CHAPTER 5

Results

In this chapter the results of the analysis is discussed. In section 5.1 the hypothesis associated with each of the latent factors in the proposed model is tested. In section 5.2 a multi-group analysis to test the model for invariance and mediation effects between subgroups is conducted. Section 5.3 contains the conclusion.

5.1. Hypothesis

The extended TAM model proposed in section 2.4 implied a number of hypotheses that were expanded on in section 2.5. Each hypothesis was tested and the results are discussed in turn. The critical ratio (CR) for each of the hypothesis was presented in table 4.4.

HYPOTHESIS 1: *SOC will directly affect BI*

This hypothesis was supported. A CR of 3.853 was determined, indicating that the hypothesis is supported at the p=0.01 level. The relationship was positive indicating that SOC has a positive influence on BI. The loading for the path was 0.247 indicating that SOC explained 6.1 percent of the observed variance in BI. Squaring the factor loading determines the amount of variance in the latent factor due to the factor under discussion. The results show that social factors have a direct effect on the behavioural intention of unbanked respondents at the bottom of the pyramid to use financial services through an intermediary.

HYPOTHESIS 2: *SOC will have an indirect effect on BI through PU.*

This hypothesis was supported. A CR of -2.056 was obtained indicating that the hypothesis is supported at the p=0.05 level. The factor loading for the path was -0.129 indicating that SOC explained 1.7 percent of the observed variance in PU and would through PU it exerts a further influence on BI.

HYPOTHESIS 3: *SOC will have an indirect effect on BI through attitude.*

A CR of 0.732 was obtained indicating that the hypothesis is not supported. From the results it is found that social factors do not influence the attitude of respondents at the bottom of the pyramid in relation to their intention to adopt financial services through an intermediary.

HYPOTHESIS 4: *PU will directly affect BI*

This hypothesis was supported. A CR of 9.762 was obtained indicating that the hypothesis is supported at the p=0.01 level. The relationship was positive indicating that PU has a positive influence on BI. The factor loading for the path was 0.839 indicating that SOC explained 70.4 percent of the observed variance in BI. Both the size of the CR as well as the factor loading shows that the relationship is very strong and explains a significant portion of the observed variance in BI.

HYPOTHESIS 5: *Attitude will directly affect BI*

A CR of -0.429 was obtained indicating that the hypothesis was not supported. The analysis that having a positive attitude or negative view of financial services offered through an intermediary, does not directly affect adoption intention.

HYPOTHESIS 6: *Attitude will have an indirect effect on BI through PU*

A CR of 1.648 was obtained indicating that the hypothesis was not supported. This result is consistent with hypothesis 5 in that attitude is neither a direct or indirect predictor of adoption intention.

HYPOTHESIS 7: *PEOU will indirectly affect BI through PU.*

This hypothesis was supported. A CR of 7.045 was obtained indicating that the hypothesis is supported at the p=0.01 level. The relationship was positive indicating that PEOU has a positive influence on PU. The factor loading for the path was 0.812 indicating that SOC explained 65.9 percent of the observed variance in PU. Both the size of the CR as well as the size of factor loading shows that the relationship is very strong and explains a significant portion of the observed variance in PU.

HYPOTHESIS 8: *HED will directly affect PEOU.*

It was hypothesised that HED would have an influence on the PEOU of the respondents toward the adoption of financial services. A CR of 7.769 was obtained indicating that the hypothesis is supported at the p = 0.01 level. The factor loading for the path was 0.745 indicating that HED explained 55.5 percent of the observed variance in PEOU. HED is clearly the most significant factor in determining PEOU. From the results and the variables that comprise the HED factor it is inferred that how respondents perceive comfort and enjoyment in carrying out the task will be the most significant determinant of how easy they perceive the task is to do.

HYPOTHESIS 9: *HED will have an indirect effect on BI through attitude.*

This hypothesis was not supported. A CR of 2.135 was obtained indicating that there was a statistically significant relationship between hedonistic factors and attitude at the p=0.05 level. There is not, however, a statistically significant relationship between ATT and BI and consequently the hypothesis cannot be held as formulated.

HYPOTHESIS 10: *HED will have an indirect effect on BI through PU.*

This hypothesis was supported. A CR of 2.857 was obtained indicating that the hypothesis is supported at the p=0.01 level. The relationship was positive indicating that PEOU has a positive influence on PU. The factor loading for the path was 0.277 indicating that HED explained 7.7 percent of the observed variance in PU. PU has a direct effect on BI and hence the hypothesis was supported.

HYPOTHESIS 11: *TASK will directly affect PEOU of a service. TASK will thus be a determinant of PEOU.*

This hypothesis was not supported. A CR of -1.689 was obtained indicating that the hypothesis is not supported. From the results and the variables that comprise the TASK factor, it is clear that matters of language, how well people are treated, how the cheap the service is to use and how dependable the service is affect the perception of the service itself but does not affect how respondent perceive how easy the service would be to use.

HYPOTHESIS 12: *TASK will have an indirect effect on BI through attitude.*

This hypothesis was not supported. A CR of 5.000 was obtained indicating that the TASK has a statistically significant effect on ATT at the p=0.01 level. The relationship was positive indicating that TASK has a positive influence on ATT. The factor loading for the path was 0.298 indicating that TASK explained 8.9 percent of the observed variance in ATT. There is not, however, a statistically significant relationship between ATT and BI and consequently the hypothesis cannot be held as formulated.

HYPOTHESIS 13: *TSE will directly affect PEOU. TASK will thus be a determinant of PEOU.*

This hypothesis was not supported. A CR of 0.115 was obtained indicating that the hypothesis is not supported. It had been expected that confidence in the use of technology would positive or negatively influence how easy the technology-enabled service would be to use. It is clear from the results is that other non technology related variables such ease of understanding and making the service easy to use were more significant that confidence in using the technology that carried the service. If someone is confident using technology and thus finds it easy to use, such a cell phone, it does not necessarily translate into perceived ease of use of a associated service, such as cell phone banking.

HYPOTHESIS 14: *TSE will have an indirect effect on BI through attitude.*

This hypothesis was not supported. A CR of -1.095 was obtained indicating that the hypothesis is not supported. It had expected that being more confident with the technology associated with the provision of financial services through an

intermediary would have a positive effect on attitude. The results indicate that other factors determine attitude and that being confident in using technology is not an predictor that attitude toward using a technology enabled financial services through an intermediary would be affected by it.

A total of seven of the 14 hypotheses were supported in the model andseven were not. In table 5.1 a summery of the hypothesis and their outcomes is presented.

Table 5.1: Summary of hypothesis outcomes

	Hypothesis	Outcome
H1	Social constructs will directly affect behavioural intent	Supported
H2	Social constructs will have an indirect effect on behavioural intent through perceived usefulness	Supported
H3	Social constructs will have an indirect effect on behavioural intent through attitude	Not Supported
H4	Perceived usefulness will directly affect behavioural intent	Supported
H5	Attitude will directly affect behavioural intent	Not Supported
H6	Attitude will have an indirect effect on behavioural intent through perceived usefulness	Not Supported
H7	Perceived ease of use will indirectly affect behavioural intent through perceived usefulness	Supported
H8	Hedonistic factors will directly affect the perceived ease of use of a service	Supported
H9	Hedonistic factors will have an indirect effect on behavioural intent through attitude	Not Supported
H10	Hedonistic factors will have an indirect effect on behavioural intent through perceived usefulness	Supported
H11	Task factors will directly affect the perceived ease of use of a service. Task factors will thus be a determinant of perceived ease of use	Not Supported

H12	Task factors will have an indirect effect on behavioural intent through attitude	Supported
H13	Technology self-efficacy will directly affect the perceived ease of use of a service. Task factors will thus be a determinant of perceived ease of use	Not Supported
H14	Technology self-efficacy will have an indirect effect on behavioural intent through attitude.	Not Supported

In the hypothesized model HED and SOC were allowed to co-vary. The rationale for this was that people are likely to relate experiences to friends, family and others if they feel comfortable and enjoy using an intermediary. In poor communities where community bonds are likely to be stronger and services fewer such engagement will likely re-enforce positively or negatively collective views surrounding the comfort and enjoyably of encounters. The hypothesis that HED and SOC would co-vary was supported. A CR of 2.595 was obtained indicating support at the p=0.01 level that these factors do co-vary. One of the advantages in using a bootstrapping approach to determining the parameter estimates in the model is that in addition to accommodating the mild non normality in our data it is possible, using the AMOS software, to determine the standardized direct, indirect and total effect across the model. In table 5.2 below the standardized indirect effects for the model are shown.

Table 5.2: Standardised indirect effects

	TASK	SOC	TSE	HED	ATT	PEOU	PU	BI
ATT	.000	.000	.000	.000	.000	.000	.000	.000
PEOU	.000	.000	.000	.000	.000	.000	.000	.000
PU	-.048	.004	.000	.618	.000	.000	.000	.000
BI	-.047	-.106	.001	.747	.064	.681	.000	.000

From the results we can see that HED has the largest indirect effect on BI followed by PEOU. SOC has an indirect effect that is negative whilst the indirect paths for ATT, TSE and TASK were all found to be statistically not significant. The analysis shows that the factor loading for these paths is in any case extremely low. The determination of the standardized direct and indirect effects allows the determination of the total effect of each of the latent variables on BI. In table 5.3 below we show the total standardised effect (direct + indirect) for the model.

Table 5.3: Standardised total effect

	TASK	SOC	TSE	HED	ATT	PEOU	PU	BI
ATT	0.298	0.055	-0.066	0.166	0.000	0.000	0.000	0.000
PEOU	-0.088	0.000	0.006	0.745	0.000	0.000	0.000	0.000
PU	-0.048	-0.125	0.000	0.895	0.077	0.812	0.000	0.000
BI	-0.047	0.141	0.001	0.747	0.041	0.681	0.839	0.000

Completing the analysis in this manner is important because there may be a sign difference between the direct and indirect effects of a specific latent variable reducing the total effect on BI. This is seen in the effect of the latent variable SOC on BI. SOC has a significant direct effect on BI at the p=0.01 level with R^2 = 0.247. SOC also has an indirect effect on BI through PU at the p=0.05 level, but in this case the value is negative. R = -0.106. The results shows that in terms of total effect on BI, the largest impact is from PU, followed by HED, PEOU and then SOC. A model that fits well and is parsimonious should ideally explain a significant portion of the variance in the primary latent factor of interest. Using AMOS we are able to calculate estimates of the squared multiple correlations for each of the endogenous variables. In table 5.4 the squared multiple correlation for the endogenous factors is shown.

Table 5.4: Squared multiple correlations

Factor	Estimate
ATT	0.134
PEOU	0.563
PU	0.991
BI	0.906

The results shows that the model is able to account for 90.6 percent of the variance observed in behavioural intent to utilise financial services through an intermediary by bottom of the pyramid respondents in South Africa.

5.2. Multi-group analysis

A methodology for comparing two or more groups to determine if a common model can be used to fit the data was developed by Joreskog (1971). In the first step the path coefficients are determined separately for each group. The resultant sets of coefficients represent an unconstrained model. A second analysis is performed in which the coefficients for the two groups are constrained to be equal. This represents the null model. The fit characteristics for each of the approaches are compared to determine if the unconstrained or null model fits the data better (Meyers et.al, 2005). If the fit index statistic does not reveal a significant difference between the unconstrained and the constrained-equal models then it is concluded that the model is invariant across the groups tested. A key advantage of multiple-groups analysis is that all aspects of measurement invariance and population heterogeneity can be examined such as factor loadings, intercepts, residual variances, factor variances, factor covariances and

latent means (Brown, 2006). If there is a significant difference between the unconstrained and null model, each pair of co-efficients between the two groups are analysed to determine which path differs significant between the two groups.

For the multigroup analyses, four variables of interest were identified. These were gender, age, location (rural or urban) and financial dependency. The variable were chosen as they may be significant in understanding how to develop, position, market and communicate financial services at the bottom of the pyramid. For each of the variables of interest the resultant groups were exclusive, i.e. no case could be a member of both groups. The groups were identified in the data set using ordinal variables. For each of the variables of interest the objective was to determine if they moderated the strength of the relationships in the model, or changed the relationships in the model, which would have theoretical and practical implications.

SPSS AMOS 20.0.0 software was used to conduct the multi group analysis with the variables of interest moderating the two groups. When testing for effect between groups the latent variables that the analysis found did not have a direct or indirect effect on BI, notably TASK and TSE, were eliminated. There are consequently 6 latent variables of interest and 29 observations. Using Soper's (2012) work with 6 latent variables, 29 observed variables, an anticipated effect size of 0.2 and desired statistical power level of 0.8, the minimum sample size required to detect effect at a probability level of 0.05 was 124, whilst the minimum sample size for model structure was 94. Each of the subgroups derived from the variable of interest thus had to ideally have a minimum sample size of 124. This requirement was met for all groups except location. In the sample

groups for location only 55 bottom of the pyramid respondents were from urban areas. Using Soper's (2012) software it was determined that the size effect was 0.29 and the researcher deemed this acceptable to draw meaningful conclusions. This deduction was based on Cohen (1986) classification of effect size. The value of 0.29 is between small and medium effect size and is still relatively close to 0.20, the cut-off for small effect size.

To conduct the analysis the statistically significant paths identified in chapter 5 were labelled F_i where F is the latent factor and i is the i^{th} path in the structural model that is significant. The values of i ranged from A to G, matching the statistically significant paths identified in the analysis. For each variable of interest two mutually exclusive groups were identified. The analysis compared, firstly, the parameters for each F_i between the groups to determine if the paths were the same in each groups or statistically different. Secondly the analysis determined if the factor loading between the groups for each of the paths was statistically difference from each other. The structural diagram used to conduct the multi-group analysis is shown in figure 5.1 below.

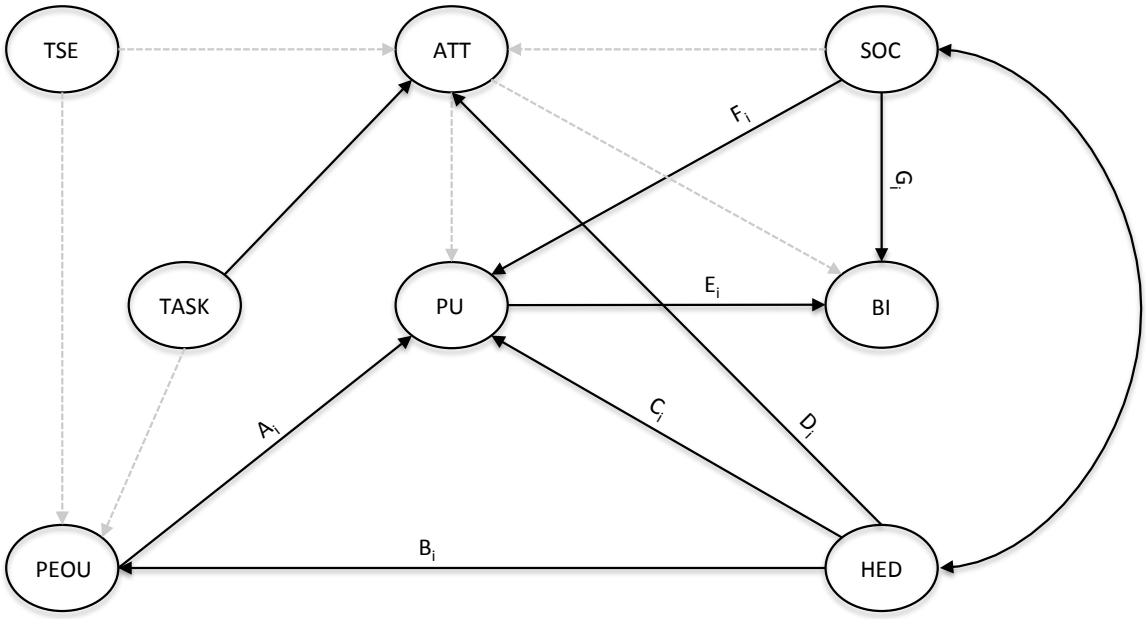

Figure 5.1: SEM for conducting multi-group comparison

5.2.1. Gender

For gender two groups were defined, men (n=137) and women (n=204). A total 3,000 bootstrap examples were used for the analysis. The model fit indices for the unconstrained (unrestricted loadings) model and the null (equal loadings) model is shown in table 5.5 below. The complete fit indices generated by the software are included in appendix 8.18. From the results both models fit the data well with both the unrestricted and equal loading models having RMSEA < 0.50 and TLI and CFI above 0.90.

Table 5.5: Gender multi-group analysis model fit values

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unrestricted loadings	0.807	0.784	0.933	0.924	0.932
Equal loadings	0.807	0.785	0.934	0.925	0.933
Saturated model	1.000		1.000		1.000

Independence model	0.000	0.000	0.000	0.000	0.000

Model	PRATIO	PNFI	PCFI
Unrestricted loadings	0.892	0.720	0.831
Equal loadings	0.900	0.726	0.840
Saturated model	0.000	0.000	0.000
Independence model	1.000	0.000	0.000

Model	RMSEA	LO 90	HI 90	PCLOSE
Unrestricted loadings	0.036	0.030	0.040	1.000
Equal loadings	0.035	0.030	0.040	1.000
Independence model	0.129	0.125	0.132	0.000

SPSS AMOS 20.0.0 allows the comparison of the two models to test if there is a statistically significant difference in fit between the two. The null hypothesis is that there is no difference between the two models whilst the alternative is that there is a statistical difference. In table 5.6 below the two models are compared. The output shows that the equal loadings model can be obtained by constraining the unrestricted loadings model. Under the hypothesis that the equal loadings model is correct, a test of the additional constraints of the equal loadings model can be based on the chi-square statistic 3.649, which has 7 degrees of freedom. The probability of a chi-square statistic with 7 degrees of freedom exceeding 3.649 is distinguishable with $p = 0.819$ which is $> p = 0.05$ at the 95 percent level. Therefore we cannot reject the null hypothesis that there is no difference between the two models. It is therefore concluded that the model is invariant under gender and applies equally to men and women.

Table 5.6: Model comparison for gender.

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Equal loadings	7	3.649	0.819	0.001	0.001	-0.001	-0.002

To test if the model is moderatedby gender, the latent factor loadings for each model was compared using the unrestricted model described above. A total of 3,000 bootstrap examples were used to conduct the analysis and factor loadings were unrestricted between the two models. In appendix 8.19 the matrix of critical ratios for differences between the parameters between the male and female models is shown. This matrix has a row and column for each parameter of the model. Each off-diagonal entry in the matrix gives a statistic for testing the hypothesis that some two-model parameters are equal in the population. The value for each cell in the matrix is the value of the z-test for the difference between coefficients from the male to the female model. For a two tailed test this value should be greater than |1.96| for the difference between paths to be statistically significant at the $p < 0.05$. The relevant comparative cells are highlighted in the matrix. There are no path coefficient critical ratio's where the value is greater than |1.96|. It can therefore be concluded that there is no difference between the two groups on path significance and that the model is not moderated by gender.

5.2.2. Age

Two groups were defined, respondents younger than 35 (n=161) and those 35 and older (n=180). The age groupings were chosen based on the average age of the population in the sample data. The mean age of respondents was 37.17 years.

Ages below this were labelled young and ages older than the mean was labelled old. As the ages were classified into bins, the closest age bin to the mean was ages 35-44. It was decided to apply the age cut-off at 35 and thus two groups' were produced. One group had respondents aged 16-34 and the second group had respondents 35 years and older. As with gender, in the first model the latent factor loadings are allowed to be free and take on different values in each of the two models to optimise the fit. In the second model the constraint that the factor loading should be equal across the two groups is introduced. The fit of both models is shown in table 5.7. The complete fit indices generated by the software are included in appendix 8.20. From the results both models fit the data well

Table 5.7: Age multi-group analysis model fit values

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unrestricted loadings	0.817	0.794	0.942	0.934	0.941
Equal loadings	0.814	0.794	0.941	0.934	0.940
Saturated model	1.000		1.000		1.000
Independence model	0.000	0.000	0.000	0.000	0.000

Model	PRATIO	PNFI	PCFI
Unrestricted loadings	0.892	0.728	0.839
Equal loadings	0.900	0.733	0.846
Saturated model	0.000	0.000	0.000
Independence model	1.000	0.000	0.000

Model	RMSEA	LO 90	HI 90	PCLOSE
Unrestricted loadings	0.033	0.028	0.038	1.000
Equal loadings	0.033	0.028	0.038	1.000
Independence model	0.129	0.126	0.133	0.000

The null hypothesis is that there are no differences between the two models whilst the alternative is that there is a statistical difference. In table 5.8 below the two models are compared. The output shows that the equal loadings model can be obtained by constraining the unrestricted loadings model. Under the hypothesis that the equal loadings model is correct, a test of the additional constraints of the equal loadings model can be based on the chi-square statistic 12.553, which has 7 degrees of freedom. The probability of a chi-square statistic with 7 degrees of freedom exceeding 12.553 is distinguishable with $p = 0.084$ which is $> p = 0.05$ at the 95 percent level. Therefore we cannot reject the null hypothesis that there is no difference between the two models. It is therefore concluded that the model is invariant for the variable age.

Table 5.8: Model comparison for age

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Equal loadings	7	12.553	0.084	0.002	0.003	0.001	0.001

To test if the model is moderated by age, the latent factor loadings for each model was compared using the unrestricted model described above. A total of 3,000 bootstrap examples were used to conduct the analysis and factor loading were unrestricted between the two models. In appendix 8.21 is the matrix of critical ratios for differences between the parameters between the under 35 and 35 years and older models is shown. There were no path coefficient critical ratio's where the value was greater than $|1.96|$. We can therefore conclude that there is no difference between the two groups on path significance and that the model is not mediated by age.

5.2.3. Location

Two groups were defined, urban (n=55) and rural (n=286) dwellers. The fit of both models is shown in table 5.9. The complete fit indices generated by the software are included in appendix 8.22. From the results both models fit the data well.

Table 5.9: Location multi-group analysis model fit values

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unrestricted loadings	0.793	0.768	0.909	0.897	0.908
Equal loadings	0.789	0.766	0.906	0.893	0.904
Saturated model	1.000		1.000		1.000
Independence model	0.000	0.000	0.000	0.000	0.000

Model	PRATIO	PNFI	PCFI
Unrestricted loadings	0.892	0.707	0.809
Equal loadings	0.900	0.710	0.814
Saturated model	0.000	0.000	0.000
Independence model	1.000	0.000	0.000

Model	RMSEA	LO 90	HI 90	PCLOSE
Unrestricted loadings	0.043	0.038	0.047	0.997
Equal loadings	0.043	0.039	0.048	0.994
Independence model	0.133	0.130	0.136	0.000

In the table 5.10 below the two models are compared. Under the hypothesis that the equal loadings model is correct, a test of the additional constraints of the equal loadings model can be based on the chi-square statistic 25.047, which has 7 degrees of freedom. The probability of a chi-square statistic with 7 degrees of freedom exceeding 25.047 is distinguishable with $p = 0.001$ which is $< p = 0.05$ at

the 95 percent level. Therefore we can reject the null hypothesis that there is no difference between the two models. NFI increases by 0.04 and IFI increases by .004 while RFI and TLI increases by .003. It is therefore concluded that the model is not invariant for location. There is a difference between rural and urban dwellers in the latent factors that impact how they adopt financial services through an intermediary.

Table 5.10: Model comparison for location

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Equal loadings	7	25.047	0.001	0.004	0.005	0.003	0.003

For completeness the matrix of critical ratios for differences between the urban and rural dwellers is shown in appendix 8.23.In table 5.11 below the standardised values for the path coefficients and critical ratio for each of the two models is shown. There are several paths highlighted in the table that appear significant for one group but not the other.

Table 5.11: Loading factors for urban and rural respondents

			Urban		Rural	
Path			C.R.	R	C.R.	R
PEOU	<---	TASKm	-0.081	-0.013	-1.445	-0.076
PEOU	<---	HED	1.233	0.225	7.593	0.820
PEOU	<---	TSEm	0.647	0.104	-0.261	-0.014
ATT	<--	TASKm	0.147	0.019	4.771	0.312

	-					
ATT	<---	SOC	1.599	0.264	0.655	0.054
ATT	<---	TSEm	-1.032	-0.144	-0.956	-0.062
ATT	<---	HED	2.388	0.368	1.682	0.143
PU	<---	PEOU	0.754	0.823	6.156	0.832
PU	<---	SOC	0.512	0.139	-2.212	-0.143
PU	<---	ATT	0.048	0.009	1.540	0.072
PU	<---	HED	0.709	0.225	2.020	0.247
BI	<---	PU	0.766	0.924	10.040	0.842
BI	<---	SOC	0.075	0.015	3.669	0.240
BI	<---	ATT	1.705	0.335	-0.852	-0.046

To test if the model is also moderated by location, the latent factor loadings for each model was compared using the unrestricted model described above. A total of 3,000 bootstrap examples were used to conduct the analysis and factor loading were unrestricted between the two models.Appendix 5.6 shows the matrix of critical ratios for differences between the parameters between the two models. The value for each cell in the matrix is the value of the z-test for the difference between coefficients for the urban and rural dwellers. For a two tailed test this value should be greater than |1.96| for the difference between paths to be

statistically significant at the $p < 0.05$. The relevant comparative cells are highlighted in the matrix.

Three paths are identified as significant. The path B_i $(PEOU \leftarrow HED)$ has a critical ratio of -4.918. This indicates that there is a significant difference between the two groups at the p=0.01 level. Rural respondents determined PEOU significantly by how comfortable and enjoyable the actual experience was. Urban dwellers do not correlate comfort and enjoyment with ease of use, but from the data appear to equate it directly with perceived usefulness. For urban dwellers the fact that an experience is comfortable and enjoyable makes it useful. For rural dwellers these factors make it easy to use, but not necessarily useful to them. The second path identified as significantly different between the two groups is F_i. The path F_i $(PU \leftarrow SOC)$ has a critical ratio of 2.066 indicating that there is a significant difference at the p=0.05 level. For rural dwellers, social factors have a significant effect on PU, whilst for urban dwellers social factors have no impact on PU. The results seem to indicate that in rural areas social factors has a strong effect on respondent's perceptions of usefulness. This may reflect the current strength that traditional values and tribal and traditional societal structures continues to hold in rural areas. Once people migrate to urban areas these previous structures may no longer be present or accessible. As a result urban dwellers have less engagement with social structures in their daily lives with a likely diminished importance in their lives and decision-making.

The final path that was found to be significantly different between the two groups is A_i. The path A_i $(PU \leftarrow PEOU)$ has a critical ratio of -2.312. This indicates that there is a significant difference between the two groups at the

p=0.05 level. For rural dweller if they perceive that something is easy to use it will likely cause them to perceive that it is also useful. This association is not seen in urban dwellers. Urban dwellers appear to base the perception of utility more on factors related to enjoyment and comfort. This may indicate that urban dwellers have more choice and consequently expect that a service providers will have products and services that are easy to use, simple to understand and trustworthy. It may be that rural dwellers do not have choices and consequently aspects such as products that are easy to understand, simple to use, trustworthy and quicker than alternatives rendering it useful. From the above analysis it is found that the model is not invariant as a function of location and that urban respondents and rural respondents do differ in terms of which latent factors are significant in determining behavioural intent. Such a difference may have implication for service providers offering services in rural and urban areas.

5.2.4. Financial dependency

Two groups were defined; those defined as financially independent (n=159) and those who are financially dependent (n=118). Financial independence was defined as respondents whose primary source of income is not dependent on a government grant or money obtained from a parent, family member or friend. Within this grouping are respondents who's primary source of income is thus formal employment, money obtained from selling things to neighbours, money from rent, money from farming, money from piece job and money from a formal (i.e. not state provided) pension. Two models have been defined to compare the moderating effect of financial independence on the strength of the regression path between the latent variables. Table 5.12 shows the results of the model

fits.The complete fit indices generated by the software are included in appendix 8.24.

Table 5.12: Financial dependency multi-group analysis model fit values

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unrestricted loadings	0.765	0.736	0.907	0.893	0.905
Equal loadings	0.764	0.738	0.907	0.895	0.905
Saturated model	1.000		1.000		1.000
Independence model	0.000	0.000	0.000	0.000	0.000

Model	PRATIO	PNFI	PCFI
Unrestricted loadings	0.892	0.682	0.807
Equal loadings	0.900	0.688	0.815
Saturated model	0.000	0.000	0.000
Independence model	1.000	0.000	0.000

Model	RMSEA	LO 90	HI 90	PCLOSE
Unrestricted loadings	0.043	0.037	0.048	0.991
Equal loadings	0.042	0.037	0.047	0.994
Independence model	0.131	0.127	0.134	0.000

The null hypothesis is that there is no difference between the two models whilst the alternative is that there is a statistical difference. In table 5.13 the two models are compared. The probability of a chi-square statistic with 7 degrees of freedom exceeding 4.405 is distinguishable with p=0.732 which is > p = 0.05 at the 95 percent level. Therefore we cannot reject the null hypothesis that there is no difference between the two models. NFI and IFI increase by .001 while RFI decreases by 0.001 TLI decreases by .002. It is therefore concluded that the model is invariant under financial independence.

Table 5.13: Model comparison for financial dependency

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Equal loadings	7	4.405	0.732	0.001	0.001	-0.001	-0.002

To test if the model is moderated by financial independence, the latent factor loadings for each model was compared using the unrestricted model described above. A total of 3,000 bootstrap examples were used to conduct the analysis and factor loading were unrestricted between the two models. The matrix of critical ratios for differences between the parameters between the models is included in appendix 8.25. There are no path coefficient critical ratio's where the value is greater than |1.96|. It can therefore be concluded that there is no difference between the two groups on path significance and that the model is not moderated by financial dependence.

5.3. Conclusion

From the results we have determined that two of the three latent factors proposed to directly affect BI section 2.6 have been found to hold. Social factors and perceived usefulness were found to directly influence the behavioural intent of bottom of the pyramidrespondents to adopt financial services through an intermediary. Social factors, perceived ease of use and hedonistic factors indirectly affected behavioural intention. Contrary to other studies using TAM to predict adoption of technology, attitude was not found to directly or indirectly affect behavioural intent Combining indirect and direct effects it was found that perceived usefulness was the most significant factor that influenced BI, followed

by hedonistic factors, perceived ease of use and social factors. In total the model successfully explained 90.6 percent of the variance observed in behavioural intention of unbanked bottom of the pyramid respondents to make use of financial services offered through an intermediary.

The results raise a number of implications for the provision of financial services through an intermediary at the bottom of the pyramid. The work confirms previous studies using the TAM that shows perceived usefulness plays a significant role in determining adoption intention. The work extends this finding to adoption of technology enabled financial services at the bottom of the pyramid. The role that hedonistic factors play in determining adoption intention is a contribution to the body of research. This construct highlights the importance that bottom of the pyramid place on feeling comfortable to make use of a service and that using a service should be enjoyable. It raises important implications for how financial services are presented at the bottom of the pyramid. It further highlights the importance for service providers to understand what makes potential customers at the bottom of the pyramid comfortable in using a service. The findings confirm that perceived ease of use plays a significant role in determining behavioural intention as proposed by the TAM. The work extends this finding to adoption of technology enabled financial services at the bottom of the pyramid.

The role that social factors play in determining adoption intention is a new contribution to the field. The results highlight that the role of friends, family, community elders and social role models play is significant in determining adoption intention. The findings have important implications for how financial

service products are marketed at the bottom of the pyramid. The role that community elders and role models play also has implications for the launch of products. The finding that attitude does not play either a direct, or indirect, role in determining adoption intention is also significant. It raises an important factor when research into the types of products and services required at the bottom of the pyramid is conducted. The finding that a person may have a positive attitude toward a product does not translate into actual adoption of the product. Marketing surveys of financial services at the bottom of the pyramid should take this finding into account, as a positive attitude toward a financial services product may not translate into actual usage.

The multi-group analysis that was conducted showed that the model was invariance under gender, age and financial dependency. These variables also did not act as a mediator of relationships in the model. It was found, however, that the model was not invariant under location, i.e. if respondents were from a rural or urban area. Rural and urban dwellers had different latent factors determining behavioural intent. Location also mediated the strength of the relationships in the model. For rural respondents they determined ease of use significantly by how comfortable and enjoyable the actual experience was. Urban dwellers do not correlate comfort and enjoyment with ease of use, but from the data appear to equate it directly with perceived usefulness.

For urban dwellers the fact that an experience is comfortable and enjoyable makes it useful. For rural dwellers these factors make it easy to use, but not necessarily useful to them. For rural dwellers, social factors have a significant (negative) effect on usefulness, whilst for urban dwellers social factors have no

impact on usefulness. For rural dweller if they perceive that something is easy to use it will likely cause them to perceive that it is also useful. This association is not seen in urban dwellers, and may reflect reduced or absence of choices for rural dwellers as compared to urban dwellers. For urban dwellers there seems to be a clear separation between the ease of use of something and the utility thereof. The fact that the service may be easy to understand, use, quick compared to competitors and trustworthy still, for urban dwellers, does not render the service useful – the primary indicator of behavioural intent. An illustrative example may be cell phone banking. Cell phone banking is a channel for banking services. In urban areas people may have multiple channel choices for banking – cell phone, Internet, branch banking, etc. Whilst cell phone banking may be easy to use, because urban dwellers have alternatives they may not consider the service useful. Rural dwellers may have no alternative to cell phone banking and consequently an easy way to access banking may render the service useful. Urban dwellers appear to base the perception of utility more on factors related to enjoyment and comfort.

CHAPTER 6

An architecture for expanding financial inclusion

In this chapter the results obtained in the study are used to propose a strategic approach to expanding financial inclusion at the bottom of the pyramid in South Africa through the use of intermediaries. The approach consists of two pillars; the first described in section 6.1 positions the role that intermediaries should play. Four principles are proposed relating to intermediaries that if implemented would enable them to play a meaningful role in expanding financial inclusion. The second pillar, discussed in section 6.2, proposes the role that technology should play. Three principles are proposed which would enable technology to support intermediaries in the expansion of financial inclusion at the bottom of the pyramid in South Africa.

6.1. The proposed role of supermarkets and the post office

Using intermediaries rather than building their own branch network has the potential to reduce the cost of serving the bottom of the pyramid for banks. The approach of using intermediaries has been shown to lower the cost of delivery of financial services to the poor, including costs both to banks of building and maintaining a delivery channel and to customers of accessing services (Ivatury and Mas, 2008). The use of intermediaries thus holds promise as a strategic approach to expanding financial inclusion. Within the South African context the thesis has found that both supermarkets and the post office are potentially viable intermediaries for unbanked bottom of the pyramid people. The development of

financial intermediaries has previously been found to reduce income inequality in a country by disproportionately boosting the income of the poor (Beck et.al, 2004). Four principles are proposed for the use of intermediaries in South Africa for the expansion of financial inclusion.

The first principle tabled is that *supermarkets and the post office should be enrolled by banks as intermediaries for the provision of financial services to unbanked people at the bottom of the pyramid*. In South Africa retail agents are permitted only for licensed financial institutions. Non-banks are thus prohibited from accepting public deposits. In South Africa using intermediaries would thus need to be a bank led model and supermarkets and the post office would have to enter into partnerships with registered banks. A regulatory framework may be needed to ensure that banks do enrol supermarkets and the post office as intermediaries. It is recommended that the South African government compel banks to enter into such partnerships with supermarkets and the post office. This approach of regulatory intervention has worked well in Brazil where it has become one of the most promising strategies for offering financial services. In Brazil, where organisations have had the greatest success with a similar strategy about 1,600 municipalities are exclusively served by intermediaries. Over the last decade, Brazil has pioneered a model of banking, known as correspondent banking, involving distribution partnership between banks, several kinds of retailers and a variety of other participants, which have allowed an unprecedented growth in bank outreach (Jayo et.al, 2011). Signing up supermarkets or the post office would be a low investment, low-risk way to test the waters in new geographic markets. It will allow banks to acquire a customer

base and transaction volume that, with time, may warrant the opening of a bank branch.

This research work has identified that both supermarkets and the post office have greater accessibility than traditional banks in bottom of the pyramid communities. Measured presence of the post office was 56 percent of the communities in which the research was conducted whilst supermarkets were present in 57.5 percent of communities. These figures were higher than traditional banks, which was present in only 33.7 percent of communities. In addition to being more accessible, the cost of access for bottom of the pyramid people may be lower for supermarkets and the post office. The post office was within walking distance of their homes for 53.9 percent of respondents and supermarkets were within walking distance for 63.3 percent of respondents. For traditional banks only 24.3 percent of respondents indicated a branch was within walking distance. The alternative to walking is the use of transport that has a cost implication for bottom of the pyramid people. By enrolling supermarkets and the post office the costs of accessing a financial service provider for the bottom of the pyramid would be lower as both types of outlet are more prevalent within communities and cheaper to access than banks.

The use of the post office and supermarkets as intermediaries for the provision of financial services is also bolstered by the findings in the thesis that bottom of the pyramid people were more likely to use financial services offered through these two types of outlets rather than traditional bank. This adoption propensity was measured across cost, trust, how well people were treated and the language spoken. The study found that unbanked bottom of the pyramid people perceived

that the post office was cheaper to use than traditional banks and that supermarkets were cheaper still. As bottom of the pyramid respondents are significantly poor, surviving on R14.94 per day for LSM 1 to R25.48 per day for LSM 4, perceptions of costs are significant for adoption. The study found that respondents felt that the post office was more likely than banks to speak their language and supermarkets were more likely than the post office to speak the same language as bottom of the pyramid people.

Language may be a significant barrier to adoption at the bottom of the pyramid with Zulu (25.8 percent) and Xhosa (22.7 percent) the most spoken languages. These two languages cover nearly half the bottom of the pyramid respondents whilst English was only 0.3 percent respondent's home language. The thesis found that hedonistic factors, such as how comfortable people were when using a service, were a significant determinant of behavioural intention. For bottom of the pyramid people any service must be provided in such a manner that bottom of the pyramid users are comfortable in using it. The results showed that bottom of the pyramid people felt that the post office treated them better than traditional banks and supermarkets treated them better then the post office.

With hedonistic factors directly influencing behavioural intention it is likely that unbanked bottom of the pyramid people would use the post office and supermarkets more readily than traditional banks for financial services. On the aspect of trustworthiness with their money, the results showed that supermarkets were more trustworthy for unbanked bottom of the pyramid people than either banks or the post office. Respondents rated the post office and bank the same in respect of trustworthiness. In enrolling the post office and

supermarkets as intermediaries, it is further proposed that they should be allowed to offer services for multiple banks. A multibank approach would drive competition between banks and would increase overall transaction flow through intermediaries. This may, again, require regulatory intervention to ensure that intermediaries are not compelled to exclusively offer financial services in partnership with a single bank. Such a situation would reduce choice for bottom of the pyramid customers and would potentially drive prices of services up.

The second principle tabled is that *supermarkets and the post office should be marketed in a socially acceptable manner and have a further responsibility of promoting financial literacy*. Education levels at the bottom of the pyramid were found to be very low. A mere 2.6 percent of people have completed high school whilst 29.8 percent of people had no schooling. Low education levels were also found to be associated with being unbanked at the bottom of the pyramid. In order to expand financial inclusion it will be important to understand the implications of low education levels on potential adoption. Unless basic financial literacy education is provided it is unlikely that people with low education will adopt financial services.

It will thus be important for intermediaries to actively support financial literacy programs and to ensure that the marketing of financial services through the intermediary is underpinned by a financial literacy approach. The extended TAM model identified that social factors directly affected behavioural intention. In choosing the type of supermarket intermediary preference must be given to those establishments of high social standing and those supermarkets of low social standing should be avoided. An example of a supermarket of low social standing

may well be a liquor outlet, whilst supermarkets that actively engage in community improvement programs may be an example of a socially acceptable outlet. Once again regulatory intervention could prove helpful by prohibiting certain types of supermarket outlets from offering financial services. Because social factors determines behavioural intention, in rural areas traditional leadership structures should be enlisted as advocates. Popular personalities in the community should also be enlisted to talk about financial inclusion and used to promote products.

The third principle tabled is that *a revised pricing model based on a transaction charge should be implemented for intermediaries*. In order to serve the bottom of the pyramid profitably, it would not be enough for banks to move transactions to a lower-cost channel. Traditional bank pricing models are not well suited to the poor as they typically rely on interest margin. This model is unattractive to the bank for small-balance savers, no matter how cheap the transactions become. For the customers typical account maintenance fees are unattractive, as they may not want to commit to a fixed cost. Poor people may not have a lot of money to save, but they may have plenty of transactions to undertake. These transactions may include frequent small deposits building up to a savings objective, microloan instalments, funeral plan premiums, bills to pay and remittances among family and friends who support each other. Banks should adopt a per-transaction pricing model for serving the bottom of the pyramid.

The mobile telephony industry managed a similar transition in business model, from post pay to prepay, introducing billing by the second and from monthly subscriptions to per-event charging, which allowed the industry to dramatically

expand its distribution options and ultimately grow the size of its addressable market. By adopting this approach the typical monthly fee approach can be eliminated, making accounts more appealing to potential bottom of the pyramid customers. In order to incentivise the intermediary banks should adopt a per transaction commission for the intermediary. It is proposed that intermediaries be paid an income for every transaction that they process. This should be a percentage of the transaction value up to a maximum amount. The introduction of a maximum cap would dis-incentivise the post office and supermarket from inducing customers to withdraw large sums of money in a single transaction from their account and encourage them to maximize the number of transactions through better service to customers. A compensation system based on this approach would further directly reward or punish individual outlets as poor service to customer will see then transact through another outlet directly affecting the income of the outlet giving poor service.

The fourth principle tabled is that *intermediaries should be positioned as a payment and services hub at the bottom of the pyramid.* Intermediaries would need to take a systemic view and attract all parties who wish to transact with their customers. Being able to make payments to remote parties is particularly valuable to users, but this by itself may not generate a significant volume of transactions. Significant transaction volumes will develop only when people use electronic payments for their daily life, in the communities where they live, to pay for day labourers, buy goods at the store, pay local fees, transfer money between family members and so forth. Transaction costs will need to come down significantly if people are to use electronic payments within their communities and to manage their own daily financial lives. The system should work for

transactions of as little as $4 or R30, the daily income for many, on agent commissions of not more than 2 percent. That means that customers' transaction fees should be in the range of R0.20-0.30. Positioning the intermediary, as a hub for payment services would attract more transactions, reducing the overhead cost per transaction.

One method of enabling this would be to couple financial inclusion with the existing social welfare program. The South African social welfare program has more than 12 million beneficiaries. Beneficiaries should receive their payment directly into a bank account and not as a cash payment. A similar approach has been proposed in India where the National Rural Employment Guarantee Program (NREGP) provides a regular and steady stream of income to the poor, although for a limited period of time in a year. Paying grants awarded under the scheme into a no-frills account and enabling the account to be used through an intermediary produces a reliable stream of income into the account (Natu et.al, 2008). Another approach in this direction would be for government to use intermediaries as the vehicle through which e-government is rolled out. E-government means different things to different researchers. Some researchers define e-government in terms of specific actions such as using a government kiosk to receive job information or applying for social security benefits through a web site. Other researchers define e-government more generally as automating the delivery of government services (Seifert, 2003).

In e-government, the state uses information technology and the Internet to support government delivery, engage citizens and provide services. The interaction may be in the form of obtaining information, conducting transactions

and other activities via the Internet (Sharma, 2005). While definitions of e-government by various sources may vary widely, there is a common theme. E-government involves using information technology, especially the Internet, to improve the delivery of government services to citizens and businesses (Sharma, 2005). The types of services that are provided through e-government include access to government information; the completion and submission of applications and obtaining required documents such as land titles, license renewals, identity documents and business permits. There is thus an overlap in technology requirements for the provision of financial services and the provision of e-government. Many of the beneficiaries of a rollout of e-government services would be bottom of the pyramid inhabitants. It would thus make sense to have a single access point for bottom of the pyramid citizens to obtain both social welfare grant payments and accessing government services.

6.2. A technology approach for expanding financial inclusion

The research work has found that technology is a viable channel for the provision of financial services at the bottom of the pyramid. Technology offers the opportunity to expand financial inclusion into areas that are remote or not financially viable to establish a branch infrastructure for banks. The largest proportion of bottom of the pyramid people live in rural areas, where physical access is to a financial services provider is a challenge. The results found that 83.9 percent of unbanked people at the bottom of the pyramid were rural dwellers. The thesis also found that people younger than 25 were significantly associated with being unbanked at the bottom of the pyramid. The greatest portion of the unbanked are younger than 25. This age group may more easily adopt technology enabled financial services.

The result provides support to this assertion with this age group having higher cell phone accessibility, lower need for people support in using technology and higher rates of Internet access. For this age group, 88.8 percent of respondents have access to cell phones. Some 10.7 percent have access to a computer and 11.2 percent have access to the Internet - including cell phones. Furthermore 44.4 percent prefer to be served by people rather than a machine compared to 63.7 percent of people older than 25 who prefer to be served by people. 46.2 percent would use an ATM or Internet banking if someone was there to help them compared to 63.9 percent of people older than 25 who would use an ATM or the Internet if someone was there to help them. The use of technology to expand financial inclusion may thus be an important tool in addressing the age group where financial inclusion is the greatest.

Consequently a fifth principle tabled is that *intermediaries should adopt a multichannel approach to providing financial services* at the bottom of the pyramid. This multichannel approach must include mobile banking, POS network, Internet banking and ATMs. People at the bottom of the pyramid suffer from high levels of formal unemployment. People may thus travel to find work and a multichannel approach must be followed to allow them to access their funds wherever they are. Workers may further be migrant or seasonal, working away from home and needing to remit money to family back home. Access to an ATM network allows account holders access or deposit cash whenever they are near an ATM. One of the most significant costs associated with withdrawing cash at an ATM is interchange fee. The interchange fee is a higher fee charged to the user when they access an ATM not owned by their bank. Intermediaries must

have access to a dedicated ATM network that offers basic cash in cash out services to eliminate the interchange fee. An alternative policy approach would be for government to compel banks to eliminate or reduce the interchange fee.

Supermarkets and the post office should participate in the POS network. This will allow new concepts such as the electronic wallet to become viable. An electronic wallet would allow the holder to use cash held in a card at retailers and a range of providers without the need to carry cash. This would reduce the risk for poor people who would not need to carry relatively large sums of cash around. Kiosk based Internet banking is another channel through which supermarkets and the post office should offer services. This could be a mechanism for encouraging self-service. The Internet could be used to teach people through on demand videos how banking works and the various products and services. Online applications could be made without the need to tie up staff in explaining such matters. Mobile banking, however, presents the greatest opportunity. 82.3 percent of bottom of the pyramid people had access to a mobile phone. This compares to 0.1 percent who had access to a computer in their homes. About 2.6 billion people in the world do not have access to formal financial services and yet one billion of them have a mobile phone (Dermish et.al, 2011).

The Sixth principle proposed is that the *design of technology enabled products and services must take the situation at the bottom of the pyramid into account*. With high levels of formal unemployment, bottom of the pyramid people may have work irregularly, or of a seasonal nature. Accounts provided for this segment of the market will have to deal with irregular cash flow and periods of

dormancy without being closed by the holding bank. It is proposed that current banking practice to close dormant accounts after 6 months should be revised and the policy changed to 12 or even 18 months. It has previously highlighted that language was associated with being unbanked at the bottom of the pyramid and that English is used as a home language by an insignificant portion of the bottom of the pyramid. Products will thus have to be developed in the languages spoken at the bottom of the pyramid, most notably isiZulu and isiXhosa. This requirement must be enforced, possibly through regulatory intervention, across all channels such as ATM, mobile banking and the Internet.

Because the bottom of the pyramid people also suffer from low education levels, product design must be simple and intuitive. The products offered to the bottom of the pyramid must their most basic needs so as to prevent them being overwhelmed with features they do not understand or need. An example of such an approach could be mobile banking initial focus should be on the most common transaction types possibly needed by the bottom of the pyramid. These transaction types may relate to an SMS advice of a payment into an account or a single button feature on a phone that sends an SMS in response to an account balance query. The products and services should also be designed so that they can operate on simple devices such as low cost or previous generation cell phones.

The seventh principle tabled is that *intermediaries should be positioned as a bridge in getting people to make use of technology for financial services*. In order to get bottom of the pyramid people to use technology for financial services, many will need to overcome anxiety of use and have support readily available. There is thus an interim step that a physical outlet staffed with people can play. Such an

interim step will allow bottom of the pyramid people to adopt technology in the presence of a person before developing the confidence over time to use the technology unaided. The thesis found that some 59 percent of respondents agreed or strongly agreed with the statement "you preferred to be served by a person rather than a machine". It was also found that 59.6 percent of respondents would make use of the Internet or an ATM if someone was there to help them. Positioning an ATM or Internet kiosk within an intermediary outlet, people could readily turn to staff for assistance. Over time people could progressively migrate to self-service and be able to use ATM, POS devices and self-service kiosks in remote areas where there was no support.

6.3. Conclusion

The role that intermediaries can play in the expansion of financial inclusion in South Africa is significant. The use of intermediaries, coupled with the use of technology has the potential to significantly reduce the cost per transaction at the bottom of the pyramid. This reduction in costs should make financial services more affordable to bottom of the pyramid people. A per transaction fee commission model is proposed that will not only enable banks to reduce their cost of providing service, but also provide an income stream for intermediaries. In respect of the financial viability of such a model, the Panel of the Banking Enquiry, established in 2006 by the Competition Commission of South Africa to enquire into aspects of competition in retail banking provides some insight. The report published by the commission (Competition Commission, 2008) shows the impact on bank profitability in moving away from the existing ad valorem pricing structure to a cost per transaction structure would not negatively affect banking profitability.

A key component of the successful deployment of such an approach is to significantly increase the volume of transaction that goes through an intermediary. To this extent it is envisioned that the best opportunity is to expand the services that an intermediary offers such that they become a payment hub for clients. By expanding the service and positioning it as a single payment window to the bottom of the pyramid the costs would be amortised over a greater volume of transactions. In order that intermediaries are able to operate across different regions, environments and clients it is essential that intermediaries adopt a multichannel approach. This will enable them to deploy the most appropriate technology for their client needs and provide client choice. Taking this approach further, by aggregating demand and sharing the costs across numerous intermediaries and different service providers the intermediaries would be able to offer their client's access to ATM's as well as Internet and mobile capability.

CHAPTER 7

Conclusions

Advances in technology have allowed the delivery of financial services outside of the traditional branch infrastructure that banks have historically used. These advances have not only enabled more convenient banking in general, but allowed banks to address the challenge of serving the poor in a cost effective manner. Expanding financial inclusion for the poor or the bottom of the pyramid is both a social and national imperative. The growth of mobile phone and communication technology allows for the expansion of financial inclusion to the bottom of the pyramid where it may have been prohibitively expensive in the past. These developments have allowed for the emergence of a model that may successfully expand financial inclusion. The emergence of an intermediary, that uses the advance in technology to offer financial services, has led to meaningful expansion of financial services in countries like Brazil. This approach has potential in South Africa where supermarkets and the post office can play the role of intermediary.

Whilst the combination of technology and intermediary has potential to expand financial inclusion, research to date shows that the model has not realised its full potential. Very little, if any, work on this subject has been undertaken on the bottom of the pyramid in South Africa. It was determined that the bottom of the pyramid in South Africa had high levels of formal unemployment, low levels of education and were heavily dependent on government grants as a primary source of income. Very few respondents had completed formal schooling. The bottom of

the pyramid respondents was also overwhelmingly rural dwellers and the use of English as a home language was insignificant. The research found that age, primary source of income, home language, the number of dependents and education levels were associated with being unbanked at the bottom of the pyramid. An evaluation of two intermediaries, supermarkets and the post office showed that these were viable intermediaries for the delivery of financial services to unbanked people at the bottom of the pyramid. The expansion of financial inclusion is one way in which poverty can be alleviated.

Understanding the role of technology adoption is key to realising this potential and the most successful technology adoption theory, the TAM, provides a basis for undertaking such a study. The original TAM was developed to explain the adoption of technology in a workplace environment and has become the most widely used technology adoption model. As the usage of the TAM expanded into different work settings and outside of mandated use, extensions to the model were developed to deal with its original shortcomings. The introduction of TAM2 saw the incorporation of social related constructs and constructs related to executing a task. Further expansion of the TAM through the introduction of the UTAUT model and TAM3 expanded these factors further and also introduced the concept of moderators such as gender, age and educational levels. In considering the application of TAM to financial services a review of the literature has indicated that researchers have added additional constructs to enable the TAM to better predict adoption. A review of the literature, along with the use of grounded theory, identified new constructs in addition to that included in the original TAM that may explain adoption at the bottom of the pyramid. The additional constructs allows for the development of an extended TAM model, to

explain adoption of financial services through an intermediary at the bottom of the pyramid.

The proposed extended TAM model to explain adoption of financial services through an intermediary at the bottom of the pyramid in South Africa was validated using structural equation modelling. The extended TAM model successfully explained over 90 percent of the variance in adoption intention in the sample data. The extended TAM model introduced two significant new constructs, social factors and hedonistic factors, to explain adoption intention. The role that social factors play in determining adoption intention is a new contribution to the field. The results highlight that the role of friends, family, community elders and social role models play is significant in determining adoption intention.

The findings have important implications for how financial service products are marketed at the bottom of the pyramid. The role that community elders and role models play also has implications for the launch of products. The finding that attitude does not play either a direct, or indirect, role in determining adoption intention is also significant. It raises an important factor when research into the types of products and services required at the bottom of the pyramid is conducted. The finding that a person may have a positive attitude toward a product does not translate into actual adoption of the product. Marketing surveys of financial services at the bottom of the pyramid should take this finding into account, as a positive attitude toward a financial services product may not translate into actual usage.

The role that hedonistic factors play in determining adoption intention is a contribution to the body of research. This construct highlights the importance that bottom of the pyramid place on feeling comfortable to make use of a service and that using a service should be enjoyable. It raises important implications for how financial services are presented at the bottom of the pyramid. A multi-group analysis that was conducted showed that the model was invariance under gender, age and financial dependency. These variables also did not act as a mediator of relationships in the model. It was found, however, that the model was not invariant under location, i.e. if respondents were from a rural or urban area. Rural and urban dwellers had different latent factors determining behavioural intent. Location also mediated the strength of the relationships in the model. For rural respondents they determined ease of use significantly by how comfortable and enjoyable the actual experience was. Urban dwellers do not correlate comfort and enjoyment with ease of use, but from the data appear to equate it directly with perceived usefulness.

The validation of the extended TAM model presents an opportunity to expand financial inclusion in South Africa. Banks should partner with supermarkets and the post office to offer a new business model to expand financial inclusion. This model should be based on a per transaction charge for customers and a per transaction commission for the intermediary. Intermediaries should further seek to ensure the commercial viability of offering the service by seeking to become a single payment window into the bottom of the pyramid customer. By expanding the range of complimentary services they can offer, transaction volumes would increase further reducing the unit cost of service provision. In order for intermediaries to remain viable and relevant they should adopt a multichannel

approach to service provision. By offering services though a range of channels such as ATM, Internet, mobile phones and self-service terminals they would be able to offer services tailored to customer needs and commercial demands. Such an approach would ensure that intermediaries remain relevant and mitigate the risk of being left behind as technology advanced.

7.1. Specific contribution of the work

The first contribution of the work was the identification of factors associated with being unbanked at the bottom of the pyramid in South Africa. The study found that being unbanked at the bottom of the pyramid was associated with age, education levels, language, primary source of income and number of dependents. Education was the most significant factor associated with being unbanked. The identification of factors associated with being unbanked allows the development of interventions targeting those specific factors as a way to improve financial inclusion.

The second contribution is that it has been shown that intermediaries such as the post office and supermarkets are viable intermediaries for the delivery of financial services to the bottom of the pyramid. Supermarkets were found to be more acceptable for delivery of financial services than the post office. The post office was found to be more acceptable than traditional banks. The finding indicates that using supermarkets and the post office to offer financial services in partnership with a bank maybe a significant method to improve financial inclusion at the bottom of the pyramid. For supermarkets the finding offers an approach to expand the range of services they offer customers and improve

returns. For the post office the finding provides one method for them to potential deal with decking revenue and a result of declining mail volumes.

The third contribution of the work is that an extended TAM model to explain adoption intention for technology enabled financial services at the bottom of the pyramid in South Africa has been validated. The model was able to account for over 90 percent of the behavioural intention of unbanked bottom of the pyramid people to use technology enabled financial services offered through an intermediary. The finding extends the utility of the TAM into a new field. The fourth specific contribution is the identification of two additional constructs, social and hedonistic that directly and indirectly influent adoption intention. The work extends the TAM model proposed by Davis (1989) through the addition of two constructs, social and hedonistic. Social constructs bring the role that others play in a person adoption intention. It highlights the important role that the opinion and influence of others can play in adoption decisions. The role of hedonistic highlights the importance of being comfortable and confident when using technology-enabled services. This finding compliments previous inclusions in the TAM that relate to self-confidence. The finding highlights that being comfortable in using a technology can have a direct and indirect effect on behavioural intention.

7.2. Research limitations

The first limitation is that the extended model of TAM and the original TAM model, measures behavioural intention and not actual usage. It is assumed in both the extended model of TAM and the original model that behavioural intention translates into actual usage. There has previous criticism of the TAM

because there has been no consistent testing of the relationship between behavioural intention and actual usage (Taylor and Todd, 1995). There is no certainty that behavioural intention will translate into actual usage. For this study it was not possible to measure actual usage, as financial services are currently not being provided at the bottom of the pyramid through an intermediary in South Africa.

The second limitation that the study has is that it has been conducted in South Africa. The role of cultural factors has previously been highlighted in research into the TAM (Mao and Palvia, 2006). It is therefore not certain that the results would be replicated in another country. Consequently the research findings, whilst applicable to South Africa, may not be readily applied in another country facing the same challenge of poverty and financial inclusion as South Africa.

A third limitation of the study was the use of a single intermediary to study the problem. The intermediary chosen as a proxy for intermediaries was the SAPO. The advantage of this approach is that it was possible to eliminate the nature of the intermediary as a variable in the study. If several intermediaries had been chosen the ability to compere the results from one region to another may have been compromised by inter intermediary differences. It would thus not have been possible to distinguish betweenoutcomes of the model and outcomes as a result of differences between regional intermediaries. The chosen approach allowed for the development of a model that could be generalized to the bottom of the pyramid population irrespective of region, language etc. The limitation is consequently the inability to see to what degree the intermediary itself affects the BI of the respondent. It is thus not known if the model would be applicable when

comparing between two small intermediaries who only have a regional presence, or to what degree the primary business of the intermediary affects behavioural intention.

7.3. Future scope of work

The work showed that while the model was invariant under gender, age and financial dependency it was not invariant under location. There was a clear difference between the findings for rural as opposed to urban dwellers. As much of the financially excluded and poor reside in rural areas in South Africa, a comparison of the extended TAM model between rural and urban dwellers would provide additional insights. Due to the small sample of urban, bottom of the pyramid unbanked people; it was not possible to compare the two groups. A larger sample of urban, unbaked bottom of the pyramid would enable a comparative study to be conducted. A comparative study of adoption of financial services through an intermediary at the bottom of the pyramid would further inform how such services are developed, marketed and sold between rural and urban populations.

One of the limitations of the work provides an opportunity for future work. A comparison was done in this study between the post office and national retail stores. it would be valuable to extend this to comparing which types of intermediary is best suited to delivering financial services at the bottom of the pyramid. A study comparing adoption propensity across a range of potential intermediaries would allow identification of those best suited to deliver financial services. Intermediaries that are more acceptable to bottom of the pyramid

customers would more likely receive more transactions that those whom customers are less disposed to. The work focussed on studying the bottom of the pyramid. It would be of interest to study the middle class, i.e. LSM 5-8. The work has validated the model for bottom of the pyramid customers. The benefits of lower cost, greater convince and increased accessibility is potentially beneficial to middle class consumers. A study comparing the models validity across the middle class would validate it for a broader section of the population and may indicate that banking through intermediaries has a wider application than servicing the bottom of the pyramid.