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# The moderating effect of gender in the adoption of mobile banking

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## Abstract

**Purpose** – This paper seeks to test the factors that can influence adoption of mobile banking among current users of internet banking in Singapore and gender as a moderating variable.

**Design/ methodology/ approach** – A sample of more than 600 current users of electronic banking provided opinions about their intention to use mobile banking, perceptions of relative advantage of the mobile device, perception of risk, social norms, ease of use and usefulness of the device for banking purposes. The data were submitted to LISREL for structural equation modeling.

**Findings** – Usefulness, social norms and social risk, in this order, are the factors that influence the intention to adopt mobile banking services the most. Ease of use has a stronger influence on female respondents than male, whereas relative advantage has a stronger effect on perception of usefulness on male respondents. Social norms (or the importance of others in the decision), also influence adoption more strongly among female respondents than male.

**Research limitations/implications** – The sample is biased towards people who are currently using internet for banking. However, mobile banking innovators may not come mainly from current users of internet banking.

**Practical implications** – Since gender plays a moderating role in the perception of ease of use, social norms and relative advantage, companies are advised to target their communication tactics according to gender. Social norm is more important to females than males as well as ease of use, whereas, relative advantage is more important for males.

**Originality/ value** – The study purposefully uses gender as a moderator and risk as an independent variable not often considered in previous studies.

**Keywords** Mobile communication systems, Banking, Gender, Singapore

**Paper type** Research paper

As technology develops, both financial institutions and consumers are taking advantage of the efficiencies it brings. On the one hand, the cost of a financial transaction is becoming lower when using an electronic device than at a bank branch (Garcia-Alba *et al.*, n.d.) and the new technology provides consumers with the convenience to obtain a financial service wherever they may find themselves provided mobile communication exists (The World Bank, 2009). If consumers value this mobility, it is possible that consumers who are presently transacting online via a PC may also move to transacting via a mobile device. After all, consumers prefer (evidence suggest) to obtain their services from various channels rather than a single one (Howcroft *et al.*, 2002).

Despite the wide adoption of mobile phones in several countries around the world, (already 70 percent in Korea, 95 percent in Finland, more than 40 million subscribers in India, and more than 300 million in China, Gillespie (2007) estimated that only half of the current internet banking users would begin to use the mobile service by 2010.



Kwiatkowski (2010) confirms the prediction by reporting that up to now “usage of mobile banking is decidedly low, even within developed markets where mobile devices have become nearly ubiquitous (Western Europe and North America)”. Consumer skepticism about mobile banking – Gillespie indicated in 2007 – is driven by lack of availability, poor wireless product quality (compared to the wired world) and insufficient technology. However, technological innovations today have made it possible to overcome some of these limitations (The World Bank, 2009).

Notwithstanding this bleak outlook, more and more banks are offering mobile banking services via Third Generation (3G) mobile phones (Howarth, 2008) and wireless application protocols (WAP) since customers look for convenience and alternative modes to complete their banking transactions.

This study seeks to test the factors that can influence adoption of mobile banking among current users of internet banking in Singapore, more specifically it investigates the role of gender as a moderating variable. This paper is structured as follows: First, the mobile banking literature is described and discussed. Second, the adoption model to be tested is justified and explained. The third and fourth sections explain the methodology used and the findings respectively. The paper concludes with a discussion and implications of the findings.

### Mobile banking

Mobile banking, is used in this paper to mean electronic banking that uses mobile phone technology (or other wireless devices) to deliver electronic financial services to consumers. It has been taunted as a powerful new marketing and CRM tool for financial services companies (Sinisalo *et al.*, 2007). This is particularly true because there are more phones than PCs in the market; mobile phones make it simple to communicate with the target market and establish a stronger relationship as banks provide market compelling-needed services (The World Bank, 2009). Also, mobile devices improve the quality of the service because clients can perform transactions at their convenience wherever and whenever they want it (Laukkanen, 2007) provided there is a connection. Thus, a mobile bank service can foster stronger relationships to the existing ones between financial institutions and clients.

Early studies on adoption of mobile banking have not been encouraging. In a survey of 1,243 Finnish non users, occasional users and current users of mobile banking, Suoranta and Mattila (2004) reported that about only half of current users of mobile banking, regardless of age differences, intended to continue to use the delivery service. Among the occasional users group, those with income level less than 50,000 Euros per year were more willing to begin usage than wealthier people, contrary to what some earlier studies on internet banking had found. Interesting also is the finding that in the current non-user group the most eager to begin using the services are older people 50 years of age and above.

As in previous research on mobile commerce, several researchers have applied statistical models combining elements of theory of innovation (Rogers, 1983), theory of planned behavior and the technology acceptance model to predict the adoption of mobile banking. Among the various factors determining adoption are: levels of perceived risk (Chung and Kwon, 2009; Donner and Tellez, 2008), security, interaction (Yu and Fang, 2009), perceived uncertainty (Laukkanen, 2007), perceived usefulness, ease of use, credibility, self efficacy, perceived system quality (Kleijnen *et al.*, 2004;

Luarn and Lin, 2005), experience (Chung and Kwon, 2009) and financial cost (Yang, 2005), time saving (Laukkanen, 2007; Yang, 2005).

Several factors are found to moderate attitude towards intention to adopt mobile banking namely age, computer skills, mobile technology readiness, and social influence (Kleijnen *et al.*, 2004). Age strengthens perceived usefulness, perceived costs and perceived system quality. Attitude is attenuated by computer skills, mobile technology readiness and social influence. Technical support interacts with perceived usefulness of the services, thus intention to use increases when companies provide technical support (Chung and Kwon, 2009).

There is no much research on the moderating impact of gender in mobile banking adoption up to now. Wan *et al.* (2005) found that males were more inclined to adopt bank technology than females, thus supporting (Pijpers *et al.*, 2001) previous finding that males are more positive about m-commerce than females. Yang (2005), in an exploratory study of m-commerce, found that gender influences perceived ease of use and usefulness but in a negative way, contrary to expectations. In relation to mobile banking, it has been found that females are more concerned by security issues than males, whereas males pay more attention to effectiveness (Amin *et al.*, 2006).

Despite all the benefits, consumers have been reluctant to adopt mobile banking services, in part because customers have grown comfortable with already a low cost service online (Kwiatkowski, 2010) and because of inferior user experience compared with fixed internet (Gillespie, 2007). Recently, based on a study by KPMG of more than 4,000 people in 19 countries, Seidel (2009) reported that an impressive majority (91 percent) of US respondents had never tried conducting banking through a mobile device.

Empirical studies investigating mobile technology adoption are still scarce, especially in relation to mobile banking. Several of the studies cited in this review may not be robust enough because of small sample size for a chosen methodology, perhaps they lack power (none reports it). Our study overcomes some of these shortcomings. The proposed adoption model is described and justified next.

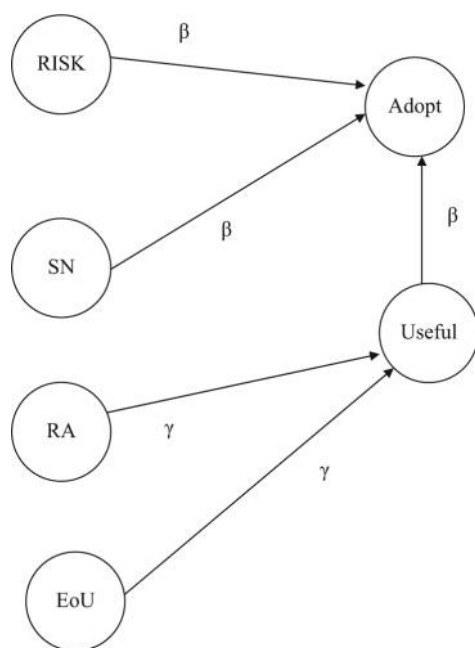
### Model justification

The research model proposed and described in Figure 1 draws from two theoretical frameworks to justify the various predictors of adoption of mobile banking. We use perceived ease of use, perceived usefulness and subjective norms from the technology acceptance model (Davis, 1989) and its expanded version (Venkatesh and Davis, 1996) as they have been recurrently found to be good predictors in adoption of technology studies. We also make use of the theory of innovation diffusion (Rogers, 1983) to select relative advantage of the application and perception of risk. These two factors, in addition to perceive usefulness, are posited to have a direct influence on the prediction of mobile banking adoption. Relative advantage and perceived ease of use are assumed to influence the perception of usefulness of mobile banking.

The next section explains each of the factors and its justification as explanatory variables of intention to adopt mobile banking.

### *Perception of risk*

Some technology adoption studies provide evidence that the individual's perception of risk is important in considering acquiring a new technology or services (Laforet and Li,



**Figure 1.**  
Basic structural model

2005; Yang, 2009). Lovelock *et al.* (2001) found both, willingness and adoption of technology-enabled service delivery are highest where the risk of using it is low. In relation to mobile commerce Wu and Wang (2005), found a statistically significant effect of perceived risk and intention to use mobile commerce in Taiwan.

The risk factor may be even more important in relation to mobile devices because mobility increases the threat of security violations resulting from the required infrastructure for wireless applications. The greater risk occurs because there are more points in the telecommunication process between mobile phones than between fixed devices (Corradi *et al.*, 2001). The risk associated with mobile phone applications may also be perceived as greater due to the potential for loss or theft of a mobile device. It has been reported that over 62,000 mobile phones were left in London taxis during the first half of 2001 (Coursaris *et al.*, 2003). All of the above lead us to conjecture that:

- H1.* The higher the perception of risk of mobile banking the lower the intention to adopt it.

#### *Perceived ease of use*

There has been extensive research indicating a strong influence of perceived ease of use of a technology and its adoption (Davis, 1989; Luarn and Lin, 2005; Venkatesh and Davis, 1996, 2000; Wang and Liao, 2007). This factor is posited as influencing the adoption of mobile banking because of the higher complexity in using a small device to conduct banking transactions:

- H2.* The higher the perceived ease of use of the mobile device for banking transactions, the higher the intention to adopt it or use it.

### *Perceived usefulness*

This is another factor of which there is recurrent evidence of its importance not only in regard of the adoption of information systems and computing (Venkatesh and Davis, 1996, 2000; Venkatesh and Morris, 2000), but also in mobile commerce (Wang *et al.*, 2006). In the mobile banking context we hypothesize that:

- H3. If consumers find it useful (especially now having electronic banking already accessible) the higher the intention to adopt mobile banking services.

### *Relative competitive advantage*

Relative advantage is defined as “the degree to which an innovation is perceived to be better than the idea it supersedes” (Karayanni, 2003; Rogers, 1983). One must bear in mind that simply replacing proven electronic debit and credit card transactions for mobile payments may not be perceived as adding any value to consumers’ shopping experience, thus adoption of wireless device for this purpose may not happen.

There is evidence to suggest that when users perceive a relative advantage of the new technology over the old one they are more prone to adopt it (Lee *et al.*, 2003; Leung, 2003; Rogers, 1983). In the USA, mobile phone adoption has fallen behind Europe and Asia mainly –some speculate – because of Americans’ infatuation with the PC (Williams, 2000). The small screen on a mobile phone does not seem to be attractive when the basis for comparison is the PC monitor.

Notwithstanding the above comparison, mobile phones have some advantages over fixed phones and PC with respect to some activities. For example, mobile phones eliminate the need to queue up for public phones, to purchase tickets, to be in communication wherever the person is, etc. The following hypothesis is derived from the preceding evidence:

- H4. The higher the perceived relative advantage of mobile banking over electronic banking, the higher the intention to adopt it.

### *Social norms*

Social norms are factors that relate to the influence of significant others such as family, relatives, or friends, in the decision to use a product or service. Pedersen and Ling (2002) suggested that external and social influence cannot be ignored in any adoption model because of their contribution to adoption behavior. Social Norms have been validated in studies such as e-mail usage (Karahana and Limayem, 2000), wireless finance adoption (Kleijnen *et al.*, 2004), and internet banking (Chan and Lu, 2004). Therefore it is hypothesized that:

- H5. Social norms have a positive and direct effect on mobile banking adoption.

### **Research method**

The sample was drawn from the population of Singapore that was currently using internet banking. The majority had been operating an internet banking account for less than a year and half of them operated the account at least once a week. In terms of gender 46.7 percent were male. The respondents were intercepted and asked to respond a brief questionnaire containing 23 statements measuring the various constructs under study on a seven-point scale. The total sample size used in the study was 681. The

items to measure the constructs were borrowed from previously published studies, and they are listed in Table I.

### Data analysis

Data analysis took place in different phases. First, we performed internal consistency reliability and – given that it has been noted elsewhere that this is necessary but not sufficient a condition for convergent validity (Schwab, 1980) – we also measured convergent and discriminant validity in various forms.

The survey data, pooled across all sites were subjected to various scale-reduction and refinement analyses. This procedure is explained below.

#### *Exploratory factor analysis*

The data on the full 23-item battery were analyzed using an iterative scale purification process consistent with Churchill and Suprenant (1982) paradigm performing a sequence of exploratory factor analysis (EFA) discriminant and reliability measures using SPSS. The criteria for factor extractions were maximum likelihood with Oblimin rotation. This extraction method represents a high quality decision to understand latent (unobserved) variables that account for relationships among measured variables (Heeler *et al.*, 1977).

Results from the EFA extracted six factors explaining 68.6 percent of the variance. In total 16 variables remained for the confirmatory factor analysis (CFA) in the second stage. They are distributed in the following manner: adoption (two items), social acceptability (three items), usefulness (three items), risk (three items), ease of use (three items), and relative advantage (two items).

#### *CFA*

We performed CFA on LISREL V8.72 to test if the first order six-factor model, suggested in the exploratory factor analysis and considered originally in the scale development, fitted the data. Once the measurement model was tested for its goodness of fit we proceeded to test the hypothesized structural model.

### Findings and discussion

#### *Discriminant validity*

Discriminant validity assesses the extent to which a concept and its indicators differ from another concept and its indicators (Davis *et al.*, 1989). Although there is no firm rule for discriminant validity, correlations with other constructs less than |0.7| are frequently accepted as evidence of discriminant validity although 0.90 has also been suggested (Davis *et al.*, 1989). Correlations among the first order construct ranged between – 0.08 to 0.73 and are below the suggested cut off value of 0.90, demonstrating that the factors are distinct from one another. Please see Table II for the correlation matrix. However, given that the correlation between ease of use and usefulness was 0.73 we tested two measurement models, one with the target correlation fixed at 1, and a second with this correlation free and used a single-degree-of-freedom. The chi square ( $X^2$ ) calculated was 518.54 and with 1 degree of freedom the difference is statistically significant at  $p = 0.000$ . This result suggests the correlation is not 1, therefore the constructs are correlationally distinct, thus suggesting discriminant validity.

	Very strongly disagree	Very strongly agree
I think that the use of a mobile phone for banking transactions is risky	<input type="checkbox"/>	<input type="checkbox"/>
I have serious doubts that the banking transactions performed on a mobile phone will work satisfactorily	<input type="checkbox"/>	<input type="checkbox"/>
Conducting banking transactions on mobile phones is risky because one can easily lose or misplace the mobile phone	<input type="checkbox"/>	<input type="checkbox"/>
It is risky to transmit and store information related to banking transactions on a mobile phone	<input type="checkbox"/>	<input type="checkbox"/>
A banking transaction via a mobile phone is dependable	<input type="checkbox"/>	<input type="checkbox"/>
A mobile phone for banking transactions offers more advantages than a PC	<input type="checkbox"/>	<input type="checkbox"/>
A mobile phone is more convenient than a PC to conduct banking transactions	<input type="checkbox"/>	<input type="checkbox"/>
Banking transactions on a mobile phone would eliminate time and space constraints that I otherwise would have when I transact on a PC	<input type="checkbox"/>	<input type="checkbox"/>
A mobile phone is not a good substitute of a PC to conduct banking transactions	<input type="checkbox"/>	<input type="checkbox"/>
A mobile phone would be easy to use to conduct banking transactions	<input type="checkbox"/>	<input type="checkbox"/>
It would be easy for me to remember how to conduct banking transactions on a mobile phone	<input type="checkbox"/>	<input type="checkbox"/>
I believe it would be easy to get the mobile phone to do banking transactions	<input type="checkbox"/>	<input type="checkbox"/>
Conducting banking transactions on a mobile phone would be an easy thing to do	<input type="checkbox"/>	<input type="checkbox"/>
If banking transactions on a mobile phone were available at my bank I would adopt it straight away	<input type="checkbox"/>	<input type="checkbox"/>
If banking transactions on a mobile phone were available at my bank I would use it regularly	<input type="checkbox"/>	<input type="checkbox"/>
If banking transactions on a mobile phone were available at my bank I would adopt it mainly for information search (not for transaction purposes)	<input type="checkbox"/>	<input type="checkbox"/>
A mobile phone would make it easier for me to conduct banking transactions	<input type="checkbox"/>	<input type="checkbox"/>
A mobile phone would be useful for me to conduct banking transactions	<input type="checkbox"/>	<input type="checkbox"/>
A mobile phone would be useful for me to eliminate the constraints of time and space when conducting banking transactions	<input type="checkbox"/>	<input type="checkbox"/>
A mobile phone would give me greater control over my banking transactions	<input type="checkbox"/>	<input type="checkbox"/>
If I adopted a mobile phone for banking transactions, it would give a higher status among colleagues	<input type="checkbox"/>	<input type="checkbox"/>
If I were to adopt a mobile phone for banking transactions, I would be more prestigious among my peers than those who have not adopted it	<input type="checkbox"/>	<input type="checkbox"/>
It would be trendy if I adopted a mobile phone for banking transactions	<input type="checkbox"/>	<input type="checkbox"/>

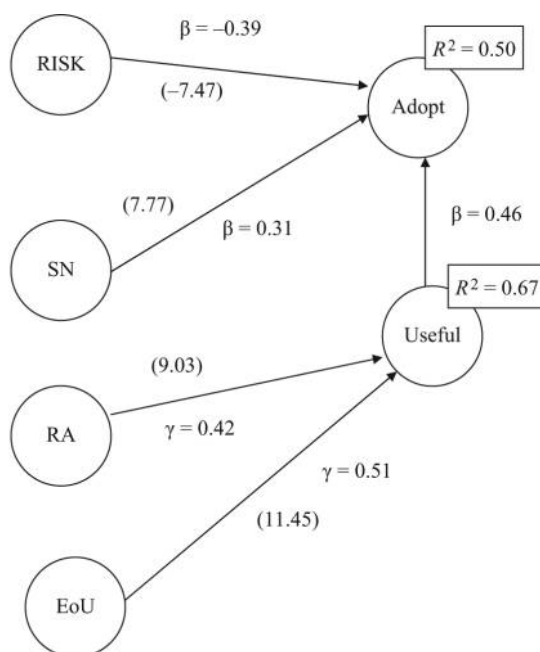
*Reliability and convergent validity*

Convergent validity was demonstrated in several ways: statistical significance of paths ( $t$ -values ranged from  $-7.48$  to  $12.36$ ), item lambda coefficient (range between  $0.74$  and  $0.90$ ), and ratio of path loading to standard error. Path loadings were greater than twice their standard errors (from  $0.039$  to  $0.054$ ) all these corroborating convergent validity. Please see Figure 2 for a description of the values summarized before.

Composite reliability is also provided as a measure of construct reliability, that is, the degree to which items are free from random error and therefore render consistent results. Composite reliability over the cut off point of  $.70$  are suggested in the literature (Hair *et al.*, 1992; Schwab, 1980). These were calculated following the formula  $(\sum \lambda)^2 / [(\sum \lambda)^2 + \sum \theta]$ .

	Risk	Ease of use	Adoption	Usefulness	Relative advantage
Risk					
Ease of use	$-0.10$				
Adoption	$-0.38$	$0.52$			
Usefulness	$-0.08$	$0.73$	$0.54$		
Relative advantage	$0.11$	$0.54$	$0.33$	$0.70$	
Social norms	$-0.21$	$0.27$	$0.46$	$0.23$	$0.10$

**Table II.**  
Construct correlation  
matrix



**Notes:** Chi-square =  $184.23$ ;  $df = 79$ ;  $p$ -value =  $0.00000$ ; RMSEA =  $0.046$   
( $t$ -values in parentheses)

**Figure 2.**  
Results for structural  
model

Composite reliabilities ranged from 0.78 to 0.90. Average variance extracted (AVE) was also measured to inform about the amount of variance accounted by the hypothesized factors. The AVE ranged from 0.62 to 0.82 with the majority of them above the recommended minimum of 0.50 (Hair *et al.*, 1992). Please see the specific values for each factor in Table III.

The results of the CFA of the six-factor measurement model are summarized in the second column of Table IV and contrasted with recommended indices on the first column.

These indices provide an indication of a good fit when compared to the recommended indices such as RMSEA < 0.05; SRMR < 0.05, parsimony and goodness of fit indices (NNFI, IFI, CFI) > 0.95, and the replication of the model across other samples (ECVI).

### Structural model

The goodness of fit indices in Table IV in the third column indicate that the structural model fits the data quite well. Further results of the structural model are provided in Figure 2. All hypothetical links are statistically significant and appear to be in the right direction. Risk was hypothesized to have a negative influence on intention to adopt mobile banking and this has proved to be the case. *T*-values range from 9.03 to 11.45 for the gamma ( $\gamma$ ) and from 2.36 to 7.7 for the beta ( $\beta$ ), all statistically significant. As proposed in the model, relative advantage and ease of use influence perception of usefulness. The former has a contribution of  $\beta = 0.43$  and the latter  $\beta = 0.51$ . These two constructs account for 67 percent of the variance of usefulness. In turn usefulness influences the intention to adopt mobile banking together with risk and social norms. Usefulness contributes ( $\beta = 0.46$ ) more than risk ( $\beta = -0.39$ ) and social norms

**Table III.**

Composite reliabilities (CR) and average variance extracted (AVE)

Construct	CR	AVE
Risk	0.83	0.62
Ease of use	0.89	0.73
Relative advantage	0.78	0.64
Adoption	0.88	0.82
Usefulness	0.90	0.77
Social norms	0.90	0.82

**Table IV.**

Fit indices of measurement model and structural model

Fit indices (recommended)	Measurement model	Structural model
$\chi^2 = \text{ / (df)} \leq 3.00$	$\chi^2 = 235.2/$ (df = 75) = 3.13 $P = 0.0000$	$\chi^2 184.23/$ 79 = 2.33 $P = 0.0000$
RMSEA = 0.05	0.033	0.046
<i>p</i> -value for test close of fit = 0.50	0.10	0.73
NNFI = 0.95	NNFI = 0.99	0.98
CFI = 0.95	CFI = 0.99	0.99
IFI = 0.95	IFI = 0.99	0.97
SRMR = 0.05	SRMR = 0.037	0.038
ECVI tested model; saturated model; independent model	0.48; 0.35; 16.34	0.43; 0.39; 14.58

( $\beta = 0.31$ ). These three constructs account for 50 percent of the explained variance of intention to adopt. Indirectly, ease of use contributes an additional 0.24 to explaining adoption and relative advantage 0.20.

The last analysis of the data was performed to determine the effect of gender as a moderator of adoption. We followed a systematic approach by testing a series of hierarchical hypotheses as suggested by Bollen (1989). We first determined if the covariance structures were invariant across gender. The result of this comparison was positive (difference  $X^2 = 591.75$  (df = 25)  $p$  value = 0.0000) therefore we proceeded to test for invariance in factor patterns and regression weights. We found statistically significant ( $p = 0.00$ ) moderated effects in the factors social norms, ease of use and relative advantage. The influence of social norms ( $\beta = 0.36$ ) on intention to adopt, and ease of use ( $\gamma = 0.63$ ) on perception of usefulness were stronger among women than men ( $\gamma = 0.26$  and  $\gamma = 0.36$  respectively). In other words, ease of use influences more the perception of usefulness among women than men. The perception of the factor relative advantage ( $\gamma = 0.62$ ) influences more strongly the perception of usefulness among men versus women ( $\gamma = 0.27$ ).

An important issue in research design involves the determination of sample size necessary to achieve adequate power for detecting when hypotheses are false. In order to estimate power for our model we have used Table 2 of MacCallum *et al.* (1996). For a model with 80 degrees of freedom (ours has 79) and a sample of 500 (ours has 618), the power estimate for the test of exact fit is 1.0 and for the test of close fit is 1.0. For the test of close fit  $\rightarrow_0 = 0.05$  and  $\rightarrow_a = 0.08$  are considered where  $\rightarrow_0$  is the null value of the RMSEA. Thus both power estimates indicate that our analysis is sufficiently powerful considering that the recommended value is 0.80.

## Discussion

Recent studies on adoption of mobile banking have attempted to explain the factors that influence the intention to adopt it. We have created a parsimonious model of technology acceptance that includes the risk factor because of the nature of the use of the service and gender as moderator. Our research shows that it was correct to include both risk and gender as complementary variables of the TAM. Perception of risk is negatively associated with intention to adopt mobile phones for banking purposes.

From our findings we deduce that usefulness, social norms and social risk, in this order, are the factors that influence the most the intention to adopt mobile banking services. Relative advantage and ease of use contribute indirectly through the perception of usefulness. Interestingly, female users of mobile phones that have conducted electronic banking perceive that ease of use leads to perception of more usefulness of the device to conduct banking services. This confirms previous studies that have shown a direct influence of such factor (Davis, 1989; Luarn and Lin, 2005). Social norms (image and approval from others) exert a high influence on intention to adopt as well. It appears that male customers are more inclined to see if there is a relative advantage in the technology to judge its usefulness. Our study corroborates Amin *et al.*'s (2006) finding that male, undergraduate students, were slightly more inclined to see mobile phones as a practical device for banking purposes. Gender had a moderated effect on social norms, perception of ease of use and usefulness but not risk. Thus, risk seems to be relevant for both groups and it is an aspect that needs to be addressed especially in the use of mobile phones in banking. Our study supports the view that before embarking on the question

of extending m-commerce facilities, it is necessary to understand the risks involved and perceived by consumers (Chakrabarty, 2009).

Our findings suggest that marketing practices may need to be different for the two groups. The social influence appears to be more relevant among women than men, and at the same time, ease of use is more an issue for females. A previous study on various perception of risks identified one type called "seclusion risk" or the risk of being excluded from adopting a technology because of its complexity (Lee *et al.*, 2003).

Although the model is parsimonious we believe it still has the weakness of not being explained more than half the variance. In other words, there is still another 50 percent not explained by the chosen factors. Perhaps it is necessary to incorporate other traditional and non-traditional variables in technology acceptance models for example self-efficacy and cost of the mobile banking service. We have assumed in this study that because the respondents already conduct banking transactions online, they are conversant with technological devices therefore a factor such as self-efficacy might not be relevant. This may not necessarily be the case when we deal with mobile banking because the device is much smaller than a PC therefore the skills may be different. Self-efficacy has proved to be important in some technologically relevant products (Wang *et al.*, 2006). It is also possible that previous use of other electronic banking services (apart from internet banking) such as phone bill paying, could help explain more the adoption of mobile banking. Suoranta and Mattila (2004), in a survey of Finnish consumers, concluded that "mobile banking innovators" may not come from current users of internet banking. internet banking users will probably stick to the wired services.

### Recommendation

Consumers in general have different preferences for channels of distribution therefore banks that offer the more alternative channels will catch a greater number of consumers.

In particular, to attract consumers to use their wireless device for banking services, banks may emphasize how easy an operation on a mobile phone is among females. Males perhaps need to be persuaded to use the service by emphasizing the functionality specifically, the relative advantage of using this alternative channel.

Social norms, or the influence of others, seem to affect more females, therefore marketing communication may emphasize the inclusiveness of the use of mobile phone together with the ease of use otherwise females may exclude themselves from the mobile banking service because they perceive it too complex.

Of all factors, perception of usefulness plays the most determining role in the adoption of banking services. Hence it is recommended to provide clues about how useful it is to be connected wireless to conduct banking transactions from wherever one is, and at whatever time one finds convenient.

### Future study

Our study, in its present form, did not explore alternative models of mobile banking adoption. Given the existence and use of various models TAM, TRA, TPB, innovation diffusion and among researchers, it may be advisable at this point to test which of the models provides the best explanation of the technology adoption for mobile banking purposes.

As in the majority of the quantitative studies, we believe that concepts can be measured by including statements that reflect the concept. This may seem easy but not

precise. For example, consumers may have a different interpretation of what “usefulness” is all about. This concept may have multiple dimensions and some of these may even overlap thus making a differentiation of concepts difficult. In this regard, a qualitative study may inform better as to what extent the measures, researchers have used, actually capture the whole spectrum of a concept.

In our study we have not made differentiations in terms of the banking services. Not all services may be perceived with the same risk thus it may be important to apply a model with a particular service in mind. For example, bank transfers between accounts may not be perceived in the same way as using bank services for information purposes only.

## Conclusions

The mobile phone has become an indispensable tool for consumers since they carry it all over the places, as important as a purse or a wallet. Perhaps in the near future, the wallet will be replaced by a mobile phone for all transactions purposes.

The research study aimed at assessing the moderating influence of gender and the perception of several factors on the intention to use a mobile device for banking transactions. The perceived usefulness of the device was found to be the most relevant factor in predicting intention to use, followed by social norms and perception of risk. This last factor, as expected, affects negatively the intention to use. In other words, the higher the perception of risk of the device the less consumers intend to adopt the technology.

Gender, as posited, moderates the effect of intention to adopt mobile banking by influencing social norms, perception of ease of use and perception of usefulness.

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