLS) path modelling approach" *Journal of Retailing & Consumer Services*, Vol. 22, pp. 1–15.

Robb, G. (2015), "Why mobile money has flopped in SA", available at: www.techcentral.co.za/why-mobile-money-has-flopped-in-sa/58282/ (accessed 12 October 2016).

Sattler, H., Völckner, F., Riediger, C. and Ringle, C.M. (2010), "The impact of brand extension success factors on brand extension price premium", *International Journal of Research in Marketing*, Vol. 27 No. 4, pp. 319–328.

Schierz, P.G., Schilke, O. and Wirtz, B.W. (2010), "Understanding consumer acceptance of mobile payment services: an empirical analysis", *Electronic Commerce & Research Applications*, Vol. 9, pp. 209-216.

Setterstrom, A.J., Pearson, J.M. and Orwig, R.A. (2013), "Web-enabled wireless technology: an exploratory study of adoption and continued use intentions", *Behaviour & Information Technology*, Vol. 32 No. 11, pp. 1139-1154.

Susanto, A., Chang, Y. and Ha, Y. (2016), "Determinants of continuance intention to use the smartphone banking services: an extension to the expectation-confirmation model", *Industrial Management & Data Systems*, Vol. 116 No. 3, pp. 1-8.

Thong, J.Y.L., Hong, S.J. and Tam, K.Y. (2006), "The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance", *International Journal of Human Computer Studies*, Vol. 64, pp. 799-810.

Van Zyl, G. (2016), "Vodacom SA reviewing its sluggish M-Pesa business", available at: www.fin24.com/Tech/Companies/vodacom-reviewing-its-sluggish-m-pesa-business-20160315 (accessed 12 September 2017).

Vedadi, A. and Warkentin, M. (2016), "Continuance intention on using mobile banking applications: a replication study of information systems continuance model", *Transactions on Replication Research*, Vol. 2, pp. 1-11.

Venkatesh, V. (2000), "Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model", *Information Systems Research*, Vol. 11 No. 4, pp. 343-365.

Vodacom South Africa (2015), "M-Pesa – SA's Mobile Financial Services, Vodacom" Available at: www.vodacom.co.za/vodacom/services/financial-solutions/m-pesa (accessed 18 July 2017).

World Wide Worx (2014), "The SnapScan effect: how mobile payments made QR codes relevant in South Africa", Available at: www.memeburn.com/2015/05/the-

snapscan-effect-how-mobile-payments-made-qr-codes-relevant-in-south-africa
(accessed 12 May 2016).

World Bank (2017), "Who are the unbanked? Uncovering the financial inclusion gap",
available at:
www.siteresources.worldbank.org/EXTGLOBALFIN/Resources/8519638-1332259343991/world_bank3_Poster.pdf (accessed 7 July 2017).

Yang, S., Lu, Y., Gupta, S., Cao, Y. and Zhang, R. (2012), "Mobile payment services' adoption across time: an empirical study of the effects of behavioural beliefs, social influences, and personal traits", *Computers in Human Behaviour*, Vol. 28, pp. 129-142.

Zhou, T. (2013), "An empirical examination of continuance intention of mobile payment services", *Decision Support Systems*, Vol 54, pp. 1085-1091.

CHAPTER 4: ARTICLE 3

AN INTEGRATED FRAMEWORK FOR ADOPTION AND CONTINUANCE INTENTIONS TO USE MOBILE PAYMENT SERVICES

Chapter 4 presents the third article, in which the proposed model, a result of the extended TRI and the EECM-IT, was tested to measure both adoption and continued use of mobile payment services in a single study, in the context of an emerging market. Because the moderating effect of gender was only evident in convenience (Article 1) and did not play a significant role in consumers' continuance intention to use mobile payment services (Article 2), it was excluded from further testing. The article was submitted to the *International Journal of Emerging Markets (IJEM)*. The article presented in this chapter is in the original format as submitted to the *International Journal of Emerging Markets*, observant of the manuscript's technical requirements. The *IJEM* publishes research focusing on issues related to business in emerging markets from multidisciplinary (economics, finance, marketing, and management) and multinational geographic perspectives. Because this study combines two Western-based theories (TRI and the EECM-IT) to test and validate the integrated model in the context of an African country (such as South Africa) with respect to adoption and continuance intention to use mobile payment services, the *IJEM* journal was deemed appropriate.

The author guidelines for the *International Journal of Emerging Markets* are available at:

- http://www.emeraldgrouppublishing.com/products/journals/author_guidelines.htm?id=ijoem

A copy of the author guidelines is in Appendix E.

AN INTEGRATED FRAMEWORK FOR THE ADOPTION AND CONTINUANCE INTENTION TO USE MOBILE PAYMENT APPS

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ABSTRACT

Purpose: The purpose of this study is to develop and test an integrated model of the modified technology readiness index (TRI) with the extended expectation-confirmation model in the context of information technology (E-ECM-IT), in order to explain the adoption and continued intention to use mobile payment applications (apps).

Design/methodology/approach: A quantitative survey was employed to collect the data from 426 users of mobile payment apps across South Africa. A confirmatory factor analysis was performed to validate the factor structure of the measurement items, while structural equation modelling (SEM) was employed to validate the proposed model and test the hypotheses.

Findings: The model was validated and explained 81% of variance in adoption and 78.5% in the continuance intention to use mobile payment apps. Drivers were better predictors of adoption than inhibitors, while satisfaction emerged as the strongest predictor of continuance intention.

Originality/value: To the best knowledge of the authors, this study is the first to empirically test an integrated modified TRI and the E-ECM-IT to supplement the paucity of research on the topic in the context of an emerging economy. The results show that the integrated model may provide an ameliorated way to understand the factors that influence adoption and how they impact on the continuance intention to

utilise mobile payment apps. The results also add to the existing knowledge, thus, laying the foundation upon which other models can be integrated in studies of various contexts relating to technology adoption and continued use.

Keywords: Mobile payment apps, adoption, continuance intention, technology readiness, expectation-confirmation theory.

Paper type: Research paper

1 INTRODUCTION

There is abundant literature examining the factors that impact the initial adoption of information technology services (Liébana-Cabanillas *et al.*, 2015; Pham and Ho, 2015; Slade *et al.*, 2014; Mallat, 2007). The majority of these adoption studies have been conducted in developed countries, with little evidence to suggest similar studies focusing on developing countries. Similarly, there also seems to be growing academic attention being paid to consumer's continued use of information technologies (Kim and Crowston, 2011; Mouakket and Bettayeb, 2015), including mobile payment apps (Zhou, 2011; Lu *et al.*, 2017).

With the advent of smartphones, experts tend to agree that the future of traditional payments such as cash, debit and credit cards, is on the demise while mobile payment apps may be the panacea for the financially excluded communities in Africa (Makina, 2017, pp 4). Retailers, mobile network operators and banks are entering the mobile payment space to facilitate the mobile based consumption of their services (Shrier *et al.*, 2016). However, little attention has been paid to understanding the factors that both predict the adoption and the continuance intention to use mobile payment apps.

As reported by Chong (2013), mobile commerce, including the use of mobile payment apps, is not carried out regularly and users may not return to the activity once they leave it. It is therefore important to ensure that there are long-term relationships with the users in order to increase the profits from their repeated use. Since adoption can be viewed as the initial step for continued use to take place, this suggests that two phenomena should be studied collectively. However, a review of the literature shows that studies examining the initial adoption and the continuance intention have been conducted separately, thereby leading to a siloed approach for doing research and this in turn, leads to a fragmented view instead of a more holistic perspective. To supplement the dearth of empirical studies on the topic, and to provide a more integrated approach, this study uses a novel approach to examine both the initial adoption and the continued use of mobile payment apps concurrently in a single study, and in the context of an emerging economy, which researchers believe has not been covered in depth to date.

There seems to be a lack of consensus among researchers regarding a clear distinction between the factors that influence adoption and the continuance intention to use various mobile technologies. The factors that have been investigated in the past, with respect to the initial adoption of new information technologies include: compatibility, perceived ease-of-use, perceived usefulness, perceived cost, convenience, innovativeness, insecurity, perceived risk, subjective norms, and attitudes (Mallat, 2007; Parasuraman, 2000; Venkatesh *et al.*, 2003; Liébana-Cabanillas *et al.*, 2015), to mention but a few.

Similarly, constructs, such as attitudes, perceived cost, perceived risk, perceived ease-of-use and perceived usefulness have also been studied to examine consumers' continuance intention to use various new technologies (Hung *et al.*, 2012; Setterstrom

et al., 2013; Cho, 2016). Previous adoption studies have also been applied in studying consumers' continued use of various information technologies (Kim and Crowston, 2011). Nevertheless, other scholars, such as Eriksson and Nilsson (2007), argue that researchers need to clearly delineate between the adoption and the continuance factors because consumer adoption and the continuance intention to use any new technology are influenced by different factors.

This finding was corroborated by Schuster *et al.* (2015), who reported that consumers' attitudes and perceptions change after experiencing a service. These contradictions require further research to provide a better understanding of the extent to which factors that lead to adoption can also lead to the continued use of the new technology. With the limited amount of research linking the initial adoption and the continued use, this study attempts to bridge the research gap that currently exists.

Compared to the rest of the world, Sub-Saharan Africa is considered to be one of the poorest areas and it requires radical financial inclusion interventions to reduce poverty (Wale and Makina, 2017). Based on reports that half of the world is unbanked (Makina, 2017), mobile payments are expected to spur the engagement of the unbanked population into the mainstream economy (Chikalipah, 2017), thereby improving the living standards of the populace.

Mobile payments could not only be beneficial to the unbanked but also continue to create opportunities to earn money, and even to create new business ventures, thus empowering the general population in developing countries (GSMA, 2016). For example, two per cent of the households in Kenya have escaped extreme poverty due to the introduction of mobile payments (GSMA, 2016). South Africa is one of the three largest markets in Africa in terms of mobile subscribers (GSMA, 2016) so that

understanding the usage of South African users of mobile payment apps is important, in order to grow the mobile payment market.

Thus, it is believed that mobile payments are the key to driving economic development in developing countries. However, the uptake of mobile payment apps in South Africa is slow (World Wide Worx, 2014). Furthermore, research shedding light on the reasons for the slow uptake and more importantly, how to enhance the uptake of mobile payment apps is very sparse. Greenland and Kwansah-Aidoo (2012) argue that international academic journals still neglect market research in emerging markets, especially in the less developed countries of Sub-Saharan Africa.

From a business perspective, examining user adoption and the continuance intention is important because the irregular and ineffective long-term use of new technologies, such as mobile payment apps, often contributes to corporate failure (Bhattacharjee, 2001, p. 352). Not all the mobile payment solutions introduced in the past have been a success. Until the continued usage of an information technology, including mobile payments can be established, it is too early to classify its use or its adoption as a success (Thong *et al.*, 2006).

Drawing on the technology readiness index (TRI) (Parasuraman, 2000) and the extended expectation-confirmation model in the context of information technology (E-ECM-IT) (Thong *et al.*, 2006), this study investigates the factors that influence the adoption and the continued use of mobile payment apps. The study proposes and empirically tests a conceptual model using structural equation modelling (SEM) to predict the adoption and continuance intention to use mobile payment apps. Firstly, the integration is intended to build a theoretical framework that can enhance the understanding of the factors that impact on adoption and continuance intention.

Secondly, the study aims to empirically validate the proposed integrated model in the context of mobile payment apps. Thirdly, previous studies have shown that the continued use and adoption decisions are affected by different factors and in different situations (Setterstrom *et al.*, 2013). Fourthly, from a practical perspective, the study may help service providers to appropriately invest the required resources in the development and provision of mobile payment services (Kim *et al.*, 2010) that not only attract new users, but also retain existing ones for the realisation of their financial investments. Lastly, “a combination of theories can collectively provide a better and more comprehensive understanding of consumer behaviour regarding their IT usage than when each theory is considered alone” (Chong, 2013, p. 24).

In the light of the above, there seems to be sufficient motivation to create a hybrid model, incorporating two or more models. Hence, the TRI and E-ECM-IT constructs have been integrated to ground this study, in order to better explain and broaden this sparsely researched perspective.

2 LITERATURE REVIEW

2.1 Conceptualisation of mobile payments

Undeniably, mobile payments have become one of the technological revolutions of modern times, and they have disrupted and dominated markets in both the developing and the developed world. In 2014, it was estimated that global mobile payment services would have 450 million users by 2017 (Slade *et al.*, 2014), and now the future projections point to an estimated 720 million subscribers by 2020 (GSMA, 2016).

Sub-Saharan Africa is leading in terms of active mobile payment services, accounting for more than 40% of adult populations in Zimbabwe, Ghana, Tanzania and Gabon (GSMA, 2016). African consumers spent over \$57.8 billion on mobile payments in

2012 alone (Leppan, 2015) and it is estimated that over \$100 billion will be spent by 2020 (GSMA, 2015). Thus, the rise in the ubiquity of mobile phones and the growth in mobile payment transactions is not only creating substantial market opportunities for the mobile industry, but it has also altered consumer behaviour in a way that can contribute to economic development in Africa.

Different perspectives have been adopted by scholars in conceptualising mobile payments. Liebana-Cabanillas *et al.* (2015) describe mobile payment as a convenient, safe and simplified payment transaction that uses a mobile device. From a consumer's perspective, mobile payments refer to purchases that are instigated and processed via a mobile phone (Schierz *et al.*, 2010). Dahlberg *et al.* (2008) describe mobile payment from a device point of view as the payments that use a mobile phone or a tablet that utilises wireless communication technologies.

Implicit in their definition, the mobile phone is the key distinguishing feature. Based on the above conceptualisations, mobile payments are described in the context of this study, as a payment form that utilises an app-enabled mobile phone instead of a cash, cheque or bank card to pay for goods and services.

In terms of subscriber base, South Africa is one of the dominant markets in the region (GSMA, 2016) but the economic value that is derived from mobile payments is disproportionate. The literature suggests that one of the reasons for low mobile payment conversion rates in South Africa is related to the issues of lack of trust, security and critical mass (Kalan, 2016). Other scholars suggest that the low uptake of mobile payment apps is due to advanced financial systems that create opportunities for financial inclusion, including other cheap means of transferring money that already exist in South African (Robb, 2015).

Thus, there is no consensus among researchers as to the salient factors responsible for the slow adoption and continued use of mobile payment apps. The lack of general agreement calls for further investigation to explore consumers' motivations to adopt and continue their use intentions.

3 DEVELOPMENT OF A THEORETICAL FRAMEWORK AND HYPOTHESES FOR EXAMINING THE ADOPTION AND CONTINUED USE OF MOBILE TECHNOLOGY

Extant literature indicates that the theoretical bases for technology adoption studies include, among others, the technology acceptance model (TAM) (Davis, 1989), diffusion of innovation (DOI) (Rogers, 2003), the theory of planned behaviour (TPB) (Ajzen, (1991), the technology readiness index (TRI) (Parasuraman, 2000), and the unified theory of technology acceptance, (UTAUT) (Venkatesh *et al.*, 2003).

On the other hand, literature is evolving which states various theories that are being employed to examine the continued use of information technologies. Some of these theories include the TAM (Davis, 1989), TRB (Ajzen, 1991), DOI (Rogers, 2003), the expectation-confirmation theory (ECM) (Oliver, 1980), expectation-confirmation in the context of IT (ECM-IT) (Bhattacharjee, 2001), the extended ECM-IT (Thong *et al.*, 2006), and the information system success (ISS) model (DeLone and McLean, 2004), to mention but a few.

As noted earlier, the proposed framework for this study is a combination of two perspectives of the TRI and the E-ECM-IT, in order to provide a holistic explanation of adoption and continuance intention behaviour in the context of mobile payments, as depicted in Figure 1. The TRI was selected as it relates to an individual person's predisposition to use new technology, as well as the general thoughts and feelings

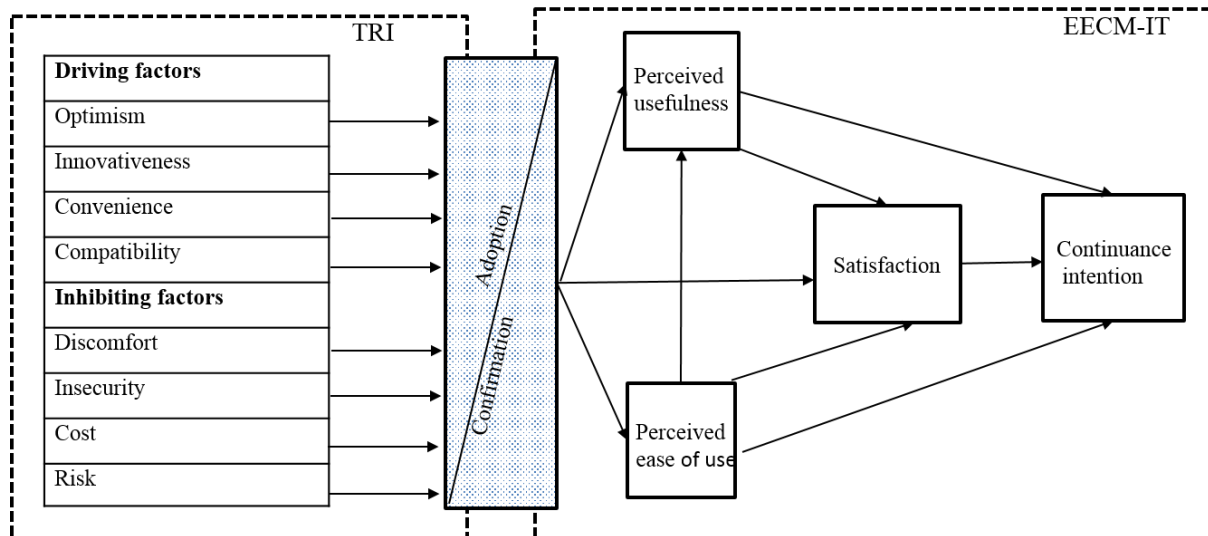
about the new technology, hence, it is an individual-specific construct (Parasuraman, 2000, p. 308).

TRI considers individual differences in adopting technology-related products in marketing settings (Lin *et al.*, 2007). The extant literature demonstrates that consumers vary in terms of their feelings or beliefs about a technology (Parasuraman, 2000) and that forms the basis of the TRI. Furthermore, the TRI considers the individual differences between the drivers and the inhibitors of technology adoption (Parasuraman, 2000), which is congruent with our study that seeks to determine the factors that influence an individual to adopt mobile payment apps.

The E-ECM-IT, on the other hand, is suited to further our understanding of the continued use of mobile payment services as it examines the salient factors that affect the user's post-adoption usage of a new technology. It is based on consumers' affective and cognitive beliefs experienced during service consumption – in order to predict satisfaction and continued use. The model is applicable to a wide range of information system and it has gained widespread acceptance in the literature to predict satisfaction and continuance intention (Hsu *et al.*, 2006).

Few studies have investigated a combination of individual-specific beliefs derived from past experience, together with cognitive and affective evaluations simultaneously, to understand the continuance use of a new technology including mobile payment apps, as reflected in Figure 1.

Figure 1: Technology readiness and extended expectation-confirmation model in the context of mobile payments



3.1 Technology readiness to adopt mobile payment apps

The first part of the proposed conceptual framework is based on a modified TRI. Parasuraman and Colby (2015) describe technology readiness as the degree to which users embrace and use the new technology to accomplish their personal goals. Before a consumer adopts a new technology such as a mobile payment app, they must be ready to embrace such a new technology. Therefore, it is important to first determine how ready consumers are to adopt the new technology in order to understand their continuance intention. The original TRI model comprises four constructs: optimism, innovativeness, discomfort, and insecurity constructs (Parasuraman, 2000). Given the significant changes in the mobile technological developments and their impact on people's lives, the updated TRI has become a relevant theoretical basis to understand consumers' reactions to the new technologies. Thus, the TRI forms the basis of the first part of the proposed model to understand consumers' readiness to adopt mobile payment apps, with an additional four constructs emerging from the literature to reflect the changing landscape.

In this regard, convenience, compatibility, perceived cost and perceived risk were included in the model. To the best knowledge of the authors, no prior study has extended the TRI to include the above constructs to improve its predictive ability in the context of mobile payments in an emerging market. Besides expanding the TRI, these factors are worthy of further investigation because prior studies have found their significance in the adoption of various new technologies (Mallat, 2007; Pham and Ho, 2015). Optimism, innovativeness, convenience and compatibility drive the technology readiness while discomfort, insecurity, cost and risk can slow down or inhibit consumer readiness to adopt the new technology.

3.2 Drivers of the technology readiness

Optimism refers to a positive attitude and the confidence that the new technology will improve users' personal lives (Parasuraman and Colby, 2015), while innovativeness is a consumer's predisposition to try out new information technologies rather than remain using previous choices (Kim *et al.*, 2010). Prior studies have shown that both optimism and innovativeness positively influence the adoption of new technologies (Parasuraman, 2000; Kim *et al.*, 2010).

The ability of mobile payments to eradicate multiple cards (Tan *et al.*, 2015), making payment transactions, viewing balances, initiating and authorising transactions, regardless of time and location (Herzberg, 2003), makes mobile payments more convenient when compared with the traditional forms of payment. Another possible driver of adoption is the compatibility of the new technology. If users perceive a technology as being consistent and in harmony with their behaviour, habits, values and needs (Mallat, 2007; Liebana-Cabanillas *et al.*, 2015), this would enhance their adoption levels.

In the light of the above, it can be hypothesised that:

H1. Optimism has a positive effect on the adoption of mobile app technology.

H2. Innovativeness has a positive effect on the adoption of mobile app technology

H3. Convenience has a positive effect on the adoption of mobile payment apps.

H4. Compatibility has a positive effect on the adoption of mobile payment apps.

3.3 Inhibitors of technology readiness

Insecurity, described by Parasuraman and Colby (2015) as the suspicions that consumers have regarding the new technology, in terms of its possible failure to deliver the expected benefits and its possible harmful effects, could inhibit the adoption of mobile payment apps. Additionally, discomfort, the perceived feeling of uneasiness regarding whether the consumer would be able to use and control the new technology to their advantage (Parasuraman and Colby, 2015), could also slow down the adoption of an innovation.

Users who experience discomfort in using the new technology feel overwhelmed by the use thereof (Walczuch *et al.*, 2007) so that they would be less receptive of new technology. Several studies have found a negative relationship between high levels of discomfort and insecurity and the adoption of the new technology (Walczuch *et al.*, 2007; Parasuraman, 2000).

In a study done by Mallat (2007), the cost of using mobile payments negatively impacted consumers' willingness to adopt mobile payments. The results of their study indicated that consumers resent mobile payments that transfer the transaction costs to consumers, without any added advantages. In the same way, the probability of a loss or injury (perceived risk) that might be caused by the use of the new technology

(Pham and Ho, 2015), could also jeopardise the chances of adopting the new technology.

Prior studies have considered the perception of risk as a deterrent factor in the adoption of mobile payment (Mallat, 2007, Pham and Ho, 2015). Consequently, we hypothesise that:

H5. Discomfort has a negative effect on the adoption of mobile app technology.

H6. Insecurity has a negative effect on the adoption of mobile app technology.

H7. Perceived cost has a negative effect on the adoption of mobile payment apps.

H8. Perceived risk has a negative effect on the adoption of mobile payment apps.

Technology readiness denotes the characteristics of users that increase the adoption of new technologies, so that they can accomplish their personal or work-related goals (Parasuraman, 2000). For Rogers (2003, pp. 12), adoption is the “full use of an innovation as the best course of action available”, and non-adoption is seen as a decision “not to adopt an innovation”.

3.4 Adoption vis-a-vis confirmation

The adoption theory explains why an individual accepts or rejects an innovation (Straub, 2009). In a study by Osah and Kyobe (2017), they found that a users’ level of M-pesa (mobile payment app) use can be enhanced if the user has identified a feature of the service that at least matches his or her task requirement. In the same vein, users will adopt mobile payment apps if they enhance the accomplishment of their tasks. If a consumer encounters obstacles, such as cost, risk, insecurity or discomfort in mobile payment app transactions, this could lead to disappointment, resulting in the rejection of the mobile payment app.

Adoption thus takes place if the mobile payment app is appropriate for the task at hand in terms of convenience and compatibility with their values, beliefs and lifestyle, and whether their pre-use expectations are met or confirmed. In a similar fashion, confirmation of expectations are realised if the product meets or exceeds the consumers' prior expectations, but when the product or service falls short of expectations, there would be negative disconfirmation, leading to rejection of the product or service (Oliver, 1980).

This study describes confirmation as the perception of consistency between the drivers and inhibitors in using the mobile payment app and in the actual adoption thereof. From the above, it can be observed that the conceptualisation between confirmation (the performance of the product as expected) (Bhattacharjee, 2001) and adoption (a choice to accept or reject an innovation) (Straub, 2009) suggests that confirmation and adoption are terms that can be used interchangeably because both of these measure consumers' experience after using a new technology.

In other words, both adoption and confirmation take into account the actual experience of using the mobile payment app to confirm/adopt, or refute the initial expectations of the service. Additionally, the assessment of scales measuring adoption and confirmation revealed that confirmation and adoption theories share important commonalities and assumptions in that they all represent consumer decisions after experiencing a service. As a consequence, we argue that the drivers and inhibitors of the modified TRI predicts adoption, and in return its adoption, reflects the confirmation of expectations that serve as an antecedent indirectly (through satisfaction) to the continued use thereof, as portrayed in the E-ECM-IT model.

The E-ECM-IT is the second part of our hybrid model, as reflected in Figure 1. Based on the argument that consumers' technology readiness significantly influences their adoption and adoption is reflective of users' cognitive and affective beliefs and expectations being confirmed. The term adoption will be used as reflective of this duality for the remainder of the article.

3.5 Continuance intention to use mobile payment apps

The E-ECM-IT which forms the basis of the second part of the model, proposes that confirmation, perceived ease-of-use and perceived usefulness, positively predict satisfaction and the continuance intention to use mobile payment apps. The impact of confirmation (adoption) on satisfaction, perceived usefulness and on perceived ease-of-use, after using a technology has been reported in various contexts, such as online banking (Bhattacharjee, 2001), general information-technology behaviour (Hong *et al.*, 2006) and smartphone-banking services (Susanto *et al.*, 2016).

Davis (1989, pp. 320) defines perceived usefulness as the belief that using a particular innovation or technology would improve one's job performance. In the context of our proposed model, perceived usefulness represents the practical benefits that an individual experiences when using mobile payment apps. Hong *et al.* (2006) reported that user's perceived usefulness of a new technology is a key determinant of satisfaction and continued intention. Perceived ease-of-use refers to an individual perceiving the use of mobile payments as easy.

Many studies have pointed to the direct effects of the perceived ease-of-use on perceived usefulness (Kim *et al.*, 2010; Liébana-Cabanillas *et al.*, 2015; Cho, 2016). A new technology regarded as being easy to use facilitates the accomplishment of more individual tasks than a new technology with lower perceived ease-of-use (Ashraf *et al.*,

2014). According to these authors, systems that are easy to use are more accessible and they would influence the perceived usefulness. It stands to reason that mobile payment apps that are easy to use will be more accessible and therefore, they would influence the perceived usefulness thereof.

Given that user satisfaction is a type of an emotion, if mobile payments are considered easy to use, consumers' level of satisfaction with the new technology would thereby be enhanced (Thong *et al.*, 2006). Prior studies have also indicated that the perceived ease-of-use can have an indirect effect on the continuance intention through usefulness (Cho, 2016). This implies that when an individual realises that few resources are needed to learn a new mobile technology, he or she may perceive the technology as being useful, which leads to the continued use thereof.

Satisfaction is one of the positive emotions experienced by the consumer from using the mobile payment app. Satisfied customers can provide not only an effective channel to attract new users via word-of-mouth communications (Thong *et al.*, 2006), but they can also act as a steady and reliable source of revenue, resulting from repeated business (Hong *et al.*, 2006). However, more importantly, previous studies have demonstrated that satisfaction is a fundamental driving force for continued use (Eriksson and Nilsson, 2007; Mouakket and Bettayeb, 2015; Thong *et al.*, 2006).

Continuance intention can be defined as the degree to which an individual currently using a mobile phone to purchase products or services has developed conscious plans to continue using it in the future (Setterstrom *et al.*, 2013). Consumers' continuance intention is determined by their satisfaction with prior use and this association has been corroborated in previous studies (Chen *et al.*, 2012; Hong *et al.*, 2006).

Based on the above, it can be hypothesised that:

H9. Adoption of mobile payment apps has a positive effect on satisfaction.

H10. Adoption of mobile payment apps has a positive effect on usefulness.

H11. Adoption of mobile payment apps has a positive effect on ease-of-use.

H12. Perceived ease-of-use of mobile payment apps has a positive effect on usefulness.

H13. Perceived ease-of-use of mobile payment apps has a positive effect on satisfaction.

H14. Perceived ease-of-use of mobile payment apps has a positive effect on continuance intention.

H15. Perceived usefulness of mobile payment apps has a positive effect on satisfaction.

H16. Perceived usefulness of mobile payment apps has a positive effect on continuance intention.

H17. Satisfaction with mobile payment apps has a positive effect on continuance intention.

4 METHODOLOGY

4.1 Sampling and data collection

A self-administered questionnaire was distributed via an online South African consumer panel hosted by an international research firm, to adults aged 18 years and older, who had downloaded a mobile payment app prior to participating in the study, resulting in a sample of 426 respondents. The sample represented all nine provinces of South Africa. Although the use of consumer panels is not without limitations, they have several advantages, such as wider geographical coverage, cost-effectiveness, and the objectivity of the responses as the respondents feel anonymous (Bryman and Bell, 2011). Existing scales were used and adapted to reflect the mobile payment app

content with 7-point Likert scales points with 1 (strongly disagree) and 7 (strongly agree).

The questionnaire consisted of three sections. Section A pertained to mobile payment app usage while section B contained statements measuring the extent of adoption and the continuance intention to do so. Section C pertained to the demographic information of the respondents. The scales measuring optimism, innovativeness, discomfort and insecurity were all adapted from Parasuraman and Colby (2015). Scales measuring convenience and perceived ease-of-use were adapted from Kim *et al.* (2010), perceived-cost scales from Kim (2010); compatibility scales from Schierz *et al.* (2010) and perceived risk scales were adapted from Ramos-de-Luna *et al.* (2015). The scales measuring adoption, continued intention and perceived usefulness were adapted from Bhattacharjee (2001), while the satisfaction scales were taken from Susanto *et al.* (2016). The questionnaire was pre-tested before it was distributed.

5 THE RESULTS

Firstly, confirmatory factor analysis (CFA) was performed in order to validate the factor structure of the measurement items, and this was followed by structural equation modelling (SEM) to test the hypothesised paths, as well as validating the proposed model.

5.1 Descriptive statistics

From a total of 426 respondents, 213 were males (51.2%) and 203 were females (48.8%) representing an almost equal gender distribution. The age distribution of the respondents ranged from 18 to 71. Most of the respondents were aged 20-29 years (35.8%) and 30-39 years (30.3%). Of the 86% of respondents who preferred to answer the question relating to household income, 33% earned below R15 000 per month,

43% earned up to R45 000, while 10% earned R47 000 and higher, thus representing low, middle and high-income brackets in South Africa (SAARF, 2012). SnapScan was the most used mobile payment app among the respondents (35%), followed by Zapper (17%).

5.2 Measurement model

To assess the reliability and validity of the proposed measurement model, confirmatory factor analysis (CFA) was conducted (Pallant, 2016), using AMOS Version 24 software. Based on the initial results, 42 out of 47 indicator items were retained for further processing. Five items with factor loadings below 0.5 (Hair *et al.*, 2006) were identified and excluded from further analysis (C1 related to optimism, C7 related to innovativeness, C9 related to discomfort, C16 related to insecurity and C37 related to usefulness). The obtained fit indices of $\chi^2(741) = 1335.293$ ($p=0.00$), $\chi^2/df.=1.802$, AGFI=0.841, CFI=0.941, TLI=0.923, and RMSEA=0.44, indicate acceptable model fit.

5.3 Reliability and validity

5.3.1 Convergent validity

Convergent validity was assessed by inspecting the values and significance of the factor loadings and the average variance extracted (AVEs) (Fornell and Larcker, 1981). The results in Table 1 indicate that all the constructs had good internal consistency as the composite reliability (CR) and Cronbach's Alpha values were all greater than the recommended threshold of 0.7 (Nunnally, 1978). Furthermore, all the factor loadings were significant and equal to or greater than 0.5 (Hair *et al.*, 2006).

The average variance extracted (AVE) also meets or exceeds the cut-off point of 0.5 (Hair *et al.*, 2006), which seems to suggest that the scale items used are representative of each construct and support convergent validity.

Table 1. Factor loadings, CR, Cronbach's Alpha and AVE values

| Construct | Items | Factor loadings | CR | Alpha | AVE |
|-----------------------|--------------|------------------------|-----------|--------------|------------|
| Optimism | Optim. C2 | 0.742 | 0.756 | 0.722 | 0.512 |
| | Optim. C3 | 0.805 | | | |
| | Optim. C4 | 0.582 | | | |
| Innovativeness | Innov. C5 | 0.631 | 0.745 | 0.738 | 0.500 |
| | Innov. C6 | 0.772 | | | |
| | Innov. C8 | 0.701 | | | |
| Convenience | Conven. C21 | 0.743 | 0.799 | 0.775 | 0.500 |
| | Conven. C22 | 0.743 | | | |
| | Conven. C23 | 0.615 | | | |
| | Conven. C24 | 0.718 | | | |
| Compatibility | Compat. C25 | 0.828 | 0.833 | 0.825 | 0.624 |
| | Compat. C26 | 0.787 | | | |
| | Compat. C27 | 0.753 | | | |
| Discomfort | Discom. C10 | 0.732 | 0.738 | 0.738 | 0.500 |
| | Discom. C11 | 0.672 | | | |
| | Discom. C12 | 0.682 | | | |
| Insecurity | Insec. C13 | 0.613 | 0.767 | 0.760 | 0.529 |
| | Insec. C14 | 0.865 | | | |
| | Insec. C15 | 0.681 | | | |
| Cost | Cost C28 | 0.675 | 0.847 | 0.838 | 0.651 |
| | Cost C29 | 0.876 | | | |
| | Cost C30 | 0.854 | | | |
| Risk | Risk C31 | 0.755 | 0.869 | 0.866 | 0.690 |
| | Risk C32 | 0.887 | | | |
| | Risk C33 | 0.845 | | | |
| Adoption | Adopt C34 | 0.766 | 0.776 | 0.776 | 0.536 |
| | Adop C35 | 0.745 | | | |
| | Adop C36 | 0.683 | | | |
| Usefulness | Use C38 | 0.816 | 0.791 | 0.791 | 0.654 |
| | Use C39 | 0.801 | | | |
| Ease-of-use | Eou C40 | 0.763 | 0.877 | 0.873 | 0.589 |
| | Eou C41 | 0.798 | | | |
| | Eou C42 | 0.763 | | | |
| | Eou C43 | 0.817 | | | |
| | Eou C44 | 0.690 | | | |
| Satisfaction | Sat C48 | 0.879 | 0.909 | 0.908 | 0.714 |
| | Sat C49 | 0.779 | | | |
| | Sat C50 | 0.868 | | | |
| | Sat C51 | 0.850 | | | |
| Continuance intention | CI C45 | 0.915 | 0.936 | 0.935 | 0.830 |
| | CI C46 | 0.927 | | | |
| | CI C47 | 0.890 | | | |

**All the factor loadings were significant at the 0.05 level*

5.3.2 Discriminant validity

Discriminant validity was assessed by using the Fornell and Larcker (1981) criterion, in which the square root of the AVE should exceed the shared correlations between each pair of constructs in order to confirm that the constructs are unique. The results in Table 2 show that most diagonal values exceed the inter-construct correlations and thereby confirm the discriminant validity.

Table 2: Results of discriminant validity

| | Opt | Inno | Disco | Insec | Conv | Com | Cost | Risk | Ado | Use | EOU | Sati | Cont |
|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Opt | 0.716 | | | | | | | | | | | | |
| Inno | 0.441 | 0.707 | | | | | | | | | | | |
| Disc | -0.077 | -0.077 | 0.707 | | | | | | | | | | |
| Insec | -0.313 | -0.136 | 0.352 | 0.728 | | | | | | | | | |
| Conv | 0.663 | 0.450 | -0.011 | -0.101 | 0.707 | | | | | | | | |
| Com | 0.572 | 0.535 | -0.047 | -0.148 | 0.850 | 0.790 | | | | | | | |
| Cost | 0.234 | 0.306 | -0.209 | -0.112 | 0.344 | 0.398 | 0.807 | | | | | | |
| Risk | 0.424 | 0.354 | -0.002 | -0.128 | 0.394 | 0.415 | 0.393 | 0.831 | | | | | |
| Ado | 0.566 | 0.494 | -0.130 | -0.236 | 0.729 | 0.734 | 0.574 | 0.553 | 0.732 | | | | |
| Use | 0.612 | 0.378 | -0.062 | -0.182 | 0.784 | 0.840 | 0.404 | 0.396 | 0.756 | 0.809 | | | |
| EOU | 0.423 | 0.440 | -0.177 | -0.134 | 0.613 | 0.551 | 0.390 | 0.360 | 0.606 | 0.692 | 0.767 | | |
| Satis | 0.543 | 0.409 | -0.083 | -0.215 | 0.745 | 0.738 | 0.407 | 0.427 | 0.782 | 0.813 | 0.691 | 0.845 | |
| Cont | 0.513 | 0.373 | -0.035 | -0.221 | 0.696 | 0.733 | 0.351 | 0.349 | 0.688 | 0.731 | 0.542 | 0.890 | 0.911 |

* The diagonal elements in bold represents the square roots of the average variance extracted (AVE).

The off-diagonal elements represent the correlation coefficients

However, a few constructs showed weak discriminant validities and these were then subjected to further testing. Shiu *et al.* (2011) cites that one of the limitations of the Fornell and Larcker (1981) criterion is that the procedure is a rule-of-thumb, in which the researcher does not take sampling errors into consideration.

Table 3. Procedures estimating discriminant validity

| | Chi-square difference tests | | | | | Confidence intervals | | Correlation coefficients |
|--------------------------------------|-----------------------------|----|-------------------------|----|-----------------|----------------------|------------|--------------------------|
| | Constrained CFA model | | Unconstrained CFA model | | Chi-square diff | | | |
| Constructs | Chi-square | Df | Chi-square | Df | | BBCI Lower | BBCI Upper | Estimate |
| Satisfaction & Continuance intention | 199.3 | 14 | 51.9 | 13 | 52.2 (df=1) | 0.835 | 0.939 | 0.890 |
| Satisfaction & Usefulness | 193.9 | 14 | 59.9 | 13 | 134 (df=1) | 0.666 | 0.885 | 0.789 |
| Satisfaction & Adoption | 156.1 | 14 | 63.4 | 13 | 92.7 (df=1) | 0.680 | 0.864 | 0.783 |
| Usefulness & Adoption | 118.5 | 9 | 21.1 | 8 | 96 (df=1) | 0.621 | 0.831 | 0.736 |
| Usefulness & Compatibility | 102.2 | 9 | 21.7 | 8 | 97.4 (df=1) | 0.735 | 0.891 | 0.840 |
| Convenience & Compatibility | 113.7 | 14 | 51.2 | 13 | 62.5 (df=1) | 0.769 | 0.912 | 0.840 |
| Convenience & Adoption | 163.1 | 14 | 67.0 | 13 | 96.1 (df=1) | 0.599 | 0.818 | 0.719 |
| Convenience & Satisfaction | 249.2 | 20 | 93.6 | 19 | 155.6 (df=1) | 0.631 | 0.824 | 0.739 |
| Convenience & Usefulness | 168.1 | 14 | 61.5 | 13 | 106.6 (df=1) | 0.654 | 0.861 | 0.761 |

Against this backdrop, this study applied three additional procedures to determine discriminant validity for those constructs showing weak validities with the Fornell and Larcker (1981) approach. These procedures are applauded in literature and are widely accepted in the assessment of discriminant validity (Shiu *et al.*, 2009).

A few pairs of constructs that showed weak discriminant validities were subjected to further testing, as suggested by Bagozzi and Phillips (1982), Bagozzi, Yi and Phillips (1991), and Hair, Anderson, Tatham, and Black, (1998). The Bagozzi and Phillips

(1982)'s test entails examining the differences in Chi-square value between the unconstrained CFA model and the nested CFA model to determine if a pair of constructs are distinct. A resultant Chi-square value must be greater than 3.84 to indicate that the two constructs are unique. The procedure proposed by Bagozzi *et al.* (1991) examines the confidence intervals for the estimated correlations between pairs of constructs. A 95% confidence interval for the correlations between pairs of constructs that does not contain unity indicates that the two constructs are indeed unique. Furthermore, if the confidence interval contains zero, then one can assert that the pair of constructs are distinct or nearly so (Bagozzi *et al.*, 1991:436). Hair *et al.* (1998)'s criteria stipulates that the correlation coefficients between a pair of constructs that is less than 0.9 is indicative of discriminant validity. The study used the confidence interval of 95% (significance level of 0.05) for all data analyses. However, the probability of achieving statistical significance is based not only on statistical considerations but also on the actual magnitude of the effect of interest, such as the correlation between variables (Hair *et al.*, 2006:10).

The difference in the Chi-square values between the unconstrained CFA model and the nested CFA model was greater than the threshold value of 3.84, indicating that a pair of constructs is distinct (Bagozzi and Phillips, 1982). Additionally, the confidence intervals for the correlations between the constructs did not contain unity, indicating that discriminant validity is established (Bagozzi *et al.*, 1991). Lastly and according to Hair *et al.* (1998)'s criterion, the results shown in Table 3 indicate that discriminant validity was confirmed, hence, all the constructs were retained for further analysis.

5.4 Structural model

The hypothesised paths were tested using SEM, due its ability to test both the relationships and the overall fitness of the research model (Hair *et al.*, 2006). The

results of the goodness-of-fit of the structural model $X^2(790) = 1594.417$ ($p=0.00$) are reported in Table 4 and indicates acceptable model fit.

Table 4. Structural model fit statistics

| Fit indicators | Overall model | Recommended thresholds | Recommending authors |
|----------------|---------------|------------------------|-----------------------|
| X^2/df | 2.018 | ≤ 5.00 | Hooper et al. (2008) |
| CFI | 0.920 | ≥ 0.90 | Hair et al. (2006) |
| TLI | 0.913 | ≥ 0.90 | Hair et al. (2006) |
| IFI | 0.921 | ≥ 0.90 | Hair et al. (2006) |
| RMSEA | 0.050 | ≤ 0.06 | Hu and Bentler (1999) |

5.5 Hypothesis testing

It is evident from Table 5 and Figure 2, that the results of the path analyses provide support for twelve out of the seventeen hypotheses tested in this study.

Table 5. Results of the hypotheses testing

| H | Hypothesised Path | SRW | P value | Remark |
|-----|--------------------------------|----------|---------|----------------------|
| H1 | Optimism-->Adoption | 0.072 | 0.246 | <i>Not supported</i> |
| H2 | Innovativeness-->Adoption | 0.009 | 0.866 | <i>Not supported</i> |
| H3 | Convenience-->Adoption | 0.407** | 0.000 | Supported |
| H4 | Compatibility-->Adoption | 0.401** | 0.000 | Supported |
| H5 | Discomfort-->Adoption | -0.014 | 0.755 | <i>Not supported</i> |
| H6 | Insecurity-->Adoption | -0.098** | 0.024 | Supported |
| H7 | Cost-->Adoption | -0.239** | 0.000 | Supported |
| H8 | Risk-->Adoption | -0.152** | 0.000 | Supported |
| H9 | Adoption-->Satisfaction | 0.499** | 0.000 | Supported |
| H10 | Adoption-->Usefulness | 0.704** | 0.000 | Supported |
| H11 | Adoption-->ease of use | 0.631** | 0.000 | Supported |
| H12 | Ease-of-use-->Usefulness | 0.213** | 0.000 | Supported |
| H13 | Usefulness-->Satisfaction | 0.245** | 0.019 | Supported |
| H14 | Ease of use-->Satisfaction | 0.180** | 0.001 | Supported |
| H15 | Usefulness-->Continued Int | 0.100 | 0.171 | <i>Not supported</i> |
| H16 | Ease of use-->Continued Int | -0.170** | 0.000 | <i>Not Supported</i> |
| H17 | Satisfaction-->Continuance Int | 0.911** | 0.000 | Supported |

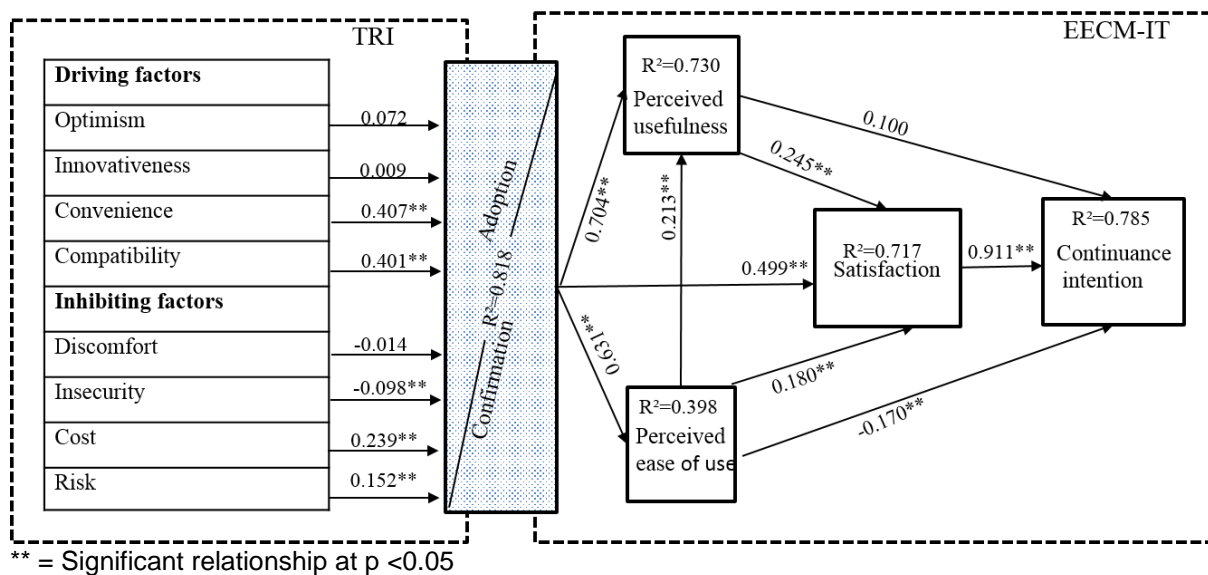
Note: H = Hypothesis; SRW = Standardized regression weight; ** = Significant at $p < 0.05$

Five of the eight factors hypothesised, as the predictors of mobile payment app adoption were significant: convenience ($\beta=0.407$, $p < 0.05$), compatibility ($\beta=0.401$,

$p < 0.05$), insecurity ($\beta = -0.098$, $p < 0.05$), cost ($\beta = 0.239$, $p < 0.05$) and risk ($\beta = 0.152$, $p < 0.05$). Thus, there is support for H3, H4, H6, H7, and H8, respectively. Contrary to our expectations, optimism ($\beta = 0.072$, $p > 0.05$), innovativeness ($\beta = 0.009$, $p > 0.05$) and discomfort ($\beta = -0.014$, $p > 0.05$), showed non-significant relationships with adoption. Consequently, H1, H2 and H5 were not confirmed.

Overall, the drivers seems to be stronger predictors of the adoption of mobile payment apps than the absence of inhibitors. As shown in Figure 2, the drivers and inhibiting factors accounted for 81.8% of the variance explained in the consumer readiness to adopt mobile payment apps.

Figure 2. Path diagram and relationships between constructs



With regard to the E-ECM-IT, adoption ($\beta = 0.499$, $p < 0.05$), usefulness ($\beta = 0.245$, $p < 0.05$) and ease-of-use ($\beta = 0.180$, $p < 0.05$) were positive predictors of consumer satisfaction, to show support for H9, H13, and H14, explaining 71.7% of the variance in satisfaction. Both the adoption of mobile payment apps ($\beta = 0.704$, $p < 0.05$) and the ease-of-use ($\beta = 0.213$, $p < 0.05$) positively predict the usefulness, thereby confirming H10 and H12, and this explained 73% of the variance in perceived usefulness. The

results also show that adoption ($\beta=0.631$, $p<0.05$) has a positive effect on ease-of-use, showing support for H11.

In terms of predicting continuance intention, usefulness ($\beta=0.100$, $p>0.05$) did not reach the level of significance while ease-of-use ($\beta=-0.170$, $p<0.05$), although significant, showed an inverse relationship that is contrary to the set hypothesis. Therefore, H15 and H16 were not supported. Satisfaction ($\beta=0.911$, $p<0.05$) emerged as the strongest predictor of continuance intentions to use mobile payment apps, and showing support for H17. Overall, Figure 2 shows that the model explained 78.5% of variance in consumers' continued intention to use mobile payment apps.

This result is higher than that of similar studies conducted by Hong *et al.* (2006), reporting 67% of the variance explained in their e-services study, and the study of Hsiao and Chang (2014), which reported 54% of variance in a mobile advertising study, which employed only the E-ECM-IT to predict continued technology usage behaviour.

6 DISCUSSION

Previous studies on mobile payment services have not fully investigated both the factors that influence consumers' intention to adopt and the continuance use of various mobile payment apps in a single study. This study attempts to fill this research gap, by introducing and testing a new integrated model, combining the constructs derived from the modified TRI and the E-ECM-IT to explain those factors that lead to adoption and their impact on the continued use of mobile payment apps.

Firstly, the results challenge some of the basic dimensions of the TRI as several of the original TRI relationships were not confirmed in our context. Optimism, innovativeness and discomfort were insignificant in predicting the adoption of mobile payment apps in

an emerging economy context. These unforeseen results are contrary to the findings of previous studies (Walczuch *et al.*, 2007; Meng *et al.*, 2009).

A plausible explanation could be the fact that the TRI was developed from an American perspective (Meng *et al.*, 2009) so that it requires further testing in other Sub-Saharan countries as individuals could differ in their personality traits and their acceptance of a new technology. The result suggests that some of the American/Western theories are not always significant in the context of developing countries (Duh, 2015), thereby highlighting the importance of conducting research, such as that of our study to test the applicability of Western theories. Despite that, the results are supportive of the majority of hypotheses and they provide a better understanding of what influences consumers to initially adopt mobile payment apps as indicated in the variance explained (81.8%) in the adoption of mobile payment apps.

The overall indication is that service providers should focus more on the driving factors than on the inhibiting factors. Convenience and compatibility emerged as strong contributors to the adoption of mobile payment apps. This implies that consumers' perception of convenience and compatibility with their life style enhances their intention to adopt and use mobile payment apps (Mallat, 2007). Thus, the convenience of being able to use mobile payment apps anytime and in any situation, and the execution of mobile payment services befitting consumers' purchase behaviours are important considerations.

Therefore, service providers ought to craft tangible solutions based on the fundamental driving forces affecting the adoption of mobile payment apps if they are to realise the economic value that can be derived from mobile payments. This is important, particularly in developing countries experiencing growth in the ubiquity of mobile

phones and broadened financial access, from which mobile payments are expected to create more opportunities for financial inclusion.

This study corroborates the findings of Kalan (2016), who underscored the impact of risk as a deterrent to the adoption of mobile payment apps in South Africa. Our study revealed that the perception of risky and costly apps reduces consumers' propensity to embrace them. Unless service providers can reduce the transaction costs and improve the transparency of mobile payment transactions, consumers' perception of the high costs associated with mobile payments would hinder the adoption process (Zhou, 2011).

This finding was also corroborated by Chong (2013), who cautioned service providers against pricing their services beyond those of the competition as some of the competitors offer the services without requiring any payment at all.

In terms of continuance intention, the findings validate the majority of the hypothesised paths of the E-ECM-IT, except H15 and H16, challenging previous studies (Thong *et al.*, 2006; Hong *et al.*, 2006). However, they corroborate other previous studies (Bhattacharjee, 2001, Hsu *et al.*, 2006), confirmation (adoption) exerts an effect on satisfaction. Thus, meeting or exceeding users' expectations such as accurate billing and transaction records in mobile payments are crucial elements in effecting high satisfaction levels. Ease-of-use was a significant predictor of satisfaction and continued intention but it showed an inverse relationship with continuance intention. This unexpected result warrants further investigation, in order to determine whether indeed the importance of ease-of-use diminishes with experience.

Usefulness was also found to be a significant predictor of satisfaction but it was not found to directly affect continuance intention. It seems as if usefulness could have a

more indirect effect through satisfaction on continuance intention. Although not expected, this result supports the findings by Hung *et al.* (2012), who reported that consumers are not motivated by past benefits, but rather by future benefits. No matter how good the mobile payment system was in the past, its future use is based on the expectations of future benefits. Therefore, the motivation to continue using mobile payment apps is dependent on the anticipated future benefits rather than on the usefulness thereof.

Satisfaction emerged as the strongest predictor of the continuance intention to use mobile payment apps. It is important to ensure that customer experiences are consistent in order to strengthen their continuance intention; because satisfaction is a result of meeting customers' expectations of the service (confirmation/adoption), as well as the usefulness and the ease-of- use of the app.

The emphasis should be placed on important issues, such as reliable connectivity and security to bring about a sense of satisfaction that would lead to the continued use of mobile payment apps. Since the majority of the E-ECM-IT relationships were confirmed, this suggests that the model could be suitable for use in the African context. Overall, the results thus provide empirical evidence for the proposed integrated model's predictive capabilities in terms of mobile payment app adoption and continued use, and they suggest that it is generic enough to apply to various new technology adoption and continuance intention studies.

7 IMPLICATIONS OF THE STUDY

7.1 Theoretical implications

The first theoretical contribution of this study is the development of a synthesised model, based on the TRI and E-ECM-IT in order to explain the adoption and

continuance intention of users of mobile payment apps. The study theorised that technology readiness significantly influences continuance intention through the direct and seemingly indirect effects of ease-of-use, usefulness and satisfaction, but still needs further testing. And indeed, the findings of this study show that mobile payment readiness significantly influences consumers' intention to continue using the mobile payment apps.

Our second contribution lies in the expanding of the original TRI by including four additional constructs taken from the existing literature, namely convenience, compatibility, cost and risk, which are found to be useful in the context of mobile payments. Because some of the relationships in the original TRI were not confirmed, the modified TRI might be a better and more applicable model for investigating the adoption of mobile payment apps in emerging markets, than the original one. Although the majority of the variance is explained (81.8%), it stands to reason that there could be other factors that may be relevant in the African context to explain the remaining 18.2%.

Overall, the model explained 78.5% of the variance in the continuance intention to use mobile payment apps, a percentage much higher, when compared with the variance explained in previous related studies (Bhattacharjee, 2001; Hong *et al.*, 2006), thereby signifying the robustness of the proposed integrated model. The results indicate that the proposed model is suitable enough and it now needs validation through additional research, in order to confirm its suitability in predicting the adoption and continuance intention to use new technologies.

Thirdly, the extant literature has focused on the adoption and continuance intention in the Western world. However, not much has been done in the context of emerging

economies, such as that of South Africa, where local market factors are conducive to mobile payment systems. Therefore, this study contributes to the growing body of literature on mobile payments, and specifically on the payment apps, especially in an emerging market context.

7.2 Managerial implications

From a managerial perspective, the findings can help service providers to increase the adoption and the continued usage of mobile payment apps. From the results, it is crucial that consumers are satisfied with their mobile payment experience and that their expectations are duly met to ensure their continued use. Service providers should craft sustainable and distinct value propositions based on convenience and compatibility, emphasising the importance of the single payment method offered by mobile payments, and their compatibility with people's busy daily lives.

Advertising campaigns depicting the convenience and compatibility of mobile payments with minimum risks could be useful. However, as suggested by De Kerviler *et al.* (2016), emphasis on the utilitarian benefits related to convenience, compatibility, at the expense of emotional benefits, may be insufficient to increase the adoption and to enhance continuance intention. Instead, service providers should also emphasise the pleasure associated with the use of mobile payment apps and introducing other unexpected services that might surprise users.

Suffice it to say that service providers should also pay attention to providing secure mobile technology, assuring users that their personal details will not be compromised, and that transactions will be processed with minimum risks of fraud and hacking. The proliferation of smartphones and the payment platforms in Africa has exposed mobile phones to various risks. To avert the scourge of theft and other risks, a concerted effort

by the service providers is needed to create awareness campaigns on security issues, in order to improve consumer confidence. Although satisfaction remains an important antecedent to continuance intention, service providers should understand that feelings of satisfaction can change after repeated use and so can expectations (Wang *et al.*, 2013).

8 LIMITATIONS AND FUTURE RESEARCH

Like all other studies, this research has limitations worth noting, and they require future research. Firstly, due to the fact that not all hypotheses in the study were confirmed, future replication studies are needed to determine whether similar results would be obtained, and whether a more parsimonious model exists. Secondly, this study has examined the predicting factors of adoption and the continuance intention to use mobile payment apps in general. Future studies could consider a specific mobile payment app. Despite these limitations, the proposed model provides high levels of confidence for future studies to apply the proposed model to ground related studies. Moreover, it may provide an impetus to other researchers to integrate other models to contribute to the body of existing knowledge related to mobile technology adoption and its continued use.

The primary objective of this study was to test the applicability of the proposed integrated model in a developing African context. The integration and application of existing theory in a new context has led to the extension of the theory through changing the direction of some relationships, finding that some of the originally hypothesised relationships were non-significant and creating new relationships. Thus, as mobile technology continues to advance and diffuse into society, we hope that the findings

reported in this study have contributed to the understanding of the mobile technology adoption and the continued use thereof.

In conclusion, we argue that mobile payment apps are becoming more prevalent and possibly, they hold the key to unlocking economic growth in Africa. As a convenient, safe and easy-to-use payment option to the middle and upper income segment but also a possible lifeline for the financially excluded communities, we urge other researchers to explore future research avenues across different cultures, in order to increase the momentum in the uptake of mobile payment apps to ensure economic growth in Africa.

LIST OF REFERENCES

- Ajzen, I. (1991), "The theory of planned behaviour", *Organisational Behaviour and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.
- Ashraf, A.R., Thongpapani, N.T. and Auh, S. (2014), "The application of the technology-acceptance model under different cultural contexts: the case of online shopping adoption", *Journal of International Marketing*, Vol. 22 No. 3, pp. 68-93.
- Bagozzi R.P. and Phillips L.W. (1982), "Representing and testing organizational theories: a holistic construction", *Administrative Science Quarterly*, Vol. 27, pp. 459–89.
- Bagozzi, R.P., Yi, Y. and Phillips, L.W. (1991), "Assessing construct validity in organizational research", *Administrative Science Quarterly*, Vol. 36, pp. 421–458.
- Bhattacharjee, A. (2001), "Understanding information systems' continuance: an expectation-confirmation model", *MIS Quarterly*, Vol. 25 No. 3, pp. 351-370.
- Bryman, A. and Bell, E. (2011), *Business Research Methods*, 3rd ed., Oxford University Press.
- Chen, S.C., Yen, D.C. and Hwang, M.I. (2012), "Factors influencing the continuance intention to the usage of Web 2.0: an empirical study", *Computers in Human Behaviour*, Vol. 28 No. 3, pp. 933-941.
- Chikalipah, S. (2017), "What determines financial inclusion in Sub-Saharan Africa?" *African Journal of Economic and Management Studies*, Vol. 8 No. 1, pp. 8-18.
- Cho, J. (2016), "The impact of post-adoption beliefs on the continued use of health apps", *International Journal of Medical Informatics*, Vol. 87, pp. 75-83.

- Chong, A.Y.L. (2013), "Understanding mobile commerce continuance intentions: an empirical analysis of Chinese consumers", *Journal of Computer Information Systems*, Vol. 53 No. 4, pp. 22-30.
- Dahlberg, T., Mallat, N., Ondrus, J. and Zmijewska, A. (2008), "Past, present and future of mobile-payments research: a literature review", *Electronic Commerce Research and Applications*, Vol. 7, pp. 165-181.
- Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340.
- De Kerviler, G., Demoulin, N.T. and Zidda, P. (2016), "Adoption of in-store mobile payment: Are perceived risk and convenience the only drivers?", *Journal of Retailing and Consumer Services*, Vol. 31, pp. 334-344.
- DeLone, W.H. and McLean, E.R. (2004), "Measuring e-commerce success: applying the DeLone & McLean information systems success model", *International Journal of Electronic Commerce*, Vol. 9 No. 1, pp. 31-47.
- Duh, H. (2015), "Testing three materialism life-course theories in South Africa", *International Journal of Emerging Markets*, Vol. 10 No. 4, pp.747-764.
- Eriksson, K. and Nilsson, D. (2007), "Determinants of the continued use of self-service technology: the case of internet banking", *Technovation*, Vol. 27, pp. 159-167.
- Fornell, C. and Larcker, D.F. (1981), "Structural equation models with observable variables and measurement errors", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

- Greenland, S. and Kwansah-Aidoo, K. (2012), "The challenges of market research in emerging markets: a practitioner perspective from Sub-Saharan Africa", *Australasian Journal of Market & Social Research*, Vol 20 No 2, pp. 9-22.
- GSMA (2015), "The mobile economy: Sub-Saharan Africa, 2015", available at: www.gsma.com/mobileeconomy/archive/GSMA_ME_SubSaharanAfrica_2015.pdf (accessed 17 January 2017).
- GSMA (2016), "The mobile economy: Africa", available at: www.gsma.com/mobileeconomy/africa/ (accessed 13 December 2016).
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2006), *Multivariate Data Analysis*, 6th ed., Pearson, Prentice Hall.
- Hair Jr., J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1998), *Multivariate Data Analysis*, 5th ed., Prentice-Hall, Upper Saddle River, NJ.
- Herzberg, A. (2003), "Payments and banking with mobile personal devices", *Communications of the ACM*, Vol. 46 No. 5, pp. 53-58.
- Hew, J.J., Lee, V.H and Lin, B. (2016), "Mobile social commerce: the booster for brand loyalty?", *Computers in Human Behaviour*, Vol. 59, pp. 142-154.
- Hong, S.J., Thong, J.Y.L. and Tam, K.Y. (2006), "Understanding continued information technology usage behaviour: a comparison of three models in the context of mobile internet", *Decision Support Systems*, Vol. 42, pp. 1819-1834.
- Hooper, D., Coughlan, J. and Mullen, M. (2008), "Structural equation modelling: guidelines for determining model fit", *Electronic Journal of Business Research Methods*, Vol. 6 No. 1, pp. 53–60.

- Hsu, M.H., Yen, C.H., Chiu, C.M. and Chang, C.M. (2006), "A longitudinal investigation of continued online shopping behaviour: an extension of the theory of planned behaviour", *International Journal of Human-Computer Studies*, Vol. 64, pp. 899-904.
- Hu, L.T. and Bentler, P.M. (1999), "Cut-off criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives", *Structural Equation Modelling: a Multidisciplinary Journal*, Vol. 6 No. 1, pp. 1-55.
- Hung, M.C., Yang, S.T. and Hsieh, T.C. (2012), "An examination of the determinants of mobile shopping continuance", *International Journal of Electronic Business Management*, Vol. 10 No. 1, pp. 29-37.
- Kalan, A. (2016), "Understanding merchant adoption of m-payments in South Africa", Thesis presented in partial fulfilment for the degree of M.Sc. Information Technology, University of Cape Town, South Africa.
- Kim, Y. and Crowston, K. (2011), "Technology adoption and use theory review for studying scientists' continued use of cyber-infrastructure", *Proceedings of the Association for Information Science and Technology*, Vol. 48 No. 1, pp. 1-10.
- Kim, C., Mirusmonov, M. and Lee, I. (2010), "An empirical examination of factors influencing the intention to use mobile payment", *Computers in Human Behaviour*, Vol. 26, pp. 310-322.
- Liébana-Cabanillas, F., Ramos de Luna, I. and Montoro-Ríos, F.J. (2015), "User behaviour in QR mobile payment system: the QR Payment Acceptance Model", *Technology Analysis & Strategic Management*, Vol. 27 No. 9, pp. 1031-1049.

- Liébana-Cabanillas, F., Muñoz-Leiva, F. and Sánchez-Fernández, J. (2015), "Influence of age in the adoption of new mobile payment systems", *Review of Business Management*, Vol. 17 No. 58, pp. 1390-1407.
- Lin, C. and Lekhawipat, W. (2016), "How customer expectations become adjusted after purchase", *International Journal of Electronic Commerce*, Vol. 20 No 4, pp. 443-469.
- Lin, C.H., Shih, H.Y. and Sher, P.J. (2007), "Integrating technology readiness into technology acceptance: the TRAM model", *Psychology & Marketing*, Vol. 24 No. 7, pp. 641-657.
- Leppan, C. (2015), "Mobile payments: leaving your wallet at home suddenly doesn't seem so weird", available at: www.memeburn.com/2015/09/4-questions-you-need-to-ask-before-building-an-app/ (accessed 10 December 2016).
- Lu, J., Wei, J., Yu, C.S. and Liu, C. (2017), "How do post-usage factors and espoused cultural values impact mobile payment continuance?", *Behaviour & Information Technology*, Vol 36 No. 2, pp. 14-164.
- Makina, D. (2017), "Introduction to the financial services in Africa special issue", *African Journal of Economic and Management Studies*, Vol. 8 No. 1, pp. 2-7.
- Mallat, N. (2007), "Exploring consumer adoption of mobile payments: a qualitative study", *Journal of Strategic information Systems*, Vol. 16, pp. 413-432.
- Meng, J.G., Elliot, K.M. and Hall, M.C. (2009), "Technology readiness index (TRI): assessing cross-cultural validity", *Journal of International Consumer Marketing*, Vol. 22 No. 1, pp. 19-31.

- Mouakket, S. and Bettayeb, A.M. (2015), "Investigating the factors influencing continuance usage intention of learning management systems by university instructors", *International Journal of Web Information Systems*, Vol. 11 No. 4, pp. 1-24.
- Nunnally, J.C. (1978), *Psychometric theory*, 2nd ed., New York, McGraw-Hill.
- Oliver, R.L. (1980), "A cognitive model of the antecedents and consequences of satisfaction decisions", *Journal of Marketing Research*, Vol. 17 No. 4, pp. 460-469.
- Osah, O. and Kyobe, M. (2017), "Predicting user continuance intention towards M-pesa in Kenya", *African Journal of Economic and Management Studies*, Vol. 8 No. 1, pp. 36-50.
- Pallant, J. (2016), *SPSS Survival manual: a step by step guide to data analysis using SPSS program*, 4th ed., Crow's Nest, NSW, Allen & Unwin.
- Parasuraman, A. (2000), "Technology readiness index (TRI): a multiple-item scale to measure readiness to embrace new technologies", *Journal of Service Research*, Vol. 2 No. 4, pp. 307-320.
- Parasuraman, A. and Colby, C.L. (2015), "An updated and streamlined technology readiness index: TRI 2.0.", *Journal of Service Research*, Vol. 18 No. 1, pp. 59-74.
- Pham, T.T.T. and Ho, J.C. (2015), "The effects of product-related, personal-related factors and attractiveness of alternatives on consumer adoption of NFC-based mobile payments", *Technology in Society*, Vol. 43, pp. 159-172.
- Ramos-de-Luna, I., Montoro-Rios. and Liebana-Cabanillas, F. (2015), "Determinants of intention to use NFC technology as a payment system: an acceptance model approach", *Information Systems E-Business Management*, 1-22.

- Robb, G. (2015), "Why mobile money has flopped in SA", available at: <https://techcentral.co.za/why-mobile-money-has-flopped-in-sa/58282/> (accessed 05 July 2017).
- Rogers, E.M. (2003), "Elements of diffusion", *Diffusion of innovations*, Vol. 5, pp. 1-38.
- SAARF. (2012), "SAARF segmentation tools", available at: <http://www.saarf.co.za/lsm/lsm.asp> (accessed 31 August 2017).
- Schierz, P.G., Schilke, O. and Wirtz, B.W. (2010), "Understanding consumer acceptance of mobile payment services: an empirical analysis", *Electronic Commerce Research and Applications*, Vol. 9, pp. 209-216.
- Schuster, L., Proudfoot, J. and Drennan, J. (2015), "Understanding consumer loyalty to technology-based self-services with credence qualities", *Journal of Services Marketing*, Vol. 29 No. 6/7, pp. 522-532.
- Setterstrom, A.J., Pearson, J.M. and Orwig, R.A. (2013), "Web-enabled wireless technology: an exploratory study of adoption and continued use intentions", *Behaviour & Information Technology*, Vol. 32 No. 11, pp. 1139-1154.
- Shiu, E., Pervan, S.J., Bove, L.L. and Beatty, S.E. (2009), "Reflections on discriminant validity: re-examining the Bove et al. (2009) findings", *Journal of Business Research*, Vol. 64, pp. 497-500.
- Shrier, D., Canale, G. and Pentland, A. (2016), "Mobile Money & Payments: technology Trends", MIT Connection Science's series on financial technology, Massachusetts institute of technology, available at: www.connection.mit.edu (accessed 12 June 2017).

- Slade, E. L., Williams, M.D. and Dwivedi, Y.K. (2014), "Devising research model to examine adoption of mobile payments: an extension of UTAUT2", *The Marketing Review*, Vol. 14 No. 3, pp. 311-336.
- Straub, E.T. (2009), "Understanding technology adoption: theory and future directions for informal learning", *Review of Educational Research*, Vol. 79 No. 2, pp. 625-649.
- Susanto, A., Chang, Y. and Ha, Y. (2016), "Determinants of continuance intention to use the smartphone banking services: an extension to the expectation-confirmation model", *Industrial Management & Data Systems*, Vol. 116 No. 3, pp. 1-8.
- Tan, A.C.T.G.W.H., Ooi, K.B., Hew, T.S. and Yew, K.T. (2015), "The effects of convenience and speed in m-payment", *Industrial Management & Data Systems*, Vol. 115 No. 2, pp. 311 – 331.
- Thong, J.Y.L., Hong, S.J. and Tam, K.Y. (2006), "The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance", *International Journal of Human Computer Studies*, Vol. 64, pp. 799-810.
- Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003), "User acceptance of information technology: toward a unified view", *MIS quarterly*, Vol. 23 No. 3, pp. 425-478.
- Walczuch, R., Lemmink, J. and Streukens, S. (2007), "The effect of service employees' technology readiness on technology acceptance", *Information & Management*, Vol. 44, pp. 206-215.

- Wale, L.E. and Makina, D. (2017), "Account ownership and use of financial services among individuals: evidence from selected Sub-Saharan African economies", *African Journal of Economic and Management Studies*, Vol. 8 No. 1, pp. 19-35.
- Wang, C., Harris, J. and Patterson, P. (2013), "The roles of habit, self-efficacy, and satisfaction in driving continued use of self-service technologies: a longitudinal study", *Journal of Service Research*, Vol. 16 No 3, pp. 400-414.
- World Wide Worx. (2014), "The SnapScan effect: how mobile payments made QR codes relevant in South Africa", available at: <http://memeburn.com/2015/05/the-snapscan-effect-how-mobile-payments-made-qr-codes-relevant-in-south-africa> (accessed 18 November 2016).
- Zhou, T. (2011), "An empirical examination of users' post-adoption behaviour of mobile services", *Behaviour & Information Technology*, Vol. 30 No. 2, pp. 241-250.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The primary purpose of this study was to investigate the factors that influence adoption and continuance intention to use mobile payment services, from an emerging market perspective. To achieve this primary objective, a review of the literature pertaining to the adoption of new technology and continuance intention was conducted. Several theories and models were identified. An evaluation of each theory and model was done, resulting in the selection of two models: one based on the adoption, and the other based on continuance intention. The justification for the selection of the two models was also clarified. These two models were subsequently combined into one integrated model that was then empirically tested in the study, based on the technology readiness index (TRI) (Parasuraman, 2000) and the extended-expectation confirmation model, in the context of IT (EECM-IT) (Thong, Hong & Tam, 2006) to understand both adoption and continuance intentions to use mobile payment services.

The TRI was extended by adding relevant constructs emerging from recent literature to reflect the changed landscape of IT, and then examined to determine its applicability to measure the adoption of mobile payment services and the moderating effect of gender. After it was found to be an appropriate theoretical underpinning to investigate continuance intentions, the EECM-IT was examined to determine its applicability to measure consumers' continuance intention to use mobile payment services. The moderating role of gender was also investigated. Gender was found not to play a significant role in the predictors of continuance intention: it only moderated one relationship in the adoption model (convenience), resulting in its exclusion from Article 3. After the EECM-IT had been found appropriate to predicting continuance intention, the two models were combined to measure both adoption and continuance intention to use mobile payment services simultaneously.

The main purpose of this study relates to the problem of insufficient research to further the understanding of the reason(s) behind low adoption rates and sluggish use of mobile payment services (some of which have been discontinued due to low usage) in an environment conducive to mobile payments, such as that of South Africa.

The remainder of the chapter addresses the research problem, the objectives and hypotheses, a summary of the main findings, its study contribution, its limitations, and directions for future research.

5.2 PROBLEM STATEMENT, OBJECTIVES AND HYPOTHESES

South Africa is one of the three dominant African markets, alongside Egypt and Nigeria, accounting for a third of the region's mobile subscriber base (GSMA, 2016). Although available reports indicate that mobile penetration rates in South Africa have reached the 145% mark (Cape Digital Foundation, 2017), the rate of adoption and continued use of mobile payment services is painstakingly low for the service providers. It is believed that the low uptake, and sometimes discontinuance, is due to a lack of understanding on the part of service providers about the salient factors that predict adoption and continued use. This study was therefore based on that premise.

Although mobile payment services in South Africa were expected to boom due to high mobile penetration rates, the expected rate of return (ROI) falls short of investor expectations. In fact, reports indicate that South Africa has the highest mobile penetration rates in Sub-Saharan Africa (GSMA, 2016), with over 20 million people owning smartphones that are capable of doing mobile transactions (World Wide Worx, 2015). Consequently, South Africa was expected to be fertile ground for mobile payment services. Surprisingly, the bottom line for investors has not lived up to these expectations. Many attempts have been made to introduce a range of mobile payment operating systems in South Africa, but not all have been successful. Yet South Africa's market conditions are more conducive to mobile payment services than other African countries, such as Kenya and Nigeria, where the market conditions were not as inviting when mobile payments were initially introduced. In Kenya, for example, Safaricom was the sole provider of mobile payments during the introduction of mobile payment services, compared with South Africa's four mobile network operators, all of which offered mobile-based products at the time.

About 25% of adults in South Africa are unbanked (Statistics SA, 2014), and all banks provide mobile payment services – yet the uptake and continued use of mobile payment services has been sluggish. Despite available statistics revealing that more people browse products on their smartphones, they are far less inclined to make purchases and pay with their mobile phones (Bhalla, 2016). There is a need, therefore,

to understand why consumers are not adopting, and why those who do initially adopt then abandon mobile payment services. This is the gap that this research attempts to fulfil.

The next section will highlight the sample characteristics, use behaviour, and main findings of each article.

5.3 MAIN FINDINGS RELATING TO THE SAMPLE PROFILE AND USE BEHAVIOUR

Table 1 below summarises the sample characteristics and use behaviour.

Table 1: Sample characteristics and use behaviour

| Variable | Response category | Percentage |
|------------------|--------------------------|-------------------|
| Gender | Male | 51.2 |
| | Female | 48.8 |
| | Total | 100 |
| Ethnicity | African | 19.7 |
| | White | 53.4 |
| | Indian | 8.9 |
| | Coloured | 9.1 |
| | Asian | 0.5 |
| | Other | 0.2 |
| | Prefer not to answer | 8.2 |
| | Total | 100 |
| Province | Eastern Cape | 4.1 |
| | Free State | 3.8 |
| | Gauteng | 45.7 |
| | KwaZulu-Natal | 13.9 |
| | Limpopo | 2.6 |
| | Mpumalanga | 2.9 |
| | Northern Cape | 2.6 |
| | Western Cape | 21.4 |
| | North West | 2.9 |
| Industry | Government | 3.8 |
| | Legal | 3.8 |
| | Financial | 14.2 |
| | Insurance | 1.4 |
| | Petrochemical | 1.4 |
| | Manufacturing | 8.7 |
| | Transportation | 1.7 |
| | Consulting | 7.2 |
| | Educational | 8.7 |

| | | |
|--------------------------------|------------------------------|------------|
| | Medical | 5.5 |
| | Retailing | 7.7 |
| | Wholesaling | 1.9 |
| | Student | 10.8 |
| | Other | 23.1 |
| | Total | 100 |
| Education | Secondary schooling or below | 16.3 |
| | Degree/Diploma/Certificate | 62 |
| | Postgraduate | 21.6 |
| | Total | 100 |
| Age group | 18-28 | 50 |
| | 29-38 | 31 |
| | 39-48 | 12.7 |
| | 49-58 | 4.3 |
| | 59+ | 2 |
| | Total | 100 |
| Income level | R15 000 or less | 33.4 |
| | R16 000- R25 000 | 21.2 |
| | R26 000- R35 000 | 13.9 |
| | R36 000- R45 000 | 7.5 |
| | R46 000- R55 000 | 4.6 |
| | R56 000 and more | 5.5 |
| | Prefer not to answer | 13.9 |
| | Total | 100 |
| App use | Snapscan | 35.3 |
| | Zapper | 17.3 |
| | VCPay | 3.8 |
| | FlickPay | 5.3 |
| | Masterpass | 9.1 |
| | Other | 29.1 |
| | Total | 100 |
| Frequency of app use | Daily | 7 |
| | Weekly | 24.8 |
| | Monthly | 33.7 |
| | Less than once a month | 34.6 |
| | Total | 100 |
| Type of products bought | Bills | 19.7 |
| | Clothes | 18 |
| | Courier | 12 |
| | Donations | 6.7 |
| Type of products bought | Electronics | 20.4 |
| | Markets | 17.3 |

| | | |
|--|-----------------|------|
| | Fuel | 14.4 |
| | Groceries | 21.2 |
| | Beauty products | 7.7 |
| | Plumbing | 2.9 |
| | Restaurant | 37.7 |
| | Take-aways | 23.3 |

From Table 1, the following insights can be established:

There is almost an equal gender split between males (51.2%) and females (48.8%). However, the majority of participants were Whites (53%), followed by Africans (19.7%). Half of the total respondents (50%) were aged between 18 and 28 years at the time of survey, and the majority of consumers (33.4%) who use mobile payments were in the R15 000 or less monthly income bracket.

The Gauteng province commands the highest percentage of respondents who use mobile payment services (45.7%), followed by Western Cape province (21.4%) and KwaZulu-Natal province with 13.9%. The results are reflective of the economic status, particularly for the Gauteng Province, where available reports indicate that, on average, people in Gauteng spend 3% of their income on cell phones, and the province has the highest penetration of mobile phones at 51% of the adult population (SAARF, 2016). The Gauteng province also has the largest share of the South African population: 23.9% of them live in the province (Statistics SA, 2014).

Respondents were asked to indicate their field of work at the time of the survey. About 14.2% of the respondents worked in the financial services sector, while 10.8% were students. Typically, respondents were well-educated, as 78.3% of them had a certificate, diploma, degree, or postgraduate qualification.

Among the familiar mobile payment apps available in South Africa, SnapScan is the most downloaded payment app (35.3%), followed by Zapper (17.3%). However, it is interesting to note that 29.1% of the respondents indicated that they use other mobile payment apps such as PayPal, Google Wallet, PayU, EasyPay, and bank-enabled mobile payment apps from First National Bank, (FNB), Capitec Bank, Standard Bank, and ABSA.

Although the majority of respondents indicated that they downloaded and used apps, it is concerning that 68.3% indicated that they use their mobile payment apps

infrequently – either less than once a month, or on a monthly basis. Products bought most often with mobile payments were mainly food items such as restaurant meals (37.7%), take away foods (23.3%), and grocery food items (21.2%). The next section provides a summary of the main findings of each article.

5.4 CHAPTER 2: ARTICLE 1: SUMMARY AND MAIN FINDINGS

A literature review relating to various models concerned with new technology adoption studies was conducted. After considering the advantages and limitations of each possible model, a recommendation was made on the choice of the TRI to ground the study (as explained in Chapter 1), and to extend the TRI to reflect recent developments.

The constructs of the TRI are categorised into drivers and inhibitors. Therefore, an analysis was done to investigate whether a second-order factor model could be derived that represents the four drivers and the four inhibitors. The result of the target coefficients that were calculated indicated that no adequate statistical reasoning could be found to use the second-order factor models. Hence, the first-order presentation was retained.

The objective of the first article was to determine the factors that influence the adoption of mobile payment services. The constructs were proven valid and reliable, and the results of the multiple regression showed that two factors (convenience and compatibility) are significant drivers of the adoption of mobile payment services, while insecurity, perceived cost, and perceived risk are significant inhibitors. The results of the hypotheses testing and structural paths of the latent variables for the structural model in terms of hypotheses, path coefficients (β), standard error (SE) and statistical significance at 0.05 level (p -value) are shown in Table 2. The results indicate that the TRI explains 53.1% of the variance in the adoption of mobile payment services. Optimism, innovativeness, and discomfort emerged as non-significant factors. A plausible explanation is provided in Article 1. The study established the insights indicated in Table 2 below.

Table 2: Results of hypotheses testing

| Hp | Proposed path | β | SE | p-value | Result |
|-------------------|---------------------------|---------|-------|------------|----------------------|
| Drivers | | | | | |
| H1 | Optimism-->Adoption | 0.058 | 0.045 | $p < 0.05$ | <i>Not supported</i> |
| H2 | Innovativeness-->Adoption | 0.063 | 0.034 | $p < 0.05$ | <i>Not supported</i> |
| H3 | Convenience-->Adoption | 0.248 | 0.050 | $p < 0.05$ | Supported |
| H4 | Compatibility-->Adoption | 0.210 | 0.041 | $p < 0.05$ | Supported |
| Inhibitors | | | | | |
| H5 | Discomfort-->Adoption | -0.006 | 0.026 | $p < 0.05$ | <i>Not supported</i> |
| H6 | Insecurity-->Adoption | -0.096 | 0.027 | $p < 0.05$ | Supported |
| H7 | Cost-->Adoption | -0.248 | 0.029 | $p < 0.05$ | Supported |
| H8 | Risk-->Adoption | -0.064 | 0.026 | $p < 0.05$ | Supported |

These results cast a shadow on the robustness of the original TRI applied to new mobile technology adoption in an emerging market context, as only one construct of the original TRI (insecurity) emerged as a significant predictor of the adoption of mobile payment services. The results support the call to expand existing theories by introducing other factors that may be important in the adoption of new mobile technologies.

Interestingly, the result of the moderation effect of gender shows that gender moderates only the effects of convenience on the adoption of mobile payment services. Males ($M = 6.038$) view mobile payment apps as more convenient than do their female counterparts ($M = 5.906$). There are no interaction effects of gender on the other seven factors tested in the study.

The results show that drivers are stronger predictors than inhibitors of the adoption of mobile payment services. Convenience and compatibility drive adoption, while perceived risk, perceived cost, and insecurity inhibit the adoption of mobile payment services. Emphasis should therefore be placed on the positive factors: convenience (Beta = 0.248), especially for males, and compatibility (Beta = 0.210).

5.5 CHAPTER 3 ARTICLE 2: SUMMARY AND MAIN FINDINGS

Article 2 examined the factors that predict consumers' continuance intention to use mobile payment services. After examining the existing literature on continuance

intention to use new technologies such as mobile payment services, a decision was made to ground the study in the EECM-IT. The model was found suitable because previous reports indicated that the model has a better explanatory power than other popular models, such as the TAM, in measuring continuance intention in the context of new technologies (Hong *et al.*, 2006).

After the confirmatory factor analysis (CFA) was performed, the EECM-IT showed internal consistency, reliability, and validity. A partial least squares structural equation modelling (PLS-SEM) approach was used to test the predictive ability and applicability of the EECM-IT in the context of an emerging economy, regarding mobile payment service continuance intention. The results show that the model accounted for an R^2 of 0.687, suggesting 68.7% of the variance explained in consumers' continuance intentions to use mobile payment services. The study established the insights indicated in Table 3 below, in accordance with the empirical objectives set out in Chapter 3.

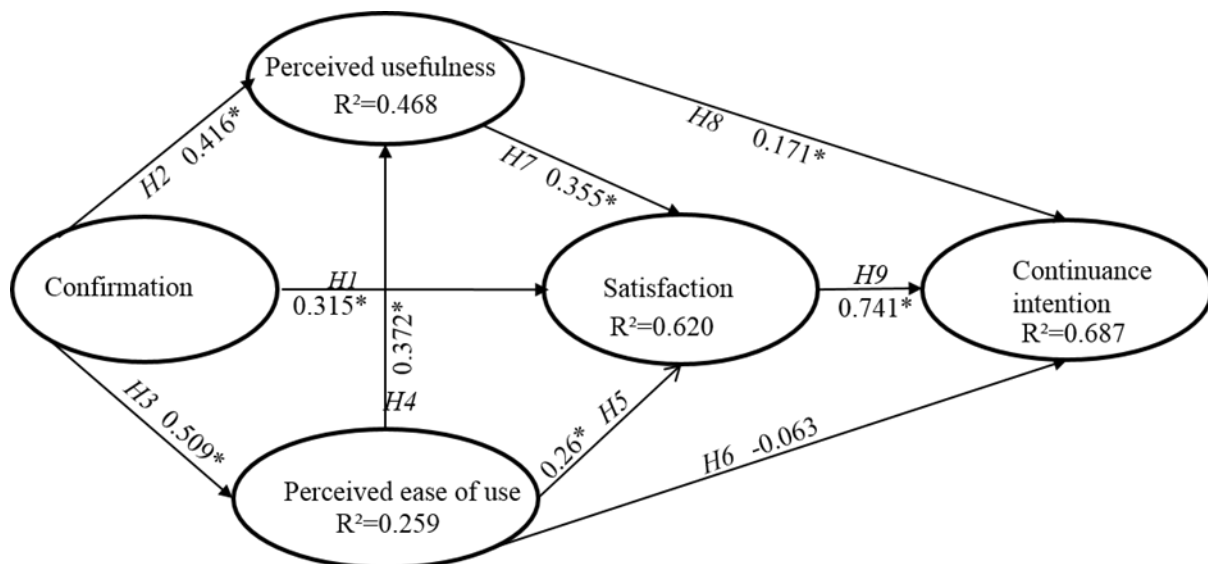
Table 3: Results of hypotheses testing

| Hp | Proposed path | β | ^a t-stat | f^2 | Result |
|----|-------------------------------|---------|---------------------|-------|---------------|
| H1 | Confirmation -> Satisfaction | 0.315 | 6.272* | 0.156 | Supported |
| H2 | Confirmation -> Usefulness | 0.416 | 6.400* | 0.241 | Supported |
| H3 | Confirmation -> Ease of use | 0.509 | 13.807* | 0.349 | Supported |
| H4 | Ease of use -> Usefulness | 0.372 | 6.294* | 0.192 | Supported |
| H5 | Ease of use -> Satisfaction | 0.260 | 3.953* | 0.111 | Supported |
| H6 | Ease of use -> Continued use | -0.063 | 1.109 | 0.007 | Not supported |
| H7 | Usefulness -> Satisfaction | 0.355 | 4.751* | 0.177 | Supported |
| H8 | Usefulness -> Continued use | 0.171 | 3.376* | 0.450 | Supported |
| H9 | Satisfaction -> Continued use | 0.741 | 13.963* | 0.770 | Supported |

Results of the PLS-SEM indicate that confirmation, ease of use, and usefulness directly influence satisfaction with mobile payment services. This implies that, if the use of mobile payment services meets customer expectations and is perceived as easy to use and useful, consumers will be satisfied, leading to continuance intention. Confirmation of mobile payment service use also directly influences usefulness and ease of use, while ease of use directly affects usefulness, satisfaction, and continued use. Ease of use emerged as a non-significant predicting factor of continuance intention to use mobile payment services, and a plausible explanation for this is

provided in Chapter 3. However, ease of use significantly predicts other constructs in the model, such as perceived usefulness and satisfaction. Satisfaction is the most significant predictor of continuance intention to use mobile payment services.

Figure 1: PLS-SEM results



As shown in Figure 1 above, the majority of the EECM-IT hypotheses were confirmed. Only one was not: the relationship between perceived ease of use and continuance intention. The results further suggest that usefulness exerts a greater influence on consumers' satisfaction with mobile payment services than does ease of use. The study thus made some contribution to increasing the body of academic knowledge about continuance use of mobile technologies.

Furthermore, the results indicate that gender does not play a significant moderating role between the predictors of continuance intention. The results of the moderating effects of gender on factors that influence continuance intention are therefore not reported in the article, but are shown in Appendix E.

5.6 CHAPTER 4 ARTICLE 3: SUMMARY AND MAIN FINDINGS

Adoption of mobile payment services is an important initial step, but the ultimate success of mobile payments depends on continued use. The study therefore initially tested the adoption of mobile payment services, using the technology readiness index. After the relationships had been confirmed, the factors predicting consumers' continuance intention to use mobile payment services were investigated, using the

extended expectation-confirmation model in the context of information technology. The validation of the relationships in Article 1 and Article 2 led to the subsequent integration of the two models to form an integrated technology readiness-extended expectation-confirmation model in the context of IT. The model was tested and validated to further the understanding of factors that influence initial adoption and that lead to continued use after the initial adoption, to provide a wider view of both adoption and continuance intention. The primary objective of Article 3 was thus to test the proposed conceptual model, using structural equation modelling (SEM), to explain the adoption and continuance intention to use mobile payment services, concurrently and in a single study.

Table 4: Results of the hypotheses testing

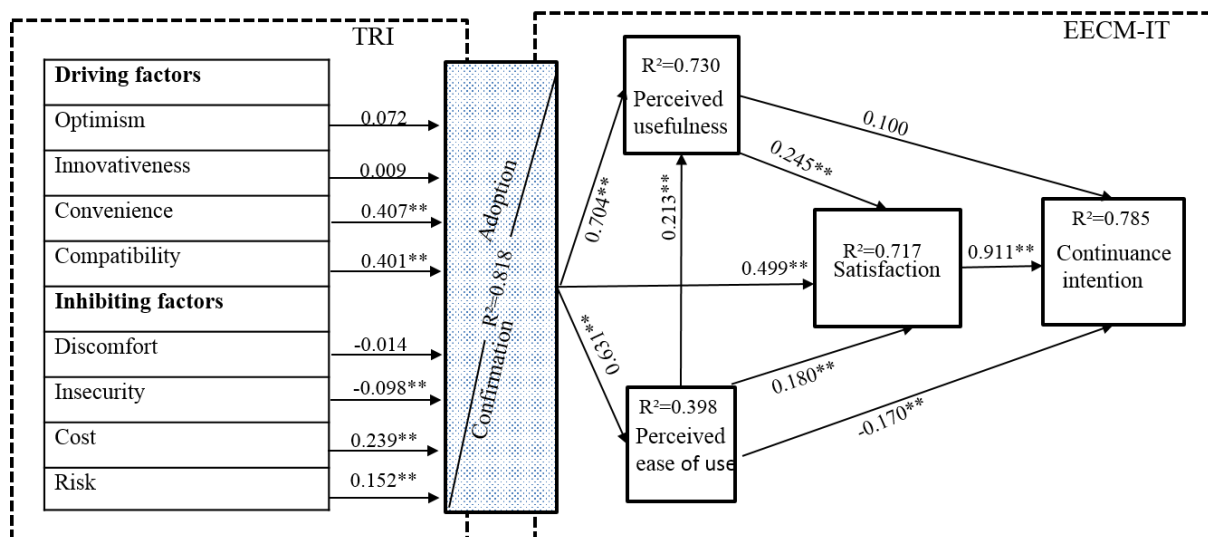
| Hp | Hypothesised path | β | p-value | Result |
|-----|--------------------------------|----------|---------|----------------------|
| H1 | Optimism-->Adoption | 0.072 | 0.246 | <i>Not supported</i> |
| H2 | Innovativeness-->Adoption | 0.009 | 0.866 | <i>Not supported</i> |
| H3 | Convenience-->Adoption | 0.407** | 0.000 | Supported |
| H4 | Compatibility-->Adoption | 0.401** | 0.000 | Supported |
| H5 | Discomfort-->Adoption | -0.014 | 0.755 | <i>Not supported</i> |
| H6 | Insecurity-->Adoption | -0.098** | 0.024 | Supported |
| H7 | Cost-->Adoption | -0.239** | 0.000 | Supported |
| H8 | Risk-->Adoption | -0.152** | 0.000 | Supported |
| H9 | Adoption-->Satisfaction | 0.499** | 0.000 | Supported |
| H10 | Adoption-->Usefulness | 0.704** | 0.000 | Supported |
| H11 | Adoption-->ease of use | 0.631** | 0.000 | Supported |
| H12 | Ease-of-use-->Usefulness | 0.213** | 0.000 | Supported |
| H13 | Usefulness-->Satisfaction | 0.245** | 0.019 | Supported |
| H14 | Ease of use-->Satisfaction | 0.180** | 0.001 | Supported |
| H15 | Usefulness-->Continued Int | 0.100 | 0.171 | <i>Not supported</i> |
| H16 | Ease of use-->Continued Int | -0.170** | 0.000 | <i>Not Supported</i> |
| H17 | Satisfaction-->Continuance Int | 0.911** | 0.000 | Supported |

After performing a confirmatory factor analysis (CFA), the integrated model showed internal consistency, reliability, and validity. The fit indices computed for the CFA and SEM both showed adequate model fit. Based on the results of Chapter 4, insights are highlighted in Table 4 above.

Figure 2 below indicates that the structural model accounted for 78.5% of the variance explained in the continuance intention to use mobile payment services. The variance

of 78.5% is higher than in previous similar studies that also employed the EECM-IT measuring technology usage behaviour (Hong *et al.*, 2006) (67%), mobile advertising (Hsiao & Chang, 2014) (54%), and when the EECM-IT was investigated separately in Article 2 (68.7%). Likewise, the TRI accounted for 53.1% of the variance explained in the adoption of mobile payment services when investigated separately in Article 1. Interestingly, when the two models were combined, the variance explained in adoption increased to 81.5%. This indicates that the integrated TRI and EECM-IT have a better explanatory power in predicting continuance intention than when the two models are tested individually.

Figure 2: Path diagram and relationships between constructs



The results in Figure 2 show that driving factors must be given more consideration rather than inhibitors when developing marketing communication strategies to persuade consumers to adopt mobile payment services. Thus the convenience of being able to use mobile payment services anytime and in any situation, and the execution of mobile payment services that fit consumers' purchase behaviours, are important considerations. However, perceived ease of use showed an inverse relationship with continuance intention. This unexpected result could be attributed to earlier reports indicating that perceived ease of use is reduced after users become more familiar with an information technology (Susanto, Chang & Ha, 2016:2) such as a mobile payment service technology. Satisfaction remains the strongest predictor of continuance intention to use mobile payment services. Emphasis should be placed on important issues such as reliable connectivity and security to bring about a sense of satisfaction that will lead to continued use of mobile payment services.

5.7 CONTRIBUTIONS OF THE STUDY

Mobile payments in South Africa are experiencing exponential growth among services providers, with new entrants emerging from the financial, retail, and mobile network operator sectors. It is important, therefore, to understand how consumers view mobile payment services and to evaluate what these services offer, the purpose of which is to increase adoption and enhance continued use. The study has made several theoretical and practical contributions.

5.7.1 Theoretical contributions

First, the study contributes to building knowledge in the field of adoption and continued use of mobile technologies by empirically testing three models: the extended TRI, the EECM-IT, and the integrated model of technology readiness extended expectation confirmation model in the context of IT (TREECM-IT).

Second, the study contributed by extending the technology readiness index in the mobile payment service context by introducing other factors relevant to mobile technology adoption. The results of the modified model suggest that the original TRI may be context-dependent, and that it may not wholly apply to a different setting such as Africa – thus emphasising the importance of re-testing models in different cultures. This is because the basic tenets of the TRI, which indicate long-proven relationships between the independent variables of optimism, innovativeness, and discomfort, with technology readiness as the dependent variable, are challenged in this study. Based on the results, it appears that the modified model may be better at predicting the adoption of mobile technology than the original TRI in the context of an emerging economy such as South Africa. The results show that other factors could be worthy of further investigation and that could be incorporated into the TRI to improve its predictive ability in a variety of situations and contexts. This is important, particularly in light of the continuous developments in the mobile technology space that underscore the growing importance of continuously streamlining and updating previous models to reflect changing technological developments.

Therefore, marketers could apply the modified model – excluding optimism, innovativeness, and discomfort – and re-test the modified model to enhance its generalisability. Alternatively, marketers could re-test this modified model, including

the relationships that were insignificant in this study, but in a different setting or sample to determine whether similar results could be generated, thus improving the model's validity. Although many prior studies have indicated that socio-demographic factors are important in the adoption of new technologies, this study shows that gender only moderates the effect of convenience on adoption among males. Thus an academic contribution has been made.

Third, the second model determines the predictors of continuance intention to use mobile payment services, grounded in the EECM-IT. The study again underscores the importance of validating Western theories in African contexts. For example, the results in Chapter 3, reported in Article 2, challenge the relationship between ease of use and continuance intention. A plausible explanation could be that socio-cultural and economic differences play a pivotal role in the continued use of new technologies. As previously alluded to, this implies that the expectation confirmation model in the context of information technology (ECM-IT) developed by Bhattacharjee (2001), which excludes perceived ease of use as a post-adoption antecedent, may be an alternative way to predict continuance intention to use new technologies in an African context. Although Thong *et al.* (2006) tested the TAM, ECM-IT, and EECM-IT to determine the model with the highest explanatory power in examining continuance intentions (where the EECM-IT showed a better prediction power), it may not apply equally to African contexts. Thus our study contributes to expanding the body of academic knowledge about continuance intention to use new mobile technology.

Fourth, the third model predicts both adoption and continued use of mobile payment services concurrently in a single study. Based on an extensive literature review on new mobile technology adoption and continuance intention to use new mobile technologies from databases such as the SABINET, EBSCOHOST, and the Emerald, this study is the first to use a combination of the modified TRI and EECM-IT to examine both adoption and continued use of mobile payment services in a single study in South Africa. This is not only a novel perspective that offers a more holistic view of a complex process: the model also explains 78.5% of the variance in continuance intention – which is quite high compared with other research results reported in the literature. This result implies that our proposed model could be used in future studies of adoption and continued use of various technologies.

The results of variances explained in the TRI (Article 1), the EECM-IT (Article 2), and the integrated TREECM-IT (Article 3) underscore the importance of continually developing new models and updating existing ones to reflect changes in the technological environment. Additionally, the explained differences in variance stress the importance not only of re-affirming Western theories in the developing world, but also of determining whether these theories would apply equally in different cultural contexts, such as emerging markets. Instead of investigating a phenomenon in isolation, researchers should rather use a more holistic approach, which in this study not only showed a higher percentage of variance explained, but also became relatively stronger and more significant when two models were integrated.

5.7.2 **Practical contributions**

From a practical perspective, the study provides managers with insights about the pertinent factors that influence adoption and continuance intention as a basis on which marketing strategies can be formulated and implemented.

First, it is evident that consumers will seek out mobile innovations that offer the best value for money and about which they are educated. Hence, for the adoption of mobile payment services, it is necessary that service providers make consumers aware of the availability of mobile payment applications, and explain how they add value. This emphasises the importance of developing effective promotional strategies to educate the market about the availability and convenience of mobile payment services that are compatible with consumers' lifestyles so as to enhance the adoption levels. Although this study reveals that males place more emphasis on the convenience of using mobile payments than do their female counterparts, well-designed promotional campaigns that target both males and females can expedite the diffusion of mobile payment technology. Advertisements need to show that mobile payments can be conveniently used as electronic cash.

Second, mobile payments are an effective solution for providing financial services to the unbanked population in developing countries such as South Africa. However, because mobile payment apps available in South Africa are predominantly linked to a credit card, this might reduce adoption levels, as not many people have sound credit records. Therefore, recommendations are made in this study to service providers to develop mobile payment apps that can be linked to debit cards, which are widely used

in South Africa. Moreover, mobile payment apps that can be used in other developing countries could contribute to higher adoption and continuance intention than apps that are restricted to South Africa, as is the case with the popular existing app such as SnaScan.

Third, not only is transparency in the costing of mobile transactions of paramount importance, the focus should also be on increasing benefits and reducing transaction costs, and on mitigating any potential risks associated with mobile payments. By doing so, service providers can experience increased adoption and enhanced continued use.

Fourth, the study offers recommendations on customer retention strategies, as some users discontinue the services shortly after initial use. One such strategy is the development of mobile payment apps that can be used across current mobile operating platforms (such as Android and iOS) so that customers can use them, regardless of their mobile phone operating system. Of particular importance is giving customers long-lasting and memorable experiences to foster their loyalty.

Fifth, merchants can offer loyalty programmes to increase adoption and continued use. By using certain apps, customers can be allowed to accumulate points that can be redeemed at the next purchase. Such benefits will attract new users and retain existing ones.

5.8 RECOMMENDATIONS

A major challenge facing providers of mobile payment services is how to maximise the return on investment (ROI). This depends, however, on a deeper understanding of consumer needs and behaviours. The study proposes several recommendations:

- Collaboration between service providers could help to develop and provide robust mobile payment applications that are compatible with consumers' life style and purchase behaviour. This has become important because mobile phones continue to be a critical part of consumers' daily lives; and the obsession with mobile phones is fast-growing and spreading across the generations.
- Customer involvement should be encouraged to mitigate the chances of short product life cycles of new apps that are introduced into the market, to avoid experiences such as that of Vodacom's M-Pesa, which was short-lived (Delloite &

Touche, 2015). It is recommended that the voice of the consumer be captured during the design of the mobile payment app to create apps that consumers are likely actually to use. Information can be gathered from younger consumers, who are traditionally 'tech savvy', and are more willing to use mobile payment services than older consumers. Millennials (born 1982 and 2000) are more than twice as likely as baby boomers (born 1943 – 1960) to use mobile phones for their banking and purchasing needs (Nielson Global Survey, 2016). Therefore, we recommend enlisting the services of millennials to effect viral marketing, as the generations have increasingly become co-dependent. According to Schrobsdorff (2015:55), boomers need millennials to get business ideas across because "when they believe in something, they will put in 7 000 thankless hours to make it happen". Customer involvement could be the key to initial adoption and ultimately to continued use.

- Concerns about security remain one of the major reasons for low adoption and low continued use of mobile payment services. Consumers continue to demand simplicity, choice, security, and privacy. Therefore security features such as encryption, biometrics, and authentication should be given due consideration, as they offer safety benefits to consumers and merchants (Deloitte & Touche, 2015). More importantly, service providers need to offer consumers sufficient payment documentation and avoid any transaction errors that may arise during the process.
- Service providers should endeavour to optimise the mobile shopper experience, as poor experience leads to low conversion rates. For any mobile payment experience to work, it has to be more convenient, safer, and faster than paying with cash. Available reports indicate that the mobile phone has been in South Africa for only 20 years or so (Jackson, 2016). People still need to become used to the idea of doing almost everything with their mobile phones; so more effort is needed on the part of service providers to convince consumers that the mobile phone can replace cash.
- For as long as the majority (68.3%) of consumers continue to use mobile payments infrequently, marketers have a long way to go to entice them to use mobile payment services regularly to ensure the viability of these apps and return on investment. It may be prudent to reward loyal customers to increase adoption and continuance

intention. Loyal members can redeem reward points for discounts, merchandise, and other perks, such as easy access to new products or sale events. Loyalty programmes, if implemented well, could not only increase use frequency, but could also be a good source of valuable customer data from which important customer insights can be gained to guide personalised messages.

- Marketers could also use a pull strategy by making mobile payments attractive to merchants who, in return, will persuade their consumers to use the apps. A good example of the success of such an approach is SnapScan. When SnapScan was initially launched in 2013, it targeted the local merchants and made it affordable to them. About 12 000 merchants signed up to receive payments via SnapScan within the first five months of operating (Vorster, 2014). Merchants then advertised the app to their customers, and persuaded them rather to pay using SnapScan. Mobile payment adoption and use by customers are more likely, therefore, if merchants buy into the idea.
- It is also apparent that mobile payments are commonly used to purchase food items. It can therefore be inferred that the food industry better understands consumer behaviour and the use of mobile payments. It seems that beauty, plumbing, and charity organisations are underusing the opportunities presented by mobile payments. Marketers in these organisations need to devise innovative ways to attract consumers on to the bandwagon of mobile payments to increase their return on investment. It could be worth their while to investigate what the food industry is doing to encourage adoption and use in their industries.

5.9 LIMITATIONS OF THE STUDY

The study made use of non-probability convenience sampling drawn from a consumer panel. Therefore, results should be interpreted with caution. Moreover, although responses were drawn from all nine provinces of South Africa, the sample consists of respondents from only one country. This limits the generalisability of the findings to a wider population. Furthermore, this study used a cross-sectional design, and because of the dynamic nature of consumer behaviour, changes in consumer behaviour over time are not captured. The study investigated the moderating effect of gender on the adoption and use of mobile payment services, but other demographic factors require

further investigation. Lastly, this study examined predicting factors of adoption and continuance intentions to use mobile payments in general, with no reference to a specific mobile payment app, thus limiting the generalisability of the findings. Despite these limitations, this study furthers the understanding of adoption and continuance intention to use mobile payment services, and provides guidelines and suggestions for the provision of effective mobile payment services in general.

5.10 DIRECTIONS FOR FUTURE RESEARCH

The study focused only on mobile payment services that are available in South Africa. It would be interesting to observe the findings of a similar study if the model were replicated in other developing countries.

Although the findings explained 81.8% of the consumer adoption of mobile payment services, the remaining 18.2% could be explained by other factors that were not included in this study. Future studies should include other variables that were not included in this study.

It is also suggested that, in future, three separate research streams should be conducted: one focusing on consumers, a second one focusing on mobile network operators, and a third study focusing on merchants, since the success of each cohort is dependent on the other two. Such a study will enhance our understanding of underlying factors that influence the adoption and continuance intention to use mobile payment services across a spectrum of industries.

Furthermore, since mobile payment services are considered to be still in their infancy in many developing countries such as South Africa, we propose that future studies be based on a mixed method approach to deepen the understanding of underlying factors contributing to the success of mobile payment services. A mixed method approach encompassing qualitative and quantitative studies can help researchers to develop better conceptualisations of mobile payments in different contexts. This study used a cross-sectional study; but, due to the dynamic nature of mobile technology, longitudinal studies may provide invaluable information, as consumer changes in tastes and preferences can be tracked and captured over time, so that compatible solutions can be developed.

Last but not least, future research can also focus on the interoperability of mobile payment apps, since a plethora of operating systems can confuse both merchants and consumers. Currently, banks, mobile network operators, and retailers each produce their own version of mobile payment apps. It is almost impossible for merchants to accept all available payment methods. More research is needed, therefore, to find ways to standardise mobile payment solutions, rather than developing proprietary solutions (as is currently the case with mobile payment apps that are available in South Africa). A unified mobile payment app could increase and expedite adoption levels, and users would build trust in the app and use it constantly thereafter.

5.11 CONCLUSION

The existing literature stipulates that it costs as much as five times more to attract a new customer than to retain an existing one. This assertion is based on the principle that making repeat sales to current customers is more profitable than continually seeking new customers, because each new sale does not need to absorb the cost of finding and winning new customers (Rix, 2006:13). In practical terms, it costs as much as \$600.00 to \$800.00 (equivalent to R8 400 to R11 200) more, in terms of advertising, marketing, sales and commissions, to acquire a new mobile subscriber than to retain an existing one (Alshurideh, 2016:384). According to Alshurideh (2016:384), new customers are not only more difficult to find and reach, but they buy 10% less than existing customers, and they are less engaged in the buying process and in relationships with retailers in general. The relationship between the consumer and the firm is built on two parties who are engaged in a continuous process of exchange that will benefit both in the long term. It stands to reason, then, that the success of mobile payment services depends not only on initial adoption, but also on continued use. Therefore, service providers should fully understand the drivers and inhibitors of mobile payment adoption and continued use to maximise their return on investment.

Mobile payments will continue to form the basis of social equality and development in Africa. Mobile payments will continue to contribute to financial inclusion and economic development in Africa at large. With the global increase in ATM fraud and robberies, the future of a cashless society is imminent. Carmody (2013:25) notes that “mobile phones are the single most transformative technology for development, and their adoption in Africa appears to have an unstoppable momentum”. Service providers

should take advantage of the new opportunities being presented by mobile payments in order to be competitive in this new world of rapid mobile technology evolution. Evidently, mobile payments are fast becoming a valid alternative to cash and cheques, and to credit and debit card transactions. As mobile technologies continue to be commonplace, mobile payments are expected to grow further, driven primarily by increased smartphone ownership, application, and use, and by the promise of a better shopping experience.

LIST OF REFERENCES

- Alshurideh, M.T. 2016. Is customer retention beneficial for customers? A conceptual background. *Journal of Research in Marketing*, 5(3): 382-389.
- Bhalla, M. 2016. *7 reasons why customers are abandoning your mobile shopping cart.* (<http://ventureburn.com/2016/01/7-reasons-why-customers-are-abandoning-your-mobile-shopping-cart/>) [Accessed 22 August 2017].
- Bhattacharjee, A. 2001. Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3): 351-370.
- Carmody, P. 2013. A knowledge economy or an information society in Africa? Thintegration and the mobile phone revolution. *Information Technology for Development*, 19(1): 24-39.
- Delloite & Touche. 2015. *Smart device, smart pay taking mobile payments from coffee shops to retail stores.* (<http://dupress.deloitte.com/dup-us-en/industry/retail-distribution/mpayments-mobile-pos-system-in-retail.html?id=us:2el:3dc:tmttrends:eng:abt:053016>) [Accessed 18 July 2016].
- Fornell, C. & Larcker, D.F. 1981. Structural equation models with observable variables and measurement errors. *Journal of Marketing Research*, 18(1): 39-50.
- Fripp, C. 2014. *South Africa's mobile penetration is 133%.* (<http://www.htxt.co.za/2014/10/23/south-africas-mobile-penetration-is-133/>) [Accessed 18 February 2015].
- Groß, M. 2016. Impediments to mobile shopping continued usage intention: A trust-risk-relationship. *Journal of Retailing & Consumer Services*, 33: 109-119.
- GSMA. 2016. *The mobile economy: Africa.* (<http://www.gsma.com/mobileeconomy/africa/>) [Accessed 13 December 2016].
- Hong, S.J., Thong, J.Y.L. & Tam, K.Y. 2006. Understanding continued information technology usage behaviour: A comparison of three models in the context of mobile internet. *Decision Support Systems*, 42(3): 1819-1834.

Hsiao, W.H. & Chang, T.S. 2014. Understanding consumers' continuance intention towards mobile advertising: A theoretical framework and empirical study. *Behaviour & Information Technology*, 33(7): 730-742.

Jackson, T. 2016. *5 lessons learnt from SA mobile payments industry*. (<http://disrupt-africa.com/2016/04/5-lessons-learnt-from-sa-mobile-payments-industry/>) [Accessed 14 August 2017].

Karjaluoto, H., Leppaniemi, M., Standing, C., Kajalo, S., Merisavo, M., Virtanen, V. & Salmenkivi, S. 2006. Individual differences in the use of mobile services among Finnish consumers. *International Journal of Mobile Marketing*, 1(2): 4-10.

Nielson Global Survey. 2016. *Device and conquer: Global consumers let their fingers do the shopping*. (<http://www.nielson.com/eu/en/insights/news/2016/device-and-conquer-global-consumers-let-their-fingers-do-the-shopping.html>) [Accessed 20 February 2017].

Parasuraman, A. 2000. Technology readiness index (TRI): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4): 307-320.

Rix, P. 2006. *Marketing: A practical approach*. 5th ed. Australia: McGraw-Hill.

SAARF. 2016. *A snapshot of South Africa's media arena. Amps readership* (Online). Available: <http://www.saarf.co.za> [Accessed: 8 August 2016].

Schrobsdorff, S. 2015. The millennial beard: Why boomers need their younger counterparts. And vice versa. *TIME magazine*, 186(24): 1-56.

Statistics South Africa. 2014. *Population statistics – 2011 statistical release*. (<http://www.statssa.gov.za/publications/P0302/P03022014.pdf>) [Accessed: 4 June 2016].

Susanto, A., Chang, Y. & Ha, Y. 2016. Determinants of continuance intention to use the smartphone banking services: An extension to the expectation-confirmation model. *Industrial Management & Data Systems*, 116(3): 1-8.

Thong, J.Y.L., Hong, S.J. & Tam, K.Y. 2006. The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance. *International Journal of Human Computer Studies*, 64(9): 799-810.

Vorster, G. 2014. *Standard Bank says 12 000 shops accepting SnapScan*. (<https://businesstech.co.za/news/banking/70207/standard-bank-says-12000-shops-accepting-snapscan/>) [Accessed 12 October 2017].

World Wide Worx. 2014. *The SnapScan effect: How mobile payments made QR codes relevant in South Africa*. (<http://memeburn.com/2015/05/the-snapscan-effect-how-mobile-payments-made-qr-codes-relevant-in-south-africa>) [Accessed 18 November 2016].

APPENDICES

APPENDIX A: RESEARCH CONSTRUCTS AND MEASURES

Seven-point Likert response format scales anchored with “strongly disagree” and “strongly agree”.

| Construct | Measurement scales | References |
|-----------------------|---|-----------------------------|
| Continuance intention | <ul style="list-style-type: none"> I intend to continue using mobile payment service rather than discontinue its use My intentions are to continue using mobile payment services If I could, I would like to discontinue my use of the mobile payment services | Bhattacharjee, (2001) |
| Adoption/confirmation | <ul style="list-style-type: none"> My experience with using mobile payment service was better than what I expected The service level provided by the mobile payment service providers was better than what I expected Overall, most of my expectations from using mobile payment services were confirmed. | Bhattacharjee, (2001) |
| Optimism | <ul style="list-style-type: none"> New technologies contribute to a better life Technology gives me more freedom of mobility Technology gives people more control over their lives Technology makes me more productive in my personal life | Parasuraman & Colby, (2015) |
| Innovativeness | <ul style="list-style-type: none"> Other people come to me for advice on new mobile technologies In general, I am among the first in my circle of friends to acquire new technology when it appears I can easily figure out new high-tech mobile technologies without help from others I keep up with the latest mobile technological developments in areas of interest | Parasuraman & Colby, (2015) |
| Knowledge | <ul style="list-style-type: none"> I enjoy purchasing products via mobile devices I use mobile payment services to make purchases I mostly use mobile payment service when purchasing goods or services via mobile phone I would be confident to use mobile payment services for financial transactions | Kim <i>et al.</i> , (2010) |
| Discomfort | <ul style="list-style-type: none"> When I get technical support from a provider of mobile payment service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do Technical support lines are not helpful because they don't explain things in terms I understand Sometimes, I think that mobile technology services are not designed for use by ordinary people There is no such thing as a manual for high-tech mobile phones that is written in plain language | Parasuraman & Colby, (2015) |

| | | |
|-----------------------|--|--|
| Insecurity | <ul style="list-style-type: none"> • People are too dependent on technology to do things for them • Too much technology distracts people to a point that is harmful • Technology lowers the quality of relationships by reducing personal interaction • I do not feel confident doing business with a place that can only be reached by a mobile phone | Parasuraman & Colby, (2015) |
| Perceived cost | <ul style="list-style-type: none"> • The fee that I pay for the use of mobile payment service is too high • The fee that I have to pay for the mobile payment service is reasonable • I am pleased with the fee that I have to pay for the use of mobile payment service | Kim, (2012) |
| Perceived risk | <ul style="list-style-type: none"> • The risk of an unauthorised party intervening in the mobile payment process is low • The risk of abuse of usage information (e.g., payment amount) is low when using mobile payment service • The risk of abuse of billing information (e.g., credit card number, bank account data) is low when using mobile payment service | Ramos-de-Luna, Montoro-Rios & Liebana-Cabanillas, (2015) |
| Customer satisfaction | <ul style="list-style-type: none"> • My choice to use the mobile payment app was a wise one • My experience with using the mobile payment app was satisfactory • I think I did the right thing by deciding to use the mobile payment app • Overall, I was satisfied with the use of the mobile payment app | Susanto, Chang & Ha, (2016) |
| Perceived usefulness | <ul style="list-style-type: none"> • Using mobile payment service improves my performance in managing personal finances • Using mobile payment services increases my productivity in managing personal finances • Using mobile payment services enhances my effectiveness in managing personal finances • Using mobile payment service is useful in managing personal finances | Bhattacharjee, (2001) |
| Perceived ease of use | <ul style="list-style-type: none"> • Learning to use mobile payment is easy for me • My interaction with mobile payment procedure would be clear and understandable • It would be easy for me to become skilful at using the mobile payment • I would find the mobile payment easy to use • I would find a mobile payment procedure to be flexible to interact with | Kim <i>et al.</i> , (2010) |

APPENDIX B: QUESTIONNAIRE

Dear respondent

Thank you for your willingness to complete the survey. The purpose of the survey is to investigate consumers' willingness to adopt and continue using **mobile payment services** (apps), such as SnapScan, Zapper, VCPay and FlickPay to purchase products and services.

Mobile payments in this study are described as all payments for goods and services that are initiated, authorised and realised with a mobile phone.

The questionnaire comprises three sections and should take not more than 10 minutes to complete. It is an anonymous and confidential survey.

A1: Screening questions

| | | |
|--|-----|----|
| Are you 18 years and older? | Yes | No |
| Have you downloaded or used any mobile payment applications? | Yes | No |

If you answer "Yes" to all questions above, please complete the questionnaire.

If you answer "No" to any of the questions above, you do not have to complete the questionnaire. Thank you for your willingness to participate.

SECTION A: PRODUCTS PURCHASED AND APPS USED

This section contains questions relating to your familiarity with and use of existing mobile payment apps in South Africa. Please answer the following questions by choosing the appropriate option(s).

A1. Which of the following mobile payment apps have you downloaded onto your mobile phone? *You can choose more than one option.*

1. SnapScan
2. Zapper
3. FlickPay
4. VCPay
5. Other (Please specify)

A2. Please indicate the mobile payment app that you **use most often**.

1. SnapScan
2. Zapper
3. FlickPay
4. VCPay
5. Other (Please specify)

A3. How often do you use mobile payment apps?

1. Daily
2. Weekly
3. Monthly
4. Less than once a month

A4. Please indicate the type of product/service that you usually buy using your mobile payment app.

You may choose more than one option

1. Restaurant meals (breakfast, lunch, dinner,)
2. Take away meals or beverages
3. Food or beverages at food markets
4. Fuel (automotive)
5. Groceries
6. Courier services
7. Clothes
8. Hair/beauty services
9. Plumbing/electrical services
10. Bills (electricity, water, medical, etc)
11. Donations for church or charity
12. Electronic products
13. I haven't bought any product with the mobile payment application that I downloaded
14. Other (Please specify)

SECTION B: ADOPTION, SATISFACTION AND CONTINUANCE INTENTIONS TO USE MOBILE PAYMENT APPS

Please answer this section by indicating the extent to which you agree or disagree with the following statements on a scale of 1 to 7 where 1 is “strongly disagree” and 7 is “strongly agree”.

| STATEMENTS | | Strongly disagree → Strongly agree | | | | | | |
|------------|---|------------------------------------|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B1 | New mobile technologies contribute to a better life | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B2 | Mobile technology gives me more freedom of mobility | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B3 | Mobile technology gives people more control over their lives | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B4 | Mobile technology makes me more productive in my personal life | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B5 | Other people come to me for advice on new mobile technologies | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B6 | In general, I am among the first in my circle of friends to acquire new mobile technology when it appears | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B7 | I can easily figure out new high-tech mobile technologies without help from others | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B8 | I keep up with the latest mobile technological developments in areas of interest | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B9 | When I get technical support from a provider of mobile service provider, I sometimes feel as if I am being taken advantage of by someone who knows more than I do | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B10 | Mobile technical support lines/support staff are generally not helpful because they don't explain things in terms I understand | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B11 | Sometimes, I think that mobile technology services are not designed for use by ordinary people | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B12 | There is no such thing as a manual for high-tech mobile phones that is written in plain language | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B13 | People are too dependent on mobile technology to do things for them | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B14 | Too much mobile technology distracts people to a point that is harmful | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B15 | Mobile technology lowers the quality of relationships by reducing personal interaction | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B16 | I do not feel confident doing business with a place that can only be reached by a mobile phone | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B17 | Mobile payment is convenient because the phone is usually with me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B18 | Mobile payment is convenient because I can use it anytime | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B19 | Mobile payment is convenient because I can use it in any situation | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B20 | Mobile payment is convenient because it is not a complex process | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B21 | Using mobile payment apps are compatible with my lifestyle | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B22 | Using mobile payment apps fits well with the way I like to purchase products and services | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B23 | I appreciate using mobile payment apps instead of alternative modes of payment (e.g., credit card, cash) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|
| B24 | The fee that I pay (costs) for the use of mobile payment apps are not too high | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B25 | The fee that I have to pay (costs) for mobile payment apps are reasonable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B26 | I am pleased with the fee that I have to pay (cost) for the use of mobile payment apps | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B27 | The risk of an unauthorised party intervening in the mobile payment app is low | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B28 | The risk of abuse of usage information (e.g., payment amount) is low when using mobile payment app | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B29 | The risk of abuse of billing information (e.g., credit card number, bank account data) is low when using mobile payment app | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B30 | My experience with using mobile payment apps were better than what I expected | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B31 | The service level provided by the mobile payment app providers was better than what I expected | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B32 | Overall, most of my expectations from using mobile payment apps were confirmed | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B33 | Using a mobile payment app enable me to pay more quickly | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B34 | Using a mobile payment app makes it easier for me to conduct transactions | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B35 | I find a mobile payment app a useful possibility for paying | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B36 | Learning to use a mobile payment app is easy for me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B37 | My interaction with the mobile payment app is clear and understandable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B38 | It is easy for me to become skillful at using the mobile payment app | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B39 | I find the mobile payment app easy to use | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B40 | I find the mobile payment app to be flexible to use | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B41 | I intend to continue using the mobile payment app rather than discontinue its use | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B42 | My intentions are to continue using the mobile payment app | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B43 | If I could, I would like to continue my use of the mobile payment app | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B44 | My choice to use the mobile payment app was a wise one | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B45 | My experience with using the mobile payment app was satisfactory | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B46 | I think I did the right thing by deciding to use the mobile payment app | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| B47 | Overall, I was satisfied with the use of the mobile payment app | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

SECTION C: DEMOGRAPHIC INFORMATION

C1. Please indicate your gender.

1. Male
2. Female

C2. In which year were you born?

1. 1998
2. 1997
3. 1996
4. 1995
5. 1994
6. 1993
7. 1992
8. 1991
9. 1990
10. etc

C3. Which income category best describe your individual gross monthly income before tax and other deductions?

1. R15 000 or less
2. R16 000 - R25 000
3. R26 000 – R35 000
4. R36 000 – R45 000
5. R46 000 – R55 000
6. R56 000 and more
7. Prefer not to answer

C4. Which of the following categories best corresponds with your highest level of education?

1. Secondary schooling or below
2. Degree/Diploma/Certificate
3. Postgraduate qualification e.g., Honours/MBA/MCom/PhD.
4. Other (Please specify)

C5. Which of the following categories best describes the industry you work in?

1. Government
2. Legal
3. Financial

4. Insurance
5. Petrochemical
6. Manufacturing
7. Transportation
8. Consulting
9. Educational
10. Medical
11. Retailing
12. Wholesaling
13. Student
14. Other (Please specify)

C6. Please indicate your ethnicity

1. African
2. Asian
3. Coloured
4. Indian
5. White
6. Other (Please specify)
7. Prefer not to answer

C8. Please indicate the Province you currently reside in.

1. Eastern Cape
2. Free State
3. Gauteng
4. KwaZulu Natal
5. Limpopo
6. Mpumalanga
7. Northern Cape
8. North West
9. Western Cape

Thank you for taking time to complete this survey

APPENDIX C (i): EDITORIAL POLICY AND GUIDELINES FOR AUTHORS OF THE JOURNAL OF AFRICAN BUSINESS

SCOPE OF THE JOURNAL

Journal of African Business is the official journal of the International Academy of African Business and Development, the largest network of professionals committed to advancement of business development in African nations. *JAB* strives to comprehensively cover all business disciplines by publishing high quality analytical, conceptual, and empirical articles that demonstrate a substantial contribution to the broad domain of African business. Regardless of the research context, tradition, approach, or philosophy, manuscripts submitted to *JAB* must demonstrate that the topics investigated are important to the understanding of business practices and the advancement of business knowledge in or with Africa. Particularly, *JAB* welcomes qualitative and quantitative research papers. *JAB* is not, however, limited to African-based empirical studies. It searches for various contributions, including those based on countries outside Africa that address issues relevant to African business.

COVERED AREAS

Accounting; Agribusiness Management and Policy; Business Law; Economics and Development Policy; Entrepreneurship and Family Business; Finance; Global Business; Human Resource Management; Information and Communications Technology (ICT); Labour Relations; Marketing; Management Information Systems (MIS); Non-Profit Management; Operations and Supply Chain Management; Organizational Behaviour and Theory; Organizational Development; Service Management; Small Business Management; Social Responsibility and Ethics; Strategic Management Policy; Technology and Innovation Management; Tourism and Hospitality Management; Transportation and Logistics.

PEER REVIEW POLICY

All research articles in *Journal of African Business* have undergone rigorous peer review, based on initial editor screening and anonymous refereeing by at least two anonymous referees.

MANUSCRIPT SUBMISSIONS

Authors should submit their manuscripts electronically through the journal's Editorial Manager site at <http://www.editorialmanager.com/wjab>. Manuscripts should be prepared using Microsoft Word, type (12-point font), double-spaced, with margins of at least one inch on all sides. Manuscript pages should be numbered consecutively throughout the paper. Authors should also supply a shortened version of the title suitable for the running head, not exceeding 50 character spaces. Each article should be summarized in an abstract of not more than 100 words. Avoid abbreviations, diagrams, and reference to the text in the abstract. Manuscripts should not exceed 9000 words (all inclusive). Each manuscript must be accompanied by a statement that it has not been published elsewhere and that it has not been submitted simultaneously for publication elsewhere.

PERMISSIONS

As an author you are required to secure permission if you want to reproduce any figure, table or extract text from any other source. This applies to direct reproduction as well as "derivative reproduction" (where you have created a new figure or table which derives substantially from a copyrighted source). All accepted manuscripts, artwork, and photographs become the property of the publisher.

REFERENCES

References, citations, and general style of manuscripts should be prepared in accordance with the APA Publication Manual, 5th ed. Cite in the text by author and date (Smith, 1983) and include an alphabetical list at the end of the article.

ILLUSTRATIONS

Illustrations submitted (line drawings, halftones, photos, photomicrographs, etc.) should be clean originals or digital files. Digital files are recommended for highest quality reproduction and should follow these guidelines: 300 dpi or higher; sized to fit on journal page; EPS, TIFF, or PSD format only; and submitted as separate files, not embedded in text files.

COLOUR ILLUSTRATIONS

Colour art will be reproduced in colour in the online publication at no additional cost to the author. Colour illustrations will also be considered for publication; however, the author will be required to bear the full cost involved in colour art reproduction.

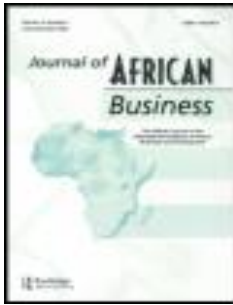
TABLES AND FIGURES

Tables and figures (illustrations) should not be embedded in the text, but should appear at the end of the document. Tables and figures should be in an editable format since they need to be able to be formatted to match the style standards of the journal. A short descriptive title should appear above each table with a clear legend and any footnotes suitably identified below. All units must be included. Figures should be completely labelled, taking into account necessary size reduction. Captions should be typed, double-spaced, on a separate sheet.

REPRINTS AND ISSUES

Authors from whom we receive a valid email address will be given an opportunity to purchase reprints of individual articles, or copies of the complete print issue. These authors will also be given complimentary access to their final article on Taylor & Francis Online.

APPENDIX C (ii): ARTICLE ACCEPTANCE LETTER (JAB)



Journal of African Business

Ref.: Ms. No. WJAB-D-17-00025R2

A cashless society for all: Determining consumers' readiness to adopt mobile payment services

Journal of African Business

Dear Mr Humbani,

I am pleased to tell you that your work has now been accepted for publication in Journal of African Business.

It was accepted on Oct 10 2017 06:17AM

Comments from the Editor and Reviewers can be found below.

Thank you for submitting your work to this journal.

With kind regards,

Simon P. Sigué

Editor-in-Chief

Journal of African Business

APPENDIX D: EDITORIAL POLICY AND GUIDELINES FOR AUTHORS OF THE AFRICAN JOURNAL OF ECONOMIC AND MANAGEMENT STUDIES

AIMS AND SCOPE

African Journal of Economic and Management Studies (AJEMS) advances both theoretical and empirical research, informs policies and practices, and improves understanding of how economic and business decisions shape the lives of Africans. AJEMS is a multidisciplinary journal and welcomes papers from all the major disciplines in economics, business and management studies.

This journal is abstracted and indexed by: British Library; Cabells; International Bibliography of Social Sciences

MANUSCRIPT REQUIREMENTS

Format: Article files should be provided in Microsoft Word format. LaTeX files can be used if an accompanying PDF document is provided. PDF as a sole file type is not accepted, a PDF must be accompanied by the source file. Acceptable figure file types are listed further below.

Article length: Articles should be between 3000 and 6000 words in length. This includes all text including references and appendices. Please allow 280 words for each figure or table.

Article title: A title of not more than eight words should be provided.

Author details: All contributing authors' names should be added to the ScholarOne submission, and their names arranged in the correct order for publication. Correct email addresses should be supplied for each author in their separate author accounts. The full name of each author must be present in their author account in the exact format they should appear for publication, including or excluding any middle names or initials as required.

The affiliation of each contributing author should be correct in their individual author account. The affiliation listed should be where they were based at the time that the research for the paper was conducted

Biographies and acknowledgements: Authors who wish to include these items should save them together in an MS Word file to be uploaded with the submission. If they are to be included, a brief professional biography of not more than 100 words should be supplied for each named author.

RESEARCH FUNDING

Authors must declare all sources of external research funding in their article and a statement to this effect should appear in the Acknowledgements section. Authors should describe the role of the funder or financial sponsor in the entire research process, from study design to submission.

STRUCTURED ABSTRACT

Authors must supply a structured abstract in their submission, set out under 4-7 sub-headings

- Purpose (mandatory)
- Design/methodology/approach (mandatory)
- Findings (mandatory)
- Research limitations/implications (if applicable)
- Practical implications (if applicable)
- Social implications (if applicable)
- Originality/value (mandatory)

Maximum is 250 words in total (including keywords and article classification, see below). Authors should avoid the use of personal pronouns within the structured abstract and body of the paper (e.g. "this paper investigates..." is correct, "I investigate..." is incorrect).

KEYWORDS

Authors should provide appropriate and short keywords in the ScholarOne submission that encapsulate the principal topics of the paper. The maximum number of keywords is 12.

ARTICLE CLASSIFICATION

Authors must categorize their paper as part of the ScholarOne submission process. The category which most closely describes their paper should be selected from the list below.

Research paper: This category covers papers which report on any type of research undertaken by the author(s). The research may involve the construction or testing of a model or framework, action research, testing of data, market research or surveys.

Viewpoint: Any paper, where content is dependent on the author's opinion and interpretation, should be included in this category; this also includes journalistic pieces.

Technical paper: Describes and evaluates technical products, processes or services.

Conceptual paper: These papers will not be based on research but will develop hypotheses. The papers are likely to be discursive and will cover philosophical discussions and comparative studies.

Case study: Case studies describe actual interventions or experiences within organizations. They may well be subjective and will not generally report on research.

Literature review: It is expected that all types of paper cite any relevant literature so this category should only be used if the main purpose of the paper is to annotate and/or critique the literature in a particular subject area.

General review: This category covers those papers which provide an overview or historical examination of some concept, technique or phenomenon. The papers are likely to be more descriptive or instructional ("how to" papers) than discursive.

HEADINGS

Headings must be concise, with a clear indication of the distinction between the hierarchy of headings. The preferred format is for first level headings to be presented in bold format and subsequent sub-headings to be presented in medium italics.

FIGURES

All Figures (charts, diagrams, line drawings, web pages/screenshots, and photographic images) should be submitted in electronic form. All Figures should be of high quality, legible and numbered consecutively with arabic numerals. Graphics may be supplied in colour to facilitate their appearance on the online database

TABLES

Tables should be typed and included in a separate file to the main body of the article. The position of each table should be clearly labelled in the body text of article with corresponding labels being clearly shown in the separate file.

REFERENCES

References to other publications must be in **Harvard** style and carefully checked for completeness, accuracy and consistency.

APPENDIX E: EDITORIAL POLICY AND GUIDELINES FOR AUTHORS OF THE INTERNATIONAL JOURNAL OF EMERGING MARKETS

AIMS AND SCOPE

The *International Journal of Emerging Markets* publishes high quality research focusing on issues related to business in emerging markets from multidisciplinary (economics, finance, marketing, and management) and multinational geographic perspectives.

The journal considers rigorous theoretical and empirical research, qualitative and quantitative, and review articles, such as meta-analysis. The *International Journal of Emerging Markets* especially encourages comparative studies of emerging markets or studies comparing the emerging markets with the developed markets, and seeks theories explaining the contextual differences.

The journal welcomes papers on:

- International business and strategy
- Emerging markets multinationals
- Consumer behaviour
- Organizational behaviour
- Marketing and entrepreneurship
- International trade, finance and investment
- Area studies and theories of emerging markets
- Ethics, corporate social responsibility and sustainability
- Policy and comparative and international political economy

The journal is indexed and abstracted in:

ABI/INFORM (Complete, Global, Professional Advanced , Professional Standard - ProQuest), Academic Search Alumni Edition (EBSCO), Academic Search Complete (EBSCO), Asian-Pacific Economic Literature, Business Source Complete (EBSCO), Cabell's Directory of Publishing Opportunities in Management & Marketing, Electronic Collections Online, INSPEC, Index Copernicus, International Bibliography of Social Sciences, Professional ProQuest Central, ProQuest Central ReadCube Discover,

Scopus, Thomson Reuters Emerging Sources Citation Index (ESCI), Zetoc (British Library).

MANUSCRIPT REQUIREMENTS

Format: Article files should be provided in Microsoft Word format. LaTeX files can be used if an accompanying PDF document is provided. PDF as a sole file type is not accepted, a PDF must be accompanied by the source file. Acceptable figure file types are listed further below.

Article length: Articles should be between 7500 and 10000 words in length. This includes all text including references and appendices. Please allow 280 words for each figure or table.

Article title: A title of not more than eight words should be provided.

Author details: All contributing authors' names should be added to the ScholarOne submission, and their names arranged in the correct order for publication.

- Correct email addresses should be supplied for each author in their separate author accounts
- The full name of each author must be present in their author account in the exact format they should appear for publication, including or excluding any middle names or initials as required
- The affiliation of each contributing author should be correct in their individual author account. The affiliation listed should be where they were based at the time that the research for the paper was conducted.

BIOGRAPHIES AND ACKNOWLEDGEMENTS

Authors who wish to include these items should save them together in an MS Word file to be uploaded with the submission. If they are to be included, a brief professional biography of not more than 100 words should be supplied for each named author.

RESEARCH FUNDING

Authors must declare all sources of external research funding in their article and a statement to this effect should appear in the Acknowledgements section. Authors should describe the role of the funder or financial sponsor in the entire research process, from study design to submission.

STRUCTURED ABSTRACT

Authors must supply a structured abstract in their submission, set out under 4-7 sub-headings:

- Purpose (mandatory)
- Design/methodology/approach (mandatory)
- Findings (mandatory)
- Research limitations/implications (if applicable)
- Practical implications (if applicable)
- Social implications (if applicable)
- Originality/value (mandatory)

Maximum is 250 words in total (including keywords and article classification, see below). Authors should avoid the use of personal pronouns within the structured abstract and body of the paper (e.g. "this paper investigates..." is correct, "I investigate..." is incorrect).

KEYWORDS

Authors should provide appropriate and short keywords in the ScholarOne submission that encapsulate the principal topics of the paper. The maximum number of keywords is 12.

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Authors must categorize their paper as part of the ScholarOne submission process. The category which most closely describes their paper should be selected from the list below.

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Viewpoint: Any paper, where content is dependent on the author's opinion and interpretation, should be included in this category; this also includes journalistic pieces.

Technical paper: Describes and evaluates technical products, processes or services.

Conceptual paper: These papers will not be based on research but will develop hypotheses. The papers are likely to be discursive and will cover philosophical discussions and comparative studies of others' work and thinking.

Case study: Case studies describe actual interventions or experiences within organizations.

Literature review: It is expected that all types of paper cite any relevant literature so this category should only be used if the main purpose of the paper is to annotate and/or critique the literature in a particular subject area. It may be a selective bibliography providing advice on information sources or it may be comprehensive in that the paper's aim is to cover the main contributors to the development of a topic and explore their different views.

General review: This category covers those papers which provide an overview or historical examination of some concept, technique or phenomenon. The papers are likely to be more descriptive or instructional ("how to" papers) than discursive.

HEADINGS

Headings must be concise, with a clear indication of the distinction between the hierarchy of headings. The preferred format is for first level headings to be presented in bold format and subsequent sub-headings to be presented in medium italics.

FIGURES

All Figures (charts, diagrams, line drawings, web pages/screenshots, and photographic images) should be submitted in electronic form. All Figures should be of high quality, legible and numbered consecutively with arabic numerals. Graphics may be supplied in colour to facilitate their appearance on the online database.

- Figures created in MS Word, MS PowerPoint, MS Excel, Illustrator should be supplied in their native formats. Electronic figures created in other applications should be copied from the origination software and pasted into a blank MS Word document or saved and imported into an MS Word document or alternatively create a .pdf file from the origination software.
- Figures which cannot be supplied as above are acceptable in the standard image formats which are: .pdf, .ai, and .eps. If you are unable to supply graphics in these formats then please ensure they are .tif, .jpeg, or .bmp at a resolution of at least 300dpi and at least 10cm wide.
- To prepare web pages/screenshots simultaneously press the "Alt" and "Print screen" keys on the keyboard, open a blank Microsoft Word document and simultaneously press "Ctrl" and "V" to paste the image. (Capture all the contents/windows on the computer screen to paste into MS Word, by simultaneously pressing "Ctrl" and "Print screen".)
- Photographic images should be submitted electronically and of high quality. They should be saved as .tif or .jpeg files at a resolution of at least 300dpi and at least 10cm wide. Digital camera settings should be set at the highest resolution/quality possible.

TABLES





Tables should be typed and included in a separate file to the main body of the article. The position of each table should be clearly labelled in the body text of article with corresponding labels being clearly shown in the separate file. Ensure that any superscripts or asterisks are shown next to the relevant items and have corresponding explanations displayed as footnotes to the table, figure or plate.

REFERENCES

References to other publications must be in **Harvard** style and carefully checked for completeness, accuracy and consistency.

APPENDIX F: PLS-SEM RESULTS OF THE MODERATING EFFECT OF GENDER

Path Coefficients

|  Bootstrapping Results | |  Confidence Intervals (Bias Corrected) | |  PLS-MGA | |  Parametric Test | |
|---|--|---|--|--|--|---|--|
| | | Path Coefficients-diff (Females - Males) | | | | p-Value(Females vs Males) | |
| Adoption -> Ease of use | | 0.090 | | | | 0.107 | |
| Adoption -> Satisfaction | | 0.160 | | | | 0.054 | |
| Adoption -> Usefulness | | 0.029 | | | | 0.592 | |
| Ease of use -> Continued use | | 0.011 | | | | 0.460 | |
| Ease of use -> Satisfaction | | 0.146 | | | | 0.869 | |
| Ease of use -> Usefulness | | 0.124 | | | | 0.147 | |
| Satisfaction -> Continued use | | 0.059 | | | | 0.288 | |
| Usefulness -> Continued use | | 0.058 | | | | 0.731 | |
| Usefulness -> Satisfaction | | 0.122 | | | | 0.208 | |