

Modelling Financial Services Adoption through an Intermediary in South Africa: TAM and SEM Approach

By

John Peter Wentzel

Submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

Department of Industrial and Systems Engineering

Faculty of Engineering, Built Environment and Information Technology,
University of Pretoria

Supervisors: Prof. VSS Yadavalli and Prof. D Krishna Sundar

2012

ABSTRACT

One of the most pressing needs society has in 2012 is addressing the plight of the 4 billion people, globally, who live at the bottom of the economic pyramid. Unless initiatives are undertaken to alleviate poverty and hardship in this portion of society, human potential will be wasted and the economic burden on the rest of society to support them will remain significant. In South Africa a significant portion of the population live at the bottom of the pyramid. One initiative to alleviate poverty and hardship is to enable bottom of the pyramid people who are excluded from formal financial services to access to them. By accessing formal financial services they would be able to safely save and borrow money. They would also be able to escape exploitative informal financial practices.

Technology has the potential to expand access to financial services and reduce the cost of service provision. To date, however, it has not delivered on its promise of expanding financial inclusion at the bottom of the pyramid. Intermediaries, too, have been used to increase access to financial services but have also not successfully expanded financial inclusion at the bottom of the pyramid. Understanding which factors would allow these approaches to realize their potential has the ability to meaningfully contribute to addressing the plight of people at the bottom of the pyramid.

This study brings together the potential of technology and the role of intermediaries to model expanding financial inclusion at the bottom of the pyramid in South Africa. The Technology Acceptance Model is used as a basis to propose an extended TAM model that explains adoption of technology enabled financial services through an intermediary at the bottom of the pyramid in South

Africa. The proposed model is validated using structural equation modelling with data collected in a national survey in South Africa. The extended TAM model successfully explains more than 90% of the behavioural intention of financially excluded people at the bottom of the pyramid to adopt financial services through an intermediary. Using the findings, a strategic approach to expanding financial inclusion at the bottom of the pyramid is proposed.

ACKNOWLEDGEMENTS

My wife, Jeannette and daughter Milenka for the immeasurable support, patience and sacrifice they made during the time of this work. The time they gave up and understanding they displayed form the scaffolding upon which this work was built. Without scaffolding no structure of merit can arise. Without them this work could not have arisen.

Professor Diatha Krishna Sundar from the Indian Institute of Management, Bangalore for his guidance, support, encouragement and hands on participation. For me he was friend, mentor, collaborator and taskmaster. I shall ever be in his debt.

Professor Sarma Yadavalli from the University of Pretoria, for his guidance, support and advice during this work. Always ready to provide direction through both the academic and administrative components of the research, I shall always be in his debt.

DEDICATION

This work is dedicated to my mother, Margaret Lillian Wentzel, who despite her poor and humble background, taught me the value of education and inspired me to advance beyond the circumstances of my birth through its power.

TABLE OF CONTENTS

CHAPTER 1

South African economic history and poverty.....	1
1.1. Background	1
1.2. The current South African economic context.	3
1.3. Definition of financial services.....	4
1.4. Financial exclusion.	5
1.5. Financial inclusion and poverty alleviation.	7
1.6. The South African banking sector.	8
1.7. The role of technology in expanding financial inclusion.....	11
1.8. The role of intermediaries in expanding financial inclusion.....	14
1.9. The research gap.....	16
1.10. The research problem.....	17
1.11. The need for the study.....	19
1.12. Structure of the thesis.	20

CHAPTER 2

Extended Technology Acceptance model development.....	22
2.1. The Technology Acceptance Model.	22
2.2. The Technology Acceptance Model in financial services.	24
2.3. Extension of the Technology Acceptance Model.....	25
2.4. Use of grounded theory to derive proposed model constructs.	32
2.4.1Social	34
2.4.2Task.....	35
2.4.3Self-Efficacy.	36

2.4.4 Attitude	37
2.4.5 Hedonistic.	38
2.5. The proposed extended Technology Acceptance Model.....	39
2.6. Hypothesis of the proposed model.....	41
2.7. Conclusion	46
 CHAPTER 3	
Instrument design and data acquisition.....	49
3.1. Determination of the bottom of the pyramid in South Africa.	49
3.2. Sampling methodology.	52
3.3. Sample size.....	55
3.4. Instrument development.	57
3.4.1 Question development.....	59
3.4.2 Question bias.	61
3.4.3 Questionnaire scales.....	62
3.4.4 Questionnaire structure.	63
3.5. Model construct development.....	66
3.5.1 Construct reliability and validity.	69
3.6. Sample descriptive statistics.....	74
3.7. Factors associated with being unbanked.....	76
3.8. Intermediary adoption at the bottom of the pyramid.	82
3.9. Conclusion	88
 CHAPTER 4	
Structural equation modelling in extended TAM.....	90
4.1. Structural Equation Modelling – an overview.	91
4.2. Advantages of using SEM over other techniques.....	92

4.3.	Model estimation and fit	93
4.4.	Assessment of normality and multicollinearity.	100
4.5.	SEM sample size.....	105
4.6.	Measurement model - Confirmatory factor analysis.	108
4.6.1	CFA specification and estimation.....	113
4.6.2	Outcome of the measurement model.	117
4.7.	Structural model – Path Analysis.....	118
4.7.1	Path analysis specification and identification.	123
4.7.2	Path analysis estimation.....	126
4.7.3	Path analysis modification and evaluation.	127
4.7.4	Outcome of the structural model.	132
4.8.	Conclusion.	133

CHAPTER 5

Results.....	136	
5.1.	Hypothesis.....	136
5.2.	Multi-group analysis.....	144
5.2.1	Gender.....	147
5.2.2	Age.....	149
5.2.3	Location.....	152
5.2.4	Financial dependency.....	156
5.3.	Conclusion.	158

CHAPTER 6

An architecture for expanding financial inclusion.	162	
6.1.	The proposed role of supermarkets and the post office.	162
6.2.	A technology approach for expanding financial inclusion.	170

6.3. Conclusion	174
-----------------------	-----

CHAPTER 7

Conclusions.....	176
-------------------------	------------

7.1. Specific contribution of the work	180
7.2. Research limitations.....	181
7.3. Future scope of work.....	183

APPENDICES	185
-------------------------	------------

8.1. LSM variables and weightings.....	185
8.2. LSM groupings.....	186
8.3. Research questionnaire	188
8.4. Research questionnaire show cards	211
8.5. Frequency distribution of key variables	236
8.6. Results of the logistic regression.....	239
8.7. Results of the logistic regression with significant variables	241
8.8. Results of the Cochran Q test.....	244
8.9. Results of the McNemar test.....	245
8.10. Channel availability	250
8.11. Matrix of implied correlations.....	253
8.12. CFA fit indices	254
8.13. CFA Standardised residual covariance	256
8.14. Modification Indices for CFA model	257
8.15. SEM fit indices.....	260
8.16. Modification indices structural model	262
8.17. SEM Standardised residual covariance.....	265
8.18. Multi-group fit indices – gender.....	266

8.19.	Multi-group critical ratios – gender.....	269
8.20.	Multi-group fit indices – age	271
8.21.	Multi-group critical ratios – age	273
8.22.	Multi-group fit indices – location.....	274
8.23.	Multi-group critical ratios – location	276
8.24.	Multi-group fit indices – financial dependency.....	277
8.25.	Multi-group critical ratios – financial dependency	279
REFERENCES		281

LIST OF TABLES

Table 3.1: Daily per capita income as a function of LSM	52
Table 3.2: Questionnaire structure.....	63
Table 3.3: Latent constructs of the hypothesized model	66
Table 3.4: Data reliability and validity	71
Table 3.5: Unidimensional inter-item correlations.....	73
Table 4.1: Data normality assessment.	101
Table 4.2: CFA model fit values.....	115
Table 4.3: SEM Model fit values.....	126
Table 4.4: Bootstrap unstandardized regression weights	129
Table 4.5: Indirect effects	131
Table 5.1: Summary of hypothesis outcomes	141
Table 5.2: Standardised indirect effects	142
Table 5.3: Standardised total effect.....	143
Table 5.4: Squared multiple correlations	144
Table 5.5: Gender multi-group analysis model fit values.....	147
Table 5.6: Model comparison for gender.....	149
Table 5.7: Age multi-group analysis model fit values	150
Table 5.8: Model comparison for age	151
Table 5.9: Location multi-group analysis model fit values.....	152
Table 5.10: Model comparison for location	153
Table 5.11: Loading factors for urban and rural respondents	153
Table 5.12: Financial dependency multi-group analysis fit values.....	157
Table 5.13: Model comparison for financial dependency	158

LIST OF FIGURES

Figure 2.1: The Technology Acceptance Model (Davis, 1989)	23
Figure 2.2: The TAM2 (Venkatesh and Davis, 2000)	26
Figure 2.3: The UTAUT (Venkatesh et.al, 2003)	28
Figure 2.4: The TAM3 (Venkatesh et.al, 2008).....	30
Figure 2.5: The proposed extended TAM	40
Figure 4.1: Typical CFA model	110
Figure 4.2: CFA for the extended TAM model	114
Figure 4.3: Typical SEM structural model.....	120
Figure 4.4: Proposed SEM model.....	124
Figure 4.5: Final SEM model with significant causal paths	133
Figure 5.1: SEM for conducting multi-group comparison	147