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VALIDATING A UTILITY AND TRUST IN MOBILE BANKING SCALE IN THE SOUTH AFRICAN CONTEXT

Abstract:

A widespread search of four large online academic databases, namely Sabinet Reference, EBSCOhost, Google Scholar and Emerald showed no evidence of a validated attitudes-towards-personal-financial-planning scale within the South African context. To fill this gap in the literature, the aim of this study was to describe the process undertaken to validate attitudes towards personal financial planning as a 13-factor structure within the South African context. The study followed a descriptive and single cross-sectional research design and used a survey self-administered questionnaire to collect the required data from a convenience sample of 334 Generation Y students registered at the campuses of two Gauteng-based public South African universities. The data analysis techniques comprised Pearson's product-moment correlation analysis, multicollinearity analysis, reliability measures and confirmatory factor analysis using the maximum likelihood method. The findings of the analysis validate that the proposed measurement model of utility and trust in mobile banking is a 13-factor structure that consists of attitudes towards mobile banking, perceived ease of use, perceived behavioural control, perceived self-efficacy, trust in mobile banking, perceived integrity of the mobile bank, perceived relative advantage, perceived compatibility, behavioural intention to use mobile banking, perceived structural assurance, perceived information quality, perceived system quality and subjective norms. In addition, the measurement model revealed evidence of internal-consistency reliability, composite reliability, construct, convergent, discriminant and nomological validity. Furthermore, the measurement model displayed no evidence of multicollinearity between the factors and the goodness-of-fit indices produced by AMOS suggested a well-fitting model.

Keywords:

Utility; trust; mobile banking; confirmatory factor analysis; South Africa

JEL Classification: G20, M31, O30

1. INTRODUCTION

Rapid changes in the technological environment, coupled with the globalisation of financial markets, force participants in the financial services domain, including retail banks to compete for increased revenue and market share (Akinci *et al.,* 2004). The entry of businesses offering financial services and products similar to banks further intensifies the competition in the financial services environment. Retail banking customers are therefore in a position to demand efficiency and flexibility in terms of their financial undertakings (Saunders & Cornett, 2006). As such, worldwide, retail banks are looking to digital banking channels, including mobile channels as the next revolutionary technology that will drive current and future revenues and enable a reduction in servicing cost while simultaneously upholding and enhancing customer service (Ernst & Young, 2015).

Advancements in mobile technologies and the continual increase of mobile devices, specifically mobile phones (Brand South Africa, 2012) has seen the retail banking sector globally witness a paradigm strategy shift in, and an increased appreciation of, the importance of mobile technology as a means of delivering banking services (Kesharwani & Radhakrishna, 2013). Mobile banking typically entails retail banks offering their services using the wireless Internet gateway (WIG) and the wireless application protocol (WAP) through mobile applications downloaded onto a customer's mobile device (Nel *et al.,* 2012). The diffusion and adoption of mobile banking have utility advantages for both retail banks and customers (Akinci *et al.,* 2004).

Retail banks offer mobile banking to benefit from both an operational and strategic perspective. Mobile banking improves a retail bank's distribution network to reach its customers (Tiwari & Buse, 2007). Furthermore, mobile banking present retail banks with the opportunity to connect with unbanked customers, including those from lower income markets (Selebalo, 2009), thereby expanding its market share (Ismail & Masinge, 2012). Moreover, mobile banking reduces a retail bank's branch overheads and transaction costs (Yu & Guo, 2008). In addition, mobile banking aids the facilitation of two-way communication between the retail bank and the customer, which, in turn, allow retail banks to create customer databases, which subsequently offer retail banks an additional advantage of providing its customers with personalised offering (Yang & Fang, 2004). The convergence of telecommunication and financial services present advantages and solutions for mobile banking customers as well (Nel & Raleting, 2012).

Mobile banking customers benefit from attractive business terms, such as lower banking fees and consistent service quality (Yu & Guo, 2008). Moreover, because mobile banking is inherently time and place independent (Lin, 2011), customers have direct access to their financial information and full control over their financial transactions, without having to visit a retail bank branch (Rotchanakitumnuai & Speece, 2003). Mobile money via

mobile phones offer customers the advantage of paying for a taxi fare, buying groceries at a local supermarket or sending money to friend or family member without having to carry physical money. Mobile banking therefore eliminates customers' fear of losing money and theft (Meyer, 2015). Although mobile banking has several utility advantages, it is cybernetic in nature and is generally associated with some degree of risk and uncertainty (Kim *et al.,* 2009). As such, it is important that retail banks invest considerable time and effort in fostering greater trust in mobile banking.

The use of any online technological innovation, including mobile banking increases the business' interpersonal distance from its customers, which may lead to certain trust concerns (Benamati & Serva, 2007). Moreover, mobile banking customers may experience fear and anxiety when using the mobile channel to satisfy their banking needs, particularly because of wireless transaction security issues such as insufficient encryption of short message services and the fact that personal data is shared (Lin, 2011; Zhou, 2011). The prominence of trust in mobile banking is expected, given that this mobile commerce platform involves the same, if not more, risks that are normally linked to any electronic commerce undertaking (Van Deventer *et al.,* 2017). Trust in mobile banking aids in mitigating these fears and risks and facilitates business transactions under uncertainty (Lin, 2011; Zhou, 2011). Evidence of these trust issues in the online environment has been apparent since the early days of the commercialisation of the Internet in the 1990s (Van Deventer *et al.,* 2017). For example, in 1998, McKnight *et al.* (1998) highlighted that fostering greater customer trust in the online environment is a costly and time consuming exercise.

Given the importance of utility and trust in mobile banking, it is essential that retail banks understand the utility and trust factors that influence customers' behavioural intention to use mobile banking. This requires having a valid and reliable multi-item scale for capturing utility and trust in mobile banking. The proposed measurement model was based on the decomposed theory of planned behaviour (DTPB), originally developed by Taylor and Todd (1995). This theory posits that attitude, subjective norms and perceived behavioural control may influence the behavioural intention to use a technology (Nor & Pearson, 2008). The attitudinal, normative and control beliefs are further decomposed into multi-dimensional factors. Attitude is decomposed into the utility factors of perceived ease of use, relative advantage and compatibility. Although this study did not decompose the normative beliefs, the DTPB decomposes subjective norms into peer and superior influences, whereas perceived behavioural control is decomposed into facilitating conditions (not measured in this study) and self-efficacy (Taylor & Todd, 1995). Acknowledging the importance of trust in the online environment, the Nor and Pearson (2008) Internet banking study extended the DTPB by including trust into the model. The trust factor was hypothesised as having a direct positive influence on behavioural intention and is decomposed into trust propensity, structural assurance, competency,

benevolence and integrity. For the purpose of this study, trust was decomposed into integrity, structural assurance, information quality and system quality. These four trust factors have proven to be valid measures of trust in mobile banking in other countries (Nor & Pearson, 2008; Zhou, 2011; Zhou, 2013)

While the dimensions of attitudes, perceived ease of use, perceived behavioural control, perceived self-efficacy, trust, perceived integrity, perceived relative advantage, perceived compatibility, behavioural intention, perceived structural assurance, perceived information quality, perceived system quality and subjective norms have demonstrated to be valid measures of utility and trust in Internet banking using the DTPB (Nor & Pearson, 2008), a widespread search of four large online academic databases, namely EBSCOhost, Emerald, Google Scholar and Sabinet Reference revealed no further evidence of a validated scale that measures utility and trust in the online environment applying the DTPB. Furthermore, these databases revealed no evidence of a validated utility-and-trust-in-mobile-banking scale that is based on the DTPB within the South African context.

2. PURPOSE OF THE STUDY AND RESEARCH QUESTION

To fill the gap in the literature, the aim of this study was to validate utility and trust in mobile banking as a 13-factor structure that consists of attitudes towards mobile banking, perceived ease of use, perceived behavioural control, perceived self-efficacy, trust in mobile banking, perceived integrity of the mobile bank, perceived relative advantage, perceived compatibility, behavioural intention to use mobile banking, perceived structural assurance, perceived information quality, perceived system quality and subjective norms amongst Generation Y students within the South African context. Generation Y students were deemed an appropriate sample to validate the utility-and-trust-in-mobile-banking scale for numerous reasons.

In generational studies, the youth are referred to as Generation Y (Eastman & Liu, 2012), and consists of those individuals that were born between 1986 and 2005 (Markert, 2004). In 2017, individuals of this cohort made up roughly 36 percent of South Africa's total population of 56.5 million people (Statistics South Africa, 2017). In terms of banking, many Generation Y customers are first-time bankers (KPMG South Africa, 2014) that not only drives digital finance services (IT news Africa, 2015), but also insists on having their banking needs satisfied through the latest innovations available on the market (KPMG South Africa, 2014). Customers of this cohort are early technology adopters, technologically astute and hyper-connected to each other (Deloitte, 2010), and prefer to take active control over their financial undertaking. As such, they also at ease with using self-service banking channels, including mobile banking (IT news Africa, 2015). This, in combination with this generational cohort paving the way forward in adopting all things mobile (Deloitte, 2010) and their significant size makes them a current and future market

segment of significant importance and value to retail banks and their mobile banking offerings. The Generation Y student cohort is a market segment of particular importance given the higher earning potential and social status generally associated with graduate education. Generation Y students are therefore often perceived as opinion leaders and trendsetters amongst their peers (Bevan-Dye & Akpojivi, 2016). As such, the research question addressed in this study is as follows:

- Is utility and trust in mobile banking amongst Generation Y students a 13-factor structure comprising attitudes towards mobile banking, perceived ease of use, perceived behavioural control, perceived self-efficacy, trust in mobile banking, perceived integrity of the mobile bank, perceived relative advantage, perceived compatibility, behavioural intention to use mobile banking, perceived structural assurance, perceived information quality, perceived system quality and subjective norms?

3. METHODOLOGY

3.1. Research design and approach

The research design followed in this study was descriptive and single cross-sectional in nature.

3.2. Sample

The population targeted for this study was delineated as Generation Y students aged between 18 and 24 years, enrolled at public higher education institutions (HEIs) in South Africa. The 26 registered South African public HEIs made up the sampling frame, which, using judgement sampling, was narrowed down to three HEI campuses located in the Gauteng province. Thereafter, a non-probability convenience sample of 450 students was selected, which was evenly split between the three campuses, leaving 150 students per campus. The size of this sample is in the range of other studies alike, such as Hanafizadeh *et al*. (2014) (sample size of 403) and Lee (2009) (sample size of 446).

3.3. Measurement instrument and data collection procedure

A self-administered questionnaire was used to survey the sampled participants. In line with the data required, the questionnaire included scaled items from two published studies that were adapted to reflect utility and trust in mobile banking. The Internet banking adoption scale (Nor & Pearson, 2011) was used to measure the participants' attitudes towards mobile banking, perceived ease of use, perceived behavioural control, perceived self-efficacy, trust in mobile banking, perceived integrity of the mobile bank,

perceived relative advantage, perceived compatibility, behavioural intention to use mobile banking, structural assurance concerning mobile banking and subjective norms. The initial trust in mobile banking scale (Zhou, 2011) was used to measure the participants' perceived information and system quality of mobile banking. While each factor consisted of three items, behavioural intention included five items. The 41-scaled responses were measured on a six-point Likert-type scale that ranged from strongly disagree (1) to strongly agree (6).

The questionnaire also included a section to gather demographic data of the participants as well as a cover letter. The cover letter provided clarity on the purpose of the study and assured the participants that their responses would be handled with due diligence and confidentiality.

With regards to the data collection procedure followed in this study, each of the three HEI campuses were contacted to request approval for questionnaire distribution to their students. After permission was given, student trained fieldworkers handed out the questionnaires employing the mall-intercept survey method to those students who willingly agreed to complete the questionnaire.

3.4. Data analysis

The IBM Statistical Package for Social Sciences (IBM SPSS) and Analysis of Moment Structures (AMOS), Version 25 were used to analyse the data. The data analysis methods included Pearson's product-moment correlation analysis, multicollinearity analysis, reliability measures and confirmatory factor analysis applying the maximum likelihood method.

4. RESULTS AND DISCUSSION

In total, 334 of the 450 questionnaires administered were complete and usable for further analysis, which gives this study a response rate of 74 percent. In accordance with the specified target population, the sample comprised participants between the ages of 18 and 24. The sample included fewer males than females and the majority originated from the black ethnic group. The sample included more participants from a traditional university (37%), followed by those who were from a comprehensive university (33%) and a university of technology (30%). All age groups specified in the target population were comprised in the sample. There were less male (42%) than female (58%) participants in the sample. The majority of the participants identified themselves as Africans (84%), followed by those who identified themselves as White (11%), Indian/Asian (2.7%) and Coloured (2.4%). Participants from each of South Africa's 11 official language groups and nine provinces made up the sample. A description of the sample is presented in Table 1.

Table 1. Sample description

	Percent (%)		Percent (%)		Percent (%)
Age		**Language**		**Province**	
18	6.9	Afrikaans	9.3	Eastern Cape	2.1
19	14.1	English	7.5	Free State	10.8
20	25.7	IsiNdebele	0.3	Gauteng	57.2
21	24.9	IsiXhosa	6.9	KwaZulu-Natal	2.7
22	14.4	IsiZulu	14.7	Limpopo	11.4
23	8.7	Sepedi	8.4	Mpumalanga	6.3
24	5.4	Sesotho	26.3	Northern Cape	0.6
Gender		Setswana	13.2	North-West	7.2
Female	58.1	SiSwati	3.9	Western Cape	1.8
Male	41.9	Tshivenda	4.5		
Ethnicity		Xitsonga	4.8		
Black/African	84.1				
Coloured	2.4				
Indian/Asian	2.7				
White	10.8				

To examine the nomological validity of the proposed measurement model and to evaluate whether there were any problems in terms of multicollinearity, a correlation matrix of Pearson's product-moment correlation coefficients was constructed. Table 2 delineates the correlation matrix.

Table 2: Correlation matrix

Latent factor[1]	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
F1												
F2	.33*											
F3	.53*	.37*										
F4	.49*	.46*	.52*									
F5	.57*	.44*	.53*	.62*								
F6	.26*	.24*	.36*	.32*	.47*							
F7	.49*	.33*	.40*	.48*	.52*	.32*						
F8	.53*	.44*	.48*	.49*	.63*	.35*	.69*					

[1] **F1** - Attitudes towards mobile banking **F2** - Perceived ease of use **F3** - Perceived behavioural control **F4** - Perceived self-efficacy **F5** - Trust in mobile banking **F6** - Perceived integrity **F7** - Perceived relative advantage **F8** - Perceived compatibility **F9** - Behavioural intention **F10** - Perceived structural assurance **F11** - Perceived information quality **F12** - Perceived system quality **F13** - Subjective norms

F9	.57*	.40*	.61*	.57*	.63*	.40*	.53*	.59*				
F10	.50*	.44*	.43*	.43*	.64*	.43*	.48*	.63*	.53*			
F11	.44*	.37*	.47*	.40*	.54*	.38*	.59*	.64*	.53*	.67*		
F12	.46*	.44*	.48*	.42*	.51*	.41*	.49*	.57*	.50*	.58*	.67*	
F13	.35*	.38*	.33*	.30*	.41*	.20*	.25*	.32*	.41*	.38*	.36*	.39*

* Statistically significant at p ≤ 0.01 (2-tailed)

The results in Table 2 shows that there is evidence of nomological validity given the statistically significant positive relationships between each of the latent factors of the proposed model (Hair et al., 2010). Furthermore, none of the correlation coefficients were above the suggested 0.80 cut-off level, which infers that there were no multicollinearity concerns (Field, 2009).

A 13-factor measurement model was specified for confirmatory factor analysis that included attitudes towards mobile banking (three indicators), perceived ease of use (three indicators), perceived behavioural control (three indicators), perceived self-efficacy (three indicators), trust in mobile banking (three indicators), perceived integrity of the mobile bank (three indicators), perceived relative advantage (three indicators), perceived compatibility (three indicators), behavioural intention to use mobile banking (three indicators), perceived structural assurance (three indicators), perceived information quality (three indicators), perceived system quality (three indicators) and subjective norms (three indicators). For model identification purposes, the first loading on each of the 13 latent factors was fixed at 1.0, which resulted in 780 distinct sample moments and 156 distinct parameters to estimate, leaving 624 degrees of freedom (df) based on an over-identified model.

The model was scrutinised for any problematic estimates, namely standardised loading estimates above 1.0 or below -1.0 and negative error variance estimates, commonly known as Heywood cases (Hair et al., 2010). Table 3 reports on the standardised loading estimates, error variance estimates, correlation coefficients, composite reliability (CR), average variance extracted (AVE), the square-root of the AVE (√AVE) as well as the Cronbach alpha (α) values.

Table 3: Measurement model estimates, construct reliability and validity, and correlation coefficients

Latent factor[2]	Standardised loading estimates	Error variance estimates	CR	AVE	√AVE	α	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
F1	.799	.638	.83	.62	.79	.83												
	.788	.621																
	.770	.594																
F2	.806	.650	.86	.67	.82	.86	.39											
	.810	.657																
	.831	.691																
F3	.788	.621	.84	.63	.79	.83	.63	.43										
	.801	.641																
	.790	.624																
F4	.807	.652	.78	.55	.74	.78	.61	.56	.65									
	.706	.498																
	.700	.490																
F5	.860	.740	.89	.73	.85	.89	.65	.50	.62	.74								
	.848	.720																
	.863	.744																
F6	.831	.691	.88	.71	.84	.88	.30	.28	.42	.38	.53							
	.872	.760																
	.815	.665																
F7	.896	.803	.93	.81	.90	.93	.55	.38	.46	.56	.57	.36						
	.923	.853																
	.873	.761																
F8	.803	.645	.88	.72	.85	.88	.61	.51	.58	.59	.71	.40	.74					
	.883	.779																
	.852	.726																
F9	.841	.708	.81	.60	.77	.78	.68	.44	.71	.70	.75	.43	.64	.68				
	.850	.723																
	.599	.359																
F10	.811	.658	.88	.72	.85	.88	.57	.50	.49	.50	.72	.50	.53	.70	.58			
	.907	.824																
	.818	.669																

[2] **F1** - Attitudes towards mobile banking **F2** - Perceived ease of use **F3** - Perceived behavioural control
F4 - Perceived self-efficacy **F5** - Trust in mobile banking **F6** - Perceived integrity **F7** - Perceived relative advantage
F8 - Perceived compatibility **F9** - Behavioural intention **F10** - Perceived structural assurance
F11 - Perceived information quality **F12** - Perceived system quality **F13** - Subjective norms

F11	.865	.748	.89	.73	.86	.89	.50	.42	.54	.48	.60	.43	.65	.71	.62	.76		
	.872	.761																
	.826	.683																
F12	.811	.658	.74	.50	.71	.73	.56	.53	.58	.57	.64	.48	.60	.73	.62	.74	.68	
	.740	.547																
	.513	.264																
F13	.814	.663	.88	.72	.85	.88	.41	.43	.37	.36	.46	.21	.28	.37	.47	.44	.40	.43
	.918	.843																
	.806	.650																

As shown in Table 3, no problematic estimates were observed. Furthermore, each latent factor computed a Cronbach alpha (α) value above the 0.60 level and a CR value above the 0.70 level which suggests that the factors exhibit internal-consistency reliability and composite reliability. There is evidence of construct validity given that all the standardised loading estimates exceeded the 0.50 cut-off level (Malhotra, 2010). In terms of convergent validity, all the AVE values were calculated at the cut-off level of 0.50. There is also evidence of discriminant validity given that none of the correlation coefficients for each respective factor was larger than its square-root of the AVE value (Hair et al., 2010).

To assess the fit of the model, a number of fit indices were used, including the chi-square statistic, the standardised root mean residual (SRMR), the root mean square error of approximation (RMSEA), the incremental fit index (IFI), comparative fit index (CFI) and the Tucker-Lewis index (TLI). For good model fit, the chi-square value should be non-significant, and the IFI, CFI and TLI values should be equal to or greater than 0.95. In addition, the SRMR value should be 0.05 or lower and the RMSEA value 0.08 or less (Byrne, 2010).

The measurement model computed a significant chi-square statistic [(1167.778 (df = 624, $p < 0.000$)]. Although this statistic suggests poor fit, it is well-known for being highly sensitised to sample size (Byrne, 2010; Malhotra, 2010). The other fit indices, however, proposed a well-fitting model with SRMR = 0.04, RMSEA = 0.05, IFI = 0.94, TLI = 0.93 and CFI = 0.94.

Since the specified measurement model was found to be a well-fitting model that showed acceptable internal-consistency reliability, composite reliability, as well as convergent and discriminant validity, it may be considered suitable to test a structural model. Grounded on the DTPB, the proposed structural model will seek to determine whether ease of use, relative advantage and compatibility have a direct positive influence on attitudes towards mobile banking, and whether attitudes towards mobile banking, in turn, have a direct positive influence on the behavioural intention to use mobile banking. Moreover, the model will test whether subjective norms have a direct positive influence on behavioural intention to use mobile banking. Furthermore, the model will determine whether self-

efficacy has a direct positive influence on perceived behavioural control, and whether perceived behavioural control, in turn, has a direct positive influence on behavioural intention to use mobile banking. Finally, the model will seek to test whether the integrity of the mobile bank, structural assurances, information and system quality have a direct positive influence on trust in mobile banking, and whether trust in mobile banking, in turn, has a direct positive influence on behavioural intention to use mobile banking.

5. LIMITATIONS AND FUTURE RESEARCH

Great care should be taken in interpreting and generalising the results of this study. This is because a non-probability convenience sampling method was used. As previously mentioned, the research this study's research design was single cross-sectional in nature. As such, only a snapshot in time is provided. Following a longitudinal research design could offer more accurate information and is therefore recommended for future research.

6. CONCLUSION

This study sought to determine whether utility and trust in mobile banking is a 13-factor structure. The results of the confirmatory factor analysis using a Generation Y student sample validated that utility and trust in mobile banking is a 13-factor structure that consists of attitudes towards mobile banking, perceived ease of use, perceived behavioural control, perceived self-efficacy, trust in mobile banking, perceived integrity of the mobile bank, perceived relative advantage, perceived compatibility, behavioural intention to use mobile banking, perceived structural assurance, perceived information quality, perceived system quality and subjective norms. The measurement model exhibited internal-consistency reliability, composite reliability, as well as construct, convergent and discriminant validity. Furthermore, the measurement model revealed no evidence of multicollinearity between the factors. In addition, the model fit indices were suggestive of good model fit. As such, the results of this study suggest that this 13-factor model is a valid measure of utility and trust in mobile banking and is deemed the first validated utility-and-trust-in-mobile-banking scale based on the DTPB within the South African context.

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