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Mobile banking services adoption in Pakistan: are there gender differences?

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Mobile banking services adoption in Pakistan: are there gender differences?

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Mobile banking services adoption in Pakistan: are there gender differences?

Abstract:

Purpose — This study provides comprehensive insight into the deciding factors affecting an individual's intention to adopt mobile banking (m-banking) services in Pakistan.

Design/methodology/approach — A survey approach was used with a sample of 189 responses from across Pakistan. Multi-group analysis was performed in order to detect gender differences among men and women in the process of adopting m-banking.

Findings — The paper found support for the positive effect of perceived behavioral control (PBC) and attitudes (ATT) toward m-banking adoption intentions. Significant differences between men and women were found to affect social norms (SN) on adoption intention, even though the combined sample of men and women was insignificant. The effect of SN on m-banking adoption is stronger for women than for men. Interestingly, our paper provides contradictory findings on the role of PBC on adoption intention. The effect of PBC on m-banking adoption intention was found to be significantly stronger for men than for women.

Practical implications — The results present implications of consumer behavior and marketing communication for bank marketing. Although men and women do not differ in their ATT towards m-banking service adoption in general, the succinct nuance between men and women in terms of the influence of SN and PBC with adoption intention calls for a strategic reorientation of how men and women as consumers of m-banking services should be appropriately segmented, targeted and communicated to. The formulation of marketing strategies to target potential consumers and to reinforce the usefulness of m-banking to existing consumers should not be 'one size fits all'. The marketing of m-banking services to segments of men and women should be approached strategically in order to increase adoption rates in developing/emerging economies.

Originality/value — This is the first study on m-banking services adoption in Pakistan to examine the role of gender in the innovation adoption process. The differences between the two genders and the insightful results that we found in our study help shed light on the uniqueness of the context. This study is also one of the first to test a combined TAM and TPB model in the context of m-banking adoption in a developing country using a variance-based modeling technique.

Keywords — Mobile banking adoption, Technology acceptance model, Theory of planned behavior, Developing country, Gender, Pakistan.

Research Type Research paper

1. Introduction

The growing competition in the banking services industry has resulted in pressure to develop and implement more advanced banking systems or alternative delivery channels. The most recent delivery channel to be introduced was m-banking, including its variant, branchless banking. Unlike m-banking, branchless banking does not usually involve cutting-edge technology, innovative or sophisticated services and is meant primarily for the underbanked,

unbanked or de-banked segment of the population that is largely present in developing and emerging countries.

Differentiating between mobile and internet banking, Laukkanen (2007) argues that the main difference relates to the location-free access to the service and the display size of the device. For example, m-banking allows use of the service wherever and whenever needed, which results in time savings during service consumption. The keyboard and the display size of mobile devices seem to be the major inhibitors to the use of m-banking services, whereas in the use of online (net) banking using a PC, the case seems to be the opposite.

M-banking services provide values, such as ubiquity, personalization, flexibility and dissemination (Wang *et al.*, 2006), and features that are less prevalent in traditional digital banking channels, such as ATM banking, internet banking, telephone banking, and so forth. These diversifying services are increasingly important for banking companies trying to create a competitive advantage in the market, retain their customer base, and cut costs (Laukkanen, 2016).

M-banking is defined as a service offered by a banking company, telecom company, or mobile network operator. In a developing country such as Pakistan, m-banking services are also developed and offered by microfinance institutions in collaboration with telecom companies to conduct financial (remote check deposits and funds transfers) and non-financial (balance enquiries and service notifications) transactions using a mobile device such as a cell phone or tablet.

Venkatesh *et al.* (2003) defined two streams of research regarding how and why consumers adopt and use new IS, such as m-banking. One stream of research discusses consumer adoption of IS by using *intention* as a dependent variable. Another stream discusses the consumer continuous usage (or post-adoption) of IS using *usage* as a dependent variable. Each of these research streams has contributed significantly to the development of literature on the individual adoption and usage of an IS. Although the potential benefits of m-banking have been widely reported in both developed and developing countries, for these predictions to materialize, the adoption of m-banking services is considered paramount (Pavlou and Fygenson, 2006).

Focusing on the relationships between customers and banks over the mobile platform (Thakur, 2014), the extant marketing and IS literature has concluded that the use of portable devices in banking services is still in its infancy (Shaikh and Karjaluoto, 2015) and m-banking's broad adoption still remains low even within established markets (Moser, 2015). Thus, we increasingly believe that these singularities in m-banking services adoption are critically significant to the study and the identification of antecedents and therefore require examination.

This study addresses three research questions: (RQ1): How do the constructs of the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) explain the adoption of m-banking services in a developing country? In detail, how do the effects differ between males and females? (RQ2): Do the explained variances in attitude, perceived behavioral control and adoption intention differ between males and females? (RQ3): What are the implications of these possible differences in terms of theory development and practice/management?

The aims of this study are multi-fold: First, this study examines m-banking services adoption in the context of a developing country. Second, this study provides comprehensive insight into the factors affecting the adoption of m-banking. Third, this study theoretically proposes and empirically tests a set of variables that could influence an individual's intention to adopt a rapidly emerging information technology (i.e., m-banking) in Pakistan. Finally, this study provides further insight on the role of gender in m-banking services adoption intention. To the best of our knowledge, this is the first study conducted in Pakistan to investigate gender differences on m-banking services adoption. Gender differences in m-banking services adoption are important for two reasons. First, as men and women have different decision-making processes, gender difference is considered one of the fundamental differences among individuals (Venkatesh and Morris, 2000). Second, understanding gender differences is significant because gender information is easily identifiable and accessible in such a way that practitioners can effectively manage different gender segments (i.e., males vs. females) using different marketing strategies (Zhou *et al.*, 2014).

To guide this effort, the current research blended, re-specified and validated two well-established models that predict an individual's intention to use m-banking services. The first was the TAM, which was originally invented by Davis (1986) to predict the adoption of an IS. The second was the TPB, which was developed by Ajzen (1985) to predict behavioral intentions and subsequent behavior across many settings and can be applied to IS use (Mathieson, 1991).

The next section presents a brief overview of m-banking adoption and the state of m-banking in Pakistan (Section 2). Subsequently, we present the theoretical background on the TAM and TPB and propose a research model and hypotheses (Section 3). The remaining sections present the research design and methods (Section 4) and, finally, the results (Section 5). A discussion on the study's contributions, theoretical and practical implications, limitations, and recommendations for future research (Section 6 & 7) concludes this paper.

2. Literature review and theoretical background

Mobile banking adoption potential in developing countries

Because they have little legacy infrastructure on which to build, developing markets are outpacing developed markets by building 21st century infrastructure (Govindarajan, 2012). Considering this advantage, many banking institutions, including microfinance institutions in developing countries, have turned to the mobile phone as a potential platform for delivering formal banking services across distinct consumer segments, such as banked, under-banked and unbanked consumers. These developments were further inspired by the fact that across the developing world, more people have cell phones than bank accounts (Medhi *et al.*, 2009). For instance, according to Statista (2015), the number of global cell phone users reached 4.61 billion, and this quantity is expected to reach 4.77 billion (or 65 percent of the global population) in 2017. Among these users, over 60 percent of subscribers live in the developing world.

Although banks and other financial institutions encourage their customers to use cell phones for banking affairs, the negative trends in the adoption of this new innovative service makes it imperative to study the factors motivating the adoption of m-banking services in both developed and developing countries (Hanafizadeh *et al.*, 2014).

Technology acceptance model (TAM)

Intrigued by the theory of reasoned action (TRA, Fishbein and Ajzen, 1975), Davis (1989) and Ajzen (1991) developed the TAM and the TPB, respectively. Since its original

publication in 1989, the TAM has been extensively validated and used in various domains (individual and organizational) across different regions of the world, including developing countries, such as Mauritius (Ramdhony and Munien, 2013); Iran (Hanafizadeh *et al.*, 2014); and Ghana (Tobbin, 2012) to address different aspects influencing technology adoption, while taking into account the fact that humans are the weakest link in information technology adoption (Sohail and Al-Jabri, 2014). In addition, the m-banking adoption literature commonly relies on TAM and its modifications (Shaikh and Karjaluoto, 2015).

The TAM consists of two important independent variables, i.e., 'perceived usefulness-PU' and 'perceived ease of use-PEOU'. Many researchers (e.g., Wallace and Sheetz, 2014) suggest that, in order to provide better explanations and predictions of an individual's adoption intention or behavior, the TAM needs to be extended with additional antecedents such as self-efficacy, institutional support, anxiety and voluntariness (Park *et al.*, 2014); perceived mobility (Park and Kim, 2014); and perceived validity and perceived language independence (Wallace and Sheetz, 2014). A decade later, Venkatesh and Davis (2000) suggested a theoretical extension of the TAM and, consequently, TAM2 was proposed with some additional constructs (besides PU and PEOU) to explain intention in terms of social influence processes and cognitive instrumental processes.

Theory of planned behavior (TPB)

Like the TAM, TPB was originally derived from the TRA as an extension and incorporation of an additional construct (perceived behavior control; PBC), to consider situations in which an individual has or lacks control over a targeted behavior (Ajzen, 1991). The antecedents of TPB include attitude (ATT), subjective norms and PBC.

Over the past two decades, the TAM and TPB have been used widely in IS management and consumer and marketing research and have been applied to examine IS adoption and usage in the context of m-banking (Luarn and Lin, 2005), e-services (Hsu *et al.*, 2006), internet banking (Nasri and Charfeddine, 2012), and online tax filing systems (Lu *et al.*, 2010), among others. Considering the complimentary nature of the TAM and TPB, extant literature has focused on integrating them to examine information technology usage and e-service adoption; the results have shown that the integrated model has better exploratory power than individual use of the TAM or TPB (Bosnjak *et al.*, 2006).

Gender

Although gender is one of the most widely recognized and investigated individual difference variables (Zhou *et al.*, 2014), little research has been conducted to effectively gauge the impact of gender differences on the adoption of mobile-based technologies (Faqih and Jaradat, 2015). Given the paucity of research in this highly emerging field, Faqih and Jaradat (2015) strongly reinforced the importance for further research to improve the understanding of the impact of gender on the adoption of mobile-based information systems (IS), particularly in a developed country context.

A considerable number of studies (e.g., Dong and Zhang, 2011) have reported that gender influences consumers' perceptions of the adoption of information technology. Some of these studies have examined the moderating effects of gender on the adoption and the usage of innovative IS including m-banking (Riquelme and Rios, 2010), m-commerce (Faqih and Jaradat, 2015), and the mobile internet (Okazaki and Hirose, 2009), and the impact of gender differences on adopting new technologies has been recognized as an important factor by academics and practitioners alike (Faqih and Jaradat, 2015).

Riquelme and Rios (2010) examined gender as a moderating variable in m-banking services adoption and concluded that ease of use has a stronger influence on female respondents than male respondents, whereas relative advantage has a stronger effect on the perception of usefulness by male respondents. In addition, SN also influences m-banking services adoption more strongly among female respondents than male respondents. Using the latest iteration of the Technology Acceptance Model (TAM3), Faqih and Jaradat (2015) investigated the moderating role of gender on the adoption of mobile commerce in a developing country context and concluded that gender does not have any moderating effect on the adoption process. This finding implies that gender does not always lead to variation in consumers' behavior toward the adoption of mobile commerce. However, research on its effect is still scarce.

3. Research model and hypotheses

The research model is illustrated in Figure 1. The model proposes that PU, PEOU and PR have a direct effect on ATT, which is hypothesized to positively affect adoption intention (INT). Given the implicit uncertainty of the m-banking environment, PU and PEOU may not accurately reflect the motivation of consumers to adopt/accept m-banking under security threats. In this situation, PR is considered an influential antecedent. The model also proposes that self-efficacy (SE), regulatory support (RSUP) and technology support (TSUP) have direct effects on PBC, which is hypothesized to positively affect INT. Finally, the model also proposes that subjective norms (SN) directly effect INT. The model is estimated based on the full sample (n=189) and, in terms of multi-group analysis, based on two sub-samples (n=116) and (n=73) for males and females, respectively. The following sub-sections elaborate the hypotheses derived from theory.

‘Insert Figure 1 about here’

Perceived usefulness, perceived ease of use, perceived risk, attitude → adoption intention
Consequent to the development, adoption and usage of various IS over the last two decades, the scope of PU and PEOU has been extended and tested as key independent variables and intention drivers in various settings, including the context of developing countries. The literature has examined the intention to adopt m-banking services (Chitungo and Munongo, 2013), ATT towards using electronic learning acceptance (Cheng, 2011), behavioral intention to use m-services (Wang *et al.*, 2006), intention to adopt email authentication services (Herath *et al.*, 2014), intention to use online banking (Lee, 2009), and behavioral intention to adopt m-banking services (Koenig-Lewis *et al.*, 2010), among other factors.

PU is defined as “the degree to which a person believes that using a particular system would enhance his/her job performance” (Davis, 1989, p.320). PEOU is defined as “the degree to which a person believes that using a particular system would be free of physical and mental effort” (Davis, 1989, p. 320). In addition to PU and PEOU, another important construct used in our model is PR. Bauer (1960) introduced the concept of PR and defined risk in terms of uncertainty and consequences associated with consumer actions. Previous research (e.g., Pavlou, 2003) has consistently argued that, in the case of technology acceptance, PU and PEOU are positively related. This positive relationship has also been validated in several studies in the context of m-banking services adoption intention (e.g., Gu *et al.*, 2009), mobile services adoption (e.g., Wang *et al.*, 2006), mobile instant messaging acceptance (e.g., Lu *et al.*, 2009) and so forth.

Lee (2009) concluded that the intention to use e-services such as online banking is adversely affected by security, privacy risk and financial risk and is positively affected by perceived benefits, ATT and PU. Nasri and Charfeddine (2012) recorded more comprehensive findings in the context of internet banking and concluded that PU and PEOU significantly and positively influence ATT, which, in turn, significantly and positively influences INT. Prior research indicates that PR is an important determinant of both initial purchase intention and repeat purchase intention (Chiu *et al.*, 2014). Here, Lu *et al.* (2005) concluded that PR indirectly impacts intentions to use an online application under security threats. This implies that once the consumers have realized that m-banking services could produce negative consequences, they will avoid those negative consequences by refusing to accept or adopt m-banking services. In view of the above, we hypothesized the following:

H1: Perceived usefulness of m-banking services has a positive effect on attitude.

H2: Perceived ease of use of m-banking services has a positive effect on attitude.

H3: Perceived risk of m-banking services has a negative effect on attitude.

H4: Attitude has a positive effect on m-banking services adoption intention.

Self-efficacy, regulatory support, technology support, perceived behavioral control → *adoption intention*

SE refers to “a belief in one’s capability to organize and execute the courses of action required to produce given attainments” (Hardin *et al.*, 2014, p. 5). In other words, consumers with a strong sense of SE consider difficult tasks as challenges to be mastered, rather than personal threats to be avoided (Manstead and Eekelen, 1998). Some degree of similarity is also observed between SE and PBC; they are generally concerned with internal and external controls. Thus, PBC refers to the factors that may impede the performance of the behavior (Tan and Teo, 2000, p.12). Internal controls come from within the individual (such as ability and motivation), and external controls are based on factors from outside the individual (such as task difficulty). Here, Manstead and Eekelen (1998) argued that PBC should be used to refer to external constraints on behavior and that SE should be used to refer to internal control factors.

The specificity of SE beliefs can range from general, i.e., computer SE (Compeau and Higgins, 1995) to specific, i.e., software SE (Hardin *et al.*, 2014), email screening SE (Herath *et al.*, 2014) and so forth. Previous research on computer SE (e.g., Wang *et al.*, 2006) confirmed the critical role it plays in understanding individual responses to IS. The concept of SE revolves around the notion that an individual with high IS expertise might have a higher intention to use that IS than an individual with lower expertise (Wang *et al.*, 2006). Consequently, research (e.g., Mun and Hwang, 2003) has found that SE has a direct influence on IS usage, such as web-based IS. As a result, research (e.g., Luarn and Lin, 2005) suggests that SE of m-banking will be an important knowledge resource for users to adopt m-banking services. For example, Whitley (1997) argued that adult males and boys had higher levels of SE, which seems to be essential in affecting attitudes towards IS use. Because of their lower SE, females tend to demonstrate greater concern for the risk of using online information services and experience anxiety. Consequently, females are slower in becoming loyal users and spend longer amounts of time deciding whether to try new services.

PBC refers to people’s perceptions of their ability to perform a given behavior (Ajzen, 1985; Ajzen and Fishbein, 1977). Thus, another important antecedent of PBC is TSUP, which is used in this study to analyze consumer behavioral intention to adopt m-banking services. Unlike previous research, where the antecedent TSUP with regard to PBC was found to have

no significant influence on the intention to adopt internet banking services (Tan and Teo, 2000), the current study considered these antecedents significant in the context of m-banking, largely based on the assumption that the demographics of Pakistan revealed a large rural or remote population (i.e., more than 60%; UNICEF, 2015) that requires the continuous support from m-banking service providers such as banks, mobile network operators and agents (or merchants) in embracing and using m-banking services.

RSUP is an important component of PBC, and we have analyzed its effect on consumer INT to adopt m-banking services. Previous research revealed that the success of IS such as mobile or internet banking is determined by banks or the government (or more specifically, regulatory support) and by its acceptance by customers (Jaruwachirathanakul and Fink, 2005). The following is therefore hypothesized:

H5: Self-efficacy has a positive effect on perceived behavioral control.

H6: Regulatory support has a positive effect on perceived behavioral control.

H7: Technology support has a positive effect on perceived behavioral control.

H8: Perceived behavioral control has a positive effect on m-banking services adoption intention.

Subjective norms → adoption intention

SN is an important construct of the TPB that influences the behavioral intention of an individual. SN refers to the perceived social pressure about whether to adopt a specific behavior (Ajzen, 1985). Social influence is used interchangeably with the terms subjective norm and social norm, which are derived from the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975).

Earlier, some studies (e.g., Hartwick and Barki 1994) found the SN construct to be significant in determining technology acceptance and usage based on TRA and TPB. Recently, some research findings on IS adoption studies (e.g., Bock *et al.*, 2005) have noted that social influence is an important predictor of the intention to adopt IS; therefore, the relationship, i.e., subjective norm → adoption intention, has a sound theoretical basis. For example, Schepers and Wetzels (2007) found a significant influence of SN on PU and INT. Bock *et al.* (2005) argued that SN can influence INT both directly and indirectly (through attitudes). It is, therefore, hypothesized that,

H9: Social norms have a positive effect on m-banking service adoption intention.

Moderating effect of gender on adoption intention

Perhaps surprisingly, the role of gender has not precisely been examined in TAM and its modifications. Venkatesh and Morris (2000) argued that the prior research has studied only gender-based perceptual differences and not gender-based differences in decision-making processes for technology such as m-banking.

In order to provide a deeper understanding of how the decision-making process in technology adoption differs between men and female, we develop and test two hypotheses. We examine how the effect of ATT on INT for m-banking services differs by gender (H10); how the effect of PBC on m-banking services INT differs by gender (H11); and how the effect of SN on INT for m-banking services differs by gender (H12). Given the extensive role of technology in everyday life and the increasing presence of the female population in every sphere of life (Venkatesh *et al.*, 2000), understanding gender differences in individual information

technology adoption decisions is an important issue that is difficult to ignore, especially in the context of a rapidly emerging technology, i.e., m-banking.

The effects of gender are evident in behavior, cognition and social orientation such that, when faced with identical IS stimuli, females and males tend to perceive them and respond to them differently (Ramakrishnan *et al.*, 2014). As a predictor of intention, males were more influenced by instrumentality, and their perception of value of an information process is based mainly on its effects on performance (Sanchez-Franco *et al.*, 2009). Males thus display a higher degree of extrinsic orientation in their motives than females, while females are more strongly influenced by social factors and environmental constraints. Venkatesh *et al.* (2000) hypothesized that the effect of ATT on INT to use a system is stronger for males than for females. The rationale behind this hypothesis is built on various studies that reflect the instrumental outcomes related to technology use being more salient to men than to women. In their longitudinal field study, this perspective was also supported (path coefficients between ATT toward using a system and INT: women: 0.34, $p < 0.001$ vs. men: 0.50, $p < 0.001$, significance $p < 0.001$).

In contrast, in the context of mobile internet usage, Okazaki and Hirose (2009) found significant differences between males and females in terms of their satisfaction from, ATT toward and habitual use of the mobile internet, suggesting that female respondents gave higher importance to these constructs in the mobile internet context.

Finally, Morris *et al.* (2005) did not find any significant gender differences in the determinants of technology use. They suggested that "...traditional gender roles may be in a state of flux, and therefore, we expect few, if any differences in the influence of ATT on technology adoption among younger men and women" (p. 73).

Given the contrary evidence on the effects of ATT on behavioral intention in the context of m-banking, we aim to examine this moderating relationship further. Following Morris *et al.* (2005), we propose that, in the m-banking context, there are no gender differences in the influence of ATT on m-banking adoption:

H10: The positive effect of attitude on adoption intention of m-banking services does not differ by gender.

The research base discussed in understanding gender differences in attitudes toward using technology such as m-banking also helps us understand potential gender differences in the salience of PBC (Venkatesh *et al.*, 2000). Males and females differ in their information-processing strategies such that men have long been associated with technology, whereas women have often been depicted as somewhat passive users (Van Slyke *et al.*, 2002). In other words, men and women process information differently in terms of types of information and levels of elaboration and, hence, arrive at different judgments (Wolin and Korgaonkar, 2003). According to Venkatesh *et al.* (2000), men are more likely to overcome constraints in order to achieve the intended outcomes, whereas women tend to more strongly emphasize the magnitude of the effort involved. Thus, women typically perceive lower levels of control, and therefore, the PEOU or difficulty in using technology has a stronger influence on their decisions to adopt a particular technology. Venkatesh *et al.* (2000) reported significant differences in terms of gender and the effect of PBC on INT. In their study, the effect of PBC on intention was significant only for women ($\beta = 0.27$, $p < 0.001$) and nonsignificant for men

($\beta = 0.02$ ns). Against this backdrop, we aim to further confirm this in the context of m-banking:

H11: The positive effect of perceived behavioral control on m-banking services adoption intention differs by gender such that, for females, the effect is stronger.

A significant body of evidence outside the domain of IS research supports the viewpoint that social influence and gender do play a critical role in influencing consumer or user behavior and behavioral intention in a wide variety of domains (Venkatesh and Morris, 2000). For example, when investigating technology acceptance and usage behavior, Venkatesh and Morris (2000) found that women were more strongly influenced by perceptions of PEOU and SN, although the effect of SN diminished over time. Similarly, in another study, Venkatesh et al. (2000) concluded that compared to men, women were more strongly influenced by SN and PBC. Hence, we hypothesized that,

H12: The positive effect of social norms on m-banking service adoption intention differs by gender in that, for females, the effect is stronger.

4. Method

Survey development

The research model included ten latent variables, each of which was measured with multiple items on a scale from one (strongly disagree) to seven (strongly agree). All the items were adapted from the literature to preserve content validity (Straub *et al.*, 2004). The wording of the items was modified to suit this study. The items, their means, standard deviations and loadings are listed in Table 1.

‘Insert Table 1 about here’

M-Banking context in Pakistan and data collection

According to the State Bank of Pakistan (SBP) Payment Systems Review (2015) and SBP Annual Performance Report (2015), as of June 30, 2015, a total of 45 financial institutions including commercial banks and microfinance institutions operated in Pakistan. Of these 45 FIs, 16 (36 percent) provide m-banking services to over 2.3 million registered m-banking customers. These reports further revealed that this m-banking consumer base of 2.3 million conducted nearly 6 million transactions, amounting to approximately 107 billion Pakistan Rupees, that constituted a volume share of only 1.3% and value share of 0.3% of total electronic banking transactions conducted in Pakistan, thereby leaving huge growth potential to be explored in m-banking services adoption and usage in the country.

The survey instrument was pretested in a pilot study with a sample of business and information technology students at a local business institute located in Sukkur city that had electronic banking usage experience, including using online banking services. Based on the feedback received, the survey instrument was modified to improve clarity and to validate the reliability of the items (Kim *et al.*, 2009).

Data were collected in Pakistan from a sample recruited using purposeful sampling methods. The data were collected using an on-site data collection methodology during July-August, 2014. At the outset, the study participants were informed about the purpose and objective of the study. In all, 210 respondents participated in the study and completed the questionnaire. After careful scrutinization of collected questionnaires and removal of those with several

missing values or similar answers to all questions, 189 valid responses were returned. To assess nonresponse bias, the responses of the first 25% of respondents were compared to the responses of the last 25%; no significant difference was found between the two groups ($p > 0.05$ level). This result indicated that nonresponse bias was unlikely to have occurred.

Common method variance (CMV)

CMV is ‘variance that is attributable to the measurement method rather than to the constructs the measures represent’ (Chang *et al.*, 2010, p. 178). Because the data for all the model variables came from the same respondents at the same time, CMV might influence some of the postulated relations in the PLS path model. To minimize CMV biases, we followed the procedure recommended by Podsakoff *et al.* (2003) to determine CMV bias, commonly known as common method bias. Prior research (e.g., Limayem *et al.*, 2007) has favored the use of this method. The common method bias procedure involves a series of steps. Here, the path model is modified to consider each indicator or manifest variable as a ‘factor’ linked to its second-order construct. A new factor (termed the method construct) is then added whose indicators include all the indicators used in the latent variables in the research model (Liang *et al.*, 2007). The results derived from the analysis indicate that the average factor loading was 0.71 and that the average variance explained by the common method construct was 0.01, indicating that common method bias did not significantly affect our study results.

5. Results

The majority of the study participants were male. Of 189 participants, 61.4% were male and 38.6% were female. Cell phone users tended to belong to higher social grades and were youthful. Primarily, 82.5% were aged between 18 and 40 years. A few participants (6.4%) were over 50 years. Around half of the respondents (50.8%) had a bachelor’s degree, and approximately two-thirds (61.4%) were students. More than 70% of respondents maintained a regular bank account. Demographic characteristics of the sample are presented in Table 2.

‘Insert Table 2 about here’

Close to half of the survey respondents (41.3%) had been using a cell phone for over 5 years, while only a few (2.6%) had used a cell phone for less than a year. Thus, the study sample was able to contribute to the theoretical understanding of the focus of the study, i.e., intention to adopt m-banking. One of the intriguing findings of this study was the reason why participants used their cell phones. Our analysis showed that, after making/receiving calls and receiving/sending short messages, the highest activity was receiving/reading emails, followed by social networking and downloading/listening to music. Another important finding concerned the preferred method of m-banking consumers in the future. Here, the participants were given three options: (1) activate/receive SMS notifications, (2) Use mobile data (WAP/GPRS) and (3) download and use a dedicated m-banking application. The majority of respondents (82%) said that they would prefer to use the first two methods of accessing m-banking services in the near future. The remaining (18%) chose to download and use m-banking applications on their mobile devices, which implied that SMS banking would still be the preferred method of m-banking.

Measurement model

To evaluate the psychometric properties of the measures, an exploratory factor analysis was conducted. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.879, and Bartlett’s test of Sphericity was significant at the 0.0001 level, indicating that the dataset was appropriate for factor analysis. The hypotheses were subsequently tested through partial least squares (PLS) using the SmartPLS 3.0 (Ringle *et al.*, 2015). PLS’s strength lies in its ability

to address complex models with a high number of constructs, indicators and relationships (Barclay *et al.*, 1995; Hair *et al.*, 2014); it is less strict with assumptions about the distribution of the data, is less stringent with multicollinearity of the variables in the model, and is ideal for a small sample size (Chin and Newsted, 1999; Hair *et al.*, 2014). The foregoing factors made it an ideal analytical technique for the current study. The PLS algorithm provides loadings between reflective constructs and their indicators (outer loadings) and loadings between formative constructs and their indicators (outer weights). It also generates standardized regression coefficients between constructs to estimate their relationships. Coefficients of multiple determination (R^2) for all endogenous constructs in the model are also provided by PLS software.

Convergent and discriminant validity

All constructs in this study were operationalized as reflective measures. Thus, we assessed the measurement model in terms of item reliability/internal consistency and discriminant validity. The rule of thumb for accepting items is to have loadings of 0.70 or greater, although loadings of at least 0.5 are considered acceptable (Barclays *et al.*, 1995). Only one indicator (item PR3) had a loading of less than 0.7, as shown in Table 1. Internal consistency was examined using Fornell and Larcker's (1981) composite reliability index. The composite reliability values for all constructs exceeded the acceptable value of 0.7 (Hair *et al.*, 1998), with the construct SE having the lowest (0.84) and INT the highest composite reliability (0.95) for the combined dataset (n=189). The composite reliabilities and average variance extracted (AVE) for all constructs for the combined and sub-samples are shown in Table 3. An average variance extracted (AVE) value of 0.5 indicates an acceptable level (Fornell and Larcker, 1981). The AVE by our measures ranged from 0.57 to 0.86 for the combined sample (n=189) and 0.51 to 0.89 for the multi-group analysis, as shown in Table 3; these were all above the acceptable value of 0.5.

'Insert Table 3 here'

Discriminant validity indicates the extent to which a given construct is different from other latent constructs. An assessment of discriminant validity of the latent variables in the PLS path model was performed using Fornell and Larcker's (1981) criterion, which requires that the square root of each latent variable's AVE be greater than the latent variable's correlation with any other construct in the model. A comparison of the square root of the AVE (diagonal values) and the correlations among the constructs is presented in Table 4. Each construct meets Fornell and Larcker's (1981) criterion in support of discriminant validity. An examination of loadings and cross loadings provided further demonstration of convergent and discriminant validity, where all constructs were more strongly correlated with their own measures than with any other constructs.

'Insert Table 4 here'

Structural model assessment and multi-group analysis

In the proposed model in Figure 1, we hypothesized structural relations between ATT and its antecedents: PU, PEOU and PR; PBC and its antecedents: SE, RSUP and TSUP. We also hypothesized the influence of ATT, PBC and SN on INT. These hypotheses (H1-H9) were assessed by estimating the proposed structural model (Figure 1).

One of the main goals of PLS is prediction (Duarte and Rapaso, 2010; Hair *et al.*, 2014), the fit of a theoretical model is established by the strength of each structural path and the

combined predictiveness (R^2) of its exogenous constructs (Chin, 1998). Falk and Miller (1992) suggested that the variance explained (R^2) for endogenous variables should be greater than 0.1. R^2 values of 0.67, 0.33 or 0.19 for endogenous latent variables are described as substantial, moderate or weak (e.g., Hair *et al.*, 2011). Table 5 shows the results of the structural model and the multi-group analysis.

Insert Table 5 about here'

H1, which states that PU of m-banking services has a positive effect on ATT is supported ($\beta = 0.24, p < 0.05$). This effect is stronger for the female group ($\beta_2 = 0.36, p < 0.001$) than for the male group ($\beta_1 = 0.18, p > 0.05$). The hypothesized positive effect of ease of use PEOU of m-banking services on ATT (H2) is supported for the combined sample ($\beta = 0.37, p < 0.001$), and both males ($\beta_1 = 0.36, p < 0.05$) and females ($\beta_2 = 0.45, p < 0.001$) samples. However, H3, which states that the PR of m-banking services has a negative effect on ATT, was not supported for the combined sample ($\beta = -0.06, p > 0.05$) or for males ($\beta_1 = -0.03, p > 0.05$) or females ($\beta_2 = -0.12, p > 0.05$). The positive effect of ATT on m-banking services INT (H4) is strongly supported, in both groups ($\beta_1 = 0.39, p < 0.001; \beta_2 = 0.44, p < 0.001$) and for the total sample ($\beta = 0.41, p < 0.001$). The results from Table 5 also show that SE has a significant effect on PBC (H5) for the total sample ($\beta = 0.20, p < 0.05$) and for the male group ($\beta_1 = 0.23, p < 0.05$), but the effect was not significant for the female group ($\beta_2 = 0.19, p > 0.05$). The hypothesized effect of RSUP on PBC (H6) received no support ($\beta = 0.05; \beta_1 = 0.11; \beta_2 = -0.05$, all at $p > 0.05$). The influence of technology on PBC (H7) is significant for both groups ($\beta_1 = 0.52, p < 0.001; \beta_2 = 0.36, p < 0.01$) and the total sample ($\beta = 0.46, p < 0.001$). PBC has a significant positive effect on m-banking services INT (H8) ($\beta = 0.42, p < 0.001; \beta_1 = 0.56, p < 0.001; \beta_2 = 0.27, p < 0.01$). In testing H9, we found that the effect of SN on m-banking services INT is insignificant for the total sample ($\beta = 0.08, p > 0.05$).

In order to test hypotheses H10, H11 and H12, an assessment of path coefficients among the groups at $p < 0.05$ (Table 5) shows that the positive effect of ATT on INT (H10) is insignificant between the groups, and the positive effect of PBC on m-banking services INT (H11) was stronger for males. Although we confirmed H10, the effect of ATT on INT for men was slightly lower ($\beta = 0.39, p < 0.001$) than for women ($\beta = 0.44, p < 0.001$), providing preliminary evidence that supports Venkatesh *et al.* (2000). Interestingly, we report contradictory findings for H11 by showing that the effect of PBC on intention is significantly stronger for men ($\beta = 0.56, p < 0.001$) than for women ($\beta = 0.27, p < 0.05$). The difference is statistically significant at $p < 0.05$. Finally, the positive effect of SN on m-banking services INT is stronger for females than for males (H12), as mentioned previously. The results discussed so far provide answers to our RQ1, which seeks to determine if the hypothesized effects differ for males and females. In order to answer our RQ2 as to whether the explained variance of ATT, PBC and INT differ between males and females, Table 6 shows the variance explained for each dependent construct.

'Insert Table 6 about here'

All three endogenous constructs (ATT, INT and PBC) meet Falk and Miller's (1992) rule of 0.1. INT, the main dependent construct that we sought to predict and explain, which has a value of 0.52, with the ATT construct having the lowest R^2 value of 0.33 for the total sample. However, the explanatory power differs between males and females. While 54% of the variance for the endogenous construct of ATT is explained for the female group, only 27% is explained for the male group. The endogenous construct, PBC, is, however, explained better

by the antecedent factors of SE, RSUP and TSUP for the males (52%) than for the females (20%). INT, which is predicted by ATT, SN and PBC, explained the variance of 65% for males and 48% for females. The difference between males and females with respect to R^2 are significant ($p < 0.01$) for PBC, and for ATT and INT ($p < 0.05$) (see Table 6), which shows some heterogeneity. Thus, males and females differ in terms of their PBC, ATT and INT towards m-banking services. The next section highlights the implications of the findings of this study for practice/management and theory development. It also concludes the paper by examining the limitations of the study and options for future research.

6. Discussion

Over the past two decades, banking and payment functions have been virtualized on a massive global scale (Bons et al., 2012), which advanced the traditional banking and payment services from 'branch' to 'branchless' and, recently, to 'mobile'. The purpose of the study was to provide a comprehensive insight into the deciding factors affecting an individual's intention to adopt or accept m-banking services in a developing country.

The results of our study offer valuable practical implications for decision makers in several organizations, including banks, other financial institutions and service providers offering or intending to offer m-banking services. This study provided valuable insight into the behavior of an individuals' intent to adopt m-banking services and the factors affecting their decision. The role of gender differences provides very useful insight into how financial institutions, information system/telecommunication service providers, marketing/advertising agencies and business managers can more appropriately formulate marketing strategies targeting customers and potential customers of m-banking services. The findings of this study therefore provide further insight into m-banking services INT relevant for developing and emerging/transition economies. Companies doing business in such markets face unique challenges, some of which include difficulty in understanding customers, their decision-making process and behavior. The introduction and the rate of adoption of innovative services such as m-banking can yield meaningful returns only if management understands how to segment, target and position the product/service in such markets. The unique differences between customers in terms of gender require the need to carefully identify relevant segments for targeted marketing. In terms of theory development, the findings of this study provide researchers with the opportunity to 'rethink' the unique role of gender in the innovation adoption process literature.

Contributions and implications for theory

A look at our findings vis-à-vis the literature shows that all significant variables validated in our study were also supported by previous research findings. For instance, Lee (2009) and Aboelmaged and Gebba (2013) confirmed that PU and ease of use of m-banking services are significant predictors of ATT toward m-banking services INT in Taiwan and Dubai, respectively. Montazemi and Qahri-Saremi's (2015) meta-analytic study on key factors that consumers consider in adopting online banking confirm the importance of usefulness and ease of use of the service. Our study confirms the significant positive effect of PEOU on ATT. However, although our study also finds support for the significant effect of PU on ATT towards m-banking services for the total sample, these effects were insignificant for males but significant for females. This finding implies that men and women must be considered as different segments for marketing communication strategy formulation and implementation, in line with consumer behavior theory. The attributes of an object are strong indicators of ATT. ATT is determined by a person's evaluation of the attributes associated with the object (herein, m-banking) and the strength of these associations (Fishbein and Ajzen, 1981).

Mobile banking service providers need to consider how customers perceive the value proposition they offer to their target customers and to use an appropriate communication medium to reach out to these segments.

The effect of PR on ATT is inconclusive. Lee (2009) looked at the effect of various types of risk, such as performance risk, social risk, time risk, financial risk and security risk, on attitudes towards internet banking. All these forms of risk except performance risk had a significant effect on ATT. Our study did not find support for the negative effect of PR on ATT. This implies that perceptions of risk concerning the use of m-banking differ in different contexts and the inconclusiveness of research on how PR influences attitudes towards m-banking requires more studies to firmly establish the association between these two constructs. The association between ATT and intention has been firmly established through numerous studies by researchers (Ajzen, 1991; Luarn and Lin, 2005; Hsu *et al.*, 2006; Nasri and Charfeddine, 2012 among others) and by our study. The association between PBC and intention has also been confirmed by previous research (e.g., Chau and Hu, 2002; Lee, 2009). Our research also sought to find out if the positive effect of ATT on INT of m-banking differs by gender (H10) and if the positive effect of PBC on m-banking services INT differs by gender such that the effect is stronger for females (H11). With respect to H11, we find opposite results for the effect of PBC on INT in terms of gender. In the study context, the effect of PBC on intention was significantly stronger for men than for women. A possible explanation for this is provided by Morris *et al.* (2005), who argued that gender differences in information processing in the importance of PBC will increase with age and will be less important for younger users. Thus, in the light of our study sample, our findings might be explained by the study participants' young age. This finding provides further support for the heterogeneity between the two groups. The introduction of PBC has been considered a key component of TPB such that a high level of PBC should intensify an individual's intention to perform the behavior, while low levels of PBC indicates less motivation to perform the behavior. Our finding is consistent with other gender-based research (e.g., Liao *et al.*, 2007), which has shown that gender differences can cause discrepancies in the effects of ATT and PBC on a user's behavioral intention. The implication is that men and women process information differently in terms of types of information and levels of elaboration and, hence, arrive at different judgments (Wolin and Korgaonkar, 2003). Attitude toward using technology would be more important to men than to women (Venkatesh *et al.*, 2000) such that women have often been depicted as somewhat passive users (Van Slyke *et al.*, 2002) of technology/innovation. The implication for theory development is that technology/innovation adoption does not follow the same process for men and women; gender plays a significant role in how a particular technology/innovation is adopted.

The findings from our study show that the positive effect of SN on m-banking services INT is stronger for women than for men (H12). This finding highlights the important role of social influence in the adoption process on some segments of consumers. Subjective norm is a central component of TPB and has been included in several studies across a large number of different settings/contexts. The concept has received much attention in ATT and adoption studies — for example, in the adoption of technology with workplace computer systems (Venkatesh and Davies, 2000); computer resource centers (Taylor and Todd, 1995); and mobile WAP services (Hung *et al.*, 2003). Norms are believed to be particularly important to young users of mobile phones (Townsend, 2000). Although subjective norms have proven to be an important determinant in the intention to use various technologies and services, the results for mobile banking adoption usage have been inconclusive. This study found no significant effects of subjective norms on INT for m-banking in the studied context for the total sample. However, the multi-group analysis suggests that differences exist between

males and females with regard to social influence. Our findings suggest that women seem to be more influenced by social norms in the adoption process than men. Thus, the intention to use m-banking may be explained by the gratification of social acceptance and influence. Since women are important influencers and decision-makers in the family decision-making process, it is logical to assume that the promotion of m-banking financial services can be more easily done by targeting the female segments of potential customers.

Though this study did not apply the diffusion of innovation theory (Rogers, 1962), the holistic application of innovation (technology and innovation were used as synonyms by Rogers, 1962, p.12) diffusion/acceptance models such as TAM (Davis, 1989) without considering the role that gender differences play limits the full application and potential of such theories. According to Rogers (1962), the adoption of innovation depends on the relative advantage of the innovation, its complexity, compatibility, observability, ability to trial the product or service and its PR. However, the theory does not consider that men and women may have different perceptions of the risk, ease of use, or complexity of the innovation and, hence, may process information concerning the attributes of the innovation differently, thereby leading to different rates of adoption. Second, TAM also fails to consider the unique role of gender difference, although recent studies (e.g., Venkatesh *et al*, 2003) now seek to incorporate gender as an important moderating variable. A full realization of these theories in explaining various phenomena requires testing of the theories in different contexts. This study contributes to the literature on the role of gender differences in the technology/innovation adoption process with empirical evidence from mobile banking adoption in a developing country.

Implications for practice/management

Consequently, organizations providing m-banking services in a developing country such as Pakistan could effectively increase their adoption rate by providing user-friendly mobile application and services, creating awareness among the masses, and disseminating the benefits (value proposition) of m-banking to potential customers intending to use these services. Given the current rate of literacy in the country and a lack of know-how about the adoption and usage of technology-based products such as m-banking, creating consumer awareness and building consumer confidence would provide several benefits to the industry, such as increasing the rate of adoption, a potential catalyst for generating operational efficiencies and providing a new revenue avenue.

The findings of this study support the feasibility of using the proposed model to assist in understanding the key factors considered by users when adopting m-banking services. For example, TSUP has a significant effect on PBC not only for the total sample but also for the male and female groups. Technological characteristics play a significant role in the process of adoption of m-banking services. Specifically, internet technology such as wireless broadband and faster internet access are important requirements for the adoption of m-banking services. For example, question item TSUP3 had the highest performance impact, followed by TSUP2 (see Table 1). Thus, the question item TSUP3 'internet technology, like...wireless broadband, makes m-banking more feasible' and TSUP2 'faster internet access speed is important for m-banking' are important performance criteria, especially in the context of very challenging information technology and IS resource scarcity. Mobile banking uses wireless technologies to provide ubiquitous real-time service and gives users mobility, access and readiness to m-banking services that are not available via online or the traditional brick-and-mortar banking services. Thus, technology makes m-banking attractive to users on the go (Oliveira *et al.*, 2014). This finding implies that technological characteristics provide a strong

impetus for the adoption of m-banking services and therefore provide options for strategy development in practice.

The integration of the TAM, TPB and gender theories in this study also provides other options for strategy formulation. Attitude is one of the key factors of TPB that influence intention. Thus, the ATT of potential users and users of m-banking services can be changed for the better if the antecedent factors are identified. However, men and women have different perceptions of how the antecedent factors of PU, ease of use and risk explains ATT. Women's perception of how useful m-banking services are differs from those of men, according to the findings of this study. This implies that, in order to target men for m-banking services, the value proposition of its usefulness needs to be made apparent through appropriate marketing communication. This study did not find support for the influence of PR on attitudes towards m-banking service adoption in the context of Pakistan. This presupposes that resources for marketing communication can be deployed not only to 'sell' the value proposition of the 'usefulness' and 'ease of use of the service' to male customers but also to emphasize the value proposition to potential and existing female segments of m-banking users. Thus, instead of using a scarce marketing communication budget to allay the fears of potential users and users of m-banking services concerning 'risk', the resources can be used to sell the value proposition of the service. These efforts will then translate into changing people's ATT towards the use of m-banking services. This does not mean that issues of security and risk are not important. Mobile devices and mobile transactions are associated with peculiar security challenges (Raina and Harsh, 2002), such as physical security, transaction and post-transaction issues, which require special attention by IS providers.

Another important practical implication is the growing usage of m-phones in developing countries. This provides avenues for telecommunication companies, mobile network operators, and financial institutions to introduce innovative m-banking services to customer segments, which have no access to brick-and-mortar banking in remote parts of the country. Users of m-banking in such remote locations of developing countries can therefore access banking services through the tap of an icon on mobile electronic devices. Potential m-banking service users in these locations will also need 'to be reached out to' through promotional and educational interventions. The cause of an underused m-banking service may be because potential users have insufficient knowledge of how these systems function. Thus, an appropriate intervention might well be an inexpensive education campaign rather than a system redesign (Luarn and Lin, 2005).

7. Limitations and future research directions

The current study is not without any limitations, and therefore, the results of the study cannot be interpreted without taking into consideration the factors discussed below.

First, although mobile banking has emerged as an important banking delivery channel, investigation of m-banking service adoption is relatively new to researchers in the field of IS (Shaikh and Karjaluo, 2015). This paper investigated m-banking adoption from the perspectives of research participants in Pakistan using a cross-sectional correlational survey design. The various hypotheses were tested at a single point in time. Thus, predicting m-banking INT based on this sample from a particular geographical location in Pakistan will differ from that based on a population in a sparsely populated rural region with no access to IT/IS infrastructure. In addition, the sample comprised students. Therefore, to generalize the findings to other settings, more empirical research is needed. Future research should consider the use of different geographical locations and extend the discussion to include other

technologies and a range of new target groups. In addition, collecting data from a developed country and making a comparative study would provide stronger support for the arguments related to a developing country and therefore are recommended.

Second, a longitudinal research design could be used to follow up on m-banking intention over a considerable period of time rather than at a single point in time. This approach is expected to throw more light on some of the dynamic mechanisms that take place within the research setting. This is important because perceptions change over time as individuals gain experience (Mathieson *et al.*, 2001).

Third, future study could also examine other moderating variables, such as income levels and marital status, and should consider a developed country context. A replication study in a developed country or a comparative study in another developing and developed country should be able to shed more light on the role of gender differences in m-banking adoption in these different settings. Fourth, as with most previous research using TPB theory, this study did not incorporate actual usage in our model. This is, however, not a serious limitation, as there is substantial empirical support for the causal link between intention and actual usage in terms of behavior (e.g., Oliveira *et al.*, 2014). Students (61%) heavily represent the study's sample, which poses some limitation in terms of the external validity. However, our objective is not to seek generalization of the findings of this study but rather to set the agenda for further studies on the unique role of gender in m-banking INT.

Finally, this study, based on the integration of the TAM and TPB models, proposed and validated a theoretical model through the use of partial least squares structural equation modeling. The model provides a useful framework for managers to assess success factors that drive m-banking service INT and the role of gender differences in the adoption process. It also highlighted the need for differentiated strategies to appropriately segment men and women for targeting. These validated success factors provide 'prescriptions' to help in the design of intervention schemes targeted at potential users and consumers of m-banking services who may be less inclined to accept and use such innovative systems.

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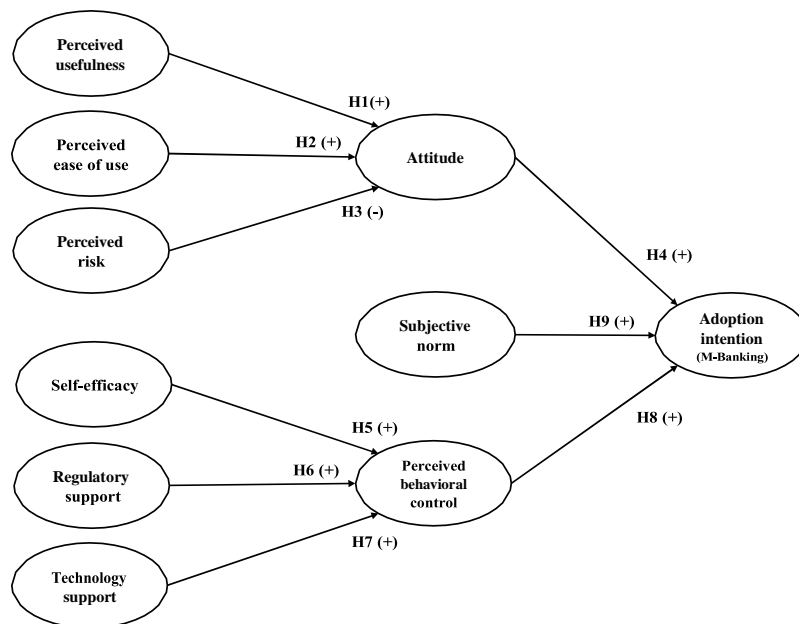
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Figure 1. Research model



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Table 1. Construct, indicators and loadings (n=189)

Construct/source	Indicators	M	SD	Loadings
Adoption intention	I would use m-banking for my banking needs (INT1).	5.62	1.223	0.924***
Cheng <i>et al.</i> (2006).	Using m-banking for handling my banking transactions is something I would do (INT2).	5.62	1.109	0.933***
	I can see myself using m-banking for handling my banking transactions (INT3).	5.74	1.244	0.923***
Attitude	Using m-banking would be a good/bad idea (ATT1).	5.50	1.198	0.855***
Cheng <i>et al.</i> (2006).	Using m-banking would be a foolish/wise idea (ATT2).	5.12	1.629	0.750***
	I dislike/like the idea of using m-banking (ATT3).	5.48	1.457	0.856***
	Using m-banking would be unpleasant/pleasant (ATT4).	5.47	1.335	0.874***
Perceived behavioral control	I have control over using m-banking (PBC1).	4.89	1.526	0.787***
	I have the resources necessary to use m-banking (PBC2).	5.33	1.321	0.857***
Wu and Chen (2005).	I have the knowledge necessary to use m-banking (PBC3).	5.35	1.347	0.796***
	Given the resource, opportunity and knowledge it takes to use m-banking, it would be easy for me to use m-banking (PBC4).	5.57	1.244	0.826***
Social norm	People who influence my behaviour think that I should use m-banking (SN1).	4.71	1.538	0.858***
Wu and Chen (2005).	People who are important to me think that I should use m-banking (SN2).	4.75	1.466	0.892***
	People whose opinions are valued by me would prefer that I use m-banking (SN3).	4.93	1.502	0.914***
Perceived ease of use	Learning to operate m-banking would be easy for me (PEOU1).	5.48	1.340	0.832***
Luarn and Lin (2005).	I would find it easy to get m-banking to do what I want it to do (PEOU2).	5.35	1.232	0.835***
Wang <i>et al.</i> (2006).	My interaction with m-banking would be clear and understandable (PEU3).	5.31	1.350	0.874***
	I would find m-banking to be flexible to interact with (PEOU4).	5.31	1.310	0.877***
	It would be easy for me to become skilled at using m-banking (PEOU5).	5.57	1.222	0.862***
	I would find m-banking easy to use (PEOU6).	5.47	1.295	0.814***
Perceived risk	The decision of whether to use m-banking services is risky (PR1).	3.53	1.664	0.950***
Karjaluoto <i>et al.</i> (2014).	Using m-banking services puts my privacy at risk (PR2). Reversed.	3.23	1.576	0.814***
	Compared with other banking channels, such as the internet, m-banking has more uncertainties (PR3).	3.60	1.641	0.616***
	In general, I believe using an m-banking service is risky (PR4).	3.42	1.687	0.886***
Perceived usefulness	I think that using m-banking would enable me to accomplish my tasks more quickly (PU1).	5.65	1.485	0.871***
Cheng <i>et al.</i> (2006).	I think that using m-banking would make it easier for me to carry out my tasks (PU2).	5.53	1.371	0.894***
	I think m-banking is useful (PU3).	5.83	1.274	0.843***
	Overall, I think using m-banking is advantageous (PU4).	5.76	1.235	0.841***
Regulatory support	The State Bank of Pakistan (SBP) endorses m-banking in Pakistan (RSUP1).	4.99	1.431	0.886***
Goh (1995) and Ko (1990).	SBP is active in setting up the facilities/regulations to enable m-banking in Pakistan (RSUP2).	4.98	1.442	0.930***
	SBP promotes the use of m-banking in Pakistan (RSUP3).	4.90	1.453	0.917***
Self-efficacy	<i>I could complete a job or task using m-banking:</i>			
Compeau and Higgins (1995).	If there was no one around to advise me on the process (SME1).	4.77	1.504	0.786***
	If I could call someone for help if I got stuck (SME2).	4.95	1.292	0.746***
	If I had a lot of time to complete the task/job for which the m-banking service was provided (SME3).	4.82	1.494	0.732***
		5.08	1.393	0.770***

If I had just the built-in help facility for assistance (SME4).				
Technology support	Advances in mobile security technology provide for safer m-banking (TSUP1).	5.28	1.404	0.784***
Goh (1995) and Ko	Faster Internet access speed is important for m-banking (TSUP2).	5.79	1.123	0.813***
(1990).	Internet technology, such as PTCL EVO Wireless Broadband makes m-banking more feasible (TSUP3).	5.81	1.162	0.834***

Table 2. Demographic characteristics of respondents (n=189)

Demographic Characteristics	Category	Frequency	Percent
Gender	Male	116	61.4
	Female	73	38.6
Age	18-25	97	51.3
	26-30	40	21.2
	31-40	19	10.0
	41-50	21	11.1
	51-60	9	4.8
	≥ 61	3	1.6
Highest level of education	College	40	21.2
	Bachelor	96	50.8
	Master	53	28.0
Current employment status	Student	116	61.4
	Employed	54	28.6
	Entrepreneur	17	9.0
	Unemployed	2	1.0
Cell phone usage experience of (no. of years)	<1	5	2.6
	>1	9	4.8
	>2	21	11.1
	>3	42	22.2
	>4	34	18.0
	>5	78	41.3

Table 3. Composite reliability and Average Variance Extracted

Construct	Composite Reliability			Average Variance Extracted		
	Combined (n=189)	Males (n=116)	Females (n=73)	Combined (n=189)	Male (n=116)	Female (n=73)
Adoption intention	0.95	0.94	0.96	0.86	0.83	0.89
Attitude	0.90	0.91	0.87	0.69	0.72	0.63
Perceived behavioral control	0.89	0.89	0.88	0.67	0.67	0.66
Social norm	0.92	0.93	0.89	0.79	0.81	0.74
Perceived ease of use	0.94	0.94	0.93	0.72	0.73	0.69
Perceived risk	0.89	0.91	0.79	0.68	0.72	0.51
Perceived usefulness	0.92	0.93	0.90	0.74	0.77	0.70
Regulatory support	0.94	0.94	0.93	0.83	0.83	0.81
Self-efficacy	0.84	0.85	0.81	0.57	0.59	0.52
Technology support	0.85	0.87	0.81	0.66	0.70	0.58

Table 4. Discriminant validity coefficients (n=189)

	1	2	3	4	5	6	7	8	9	10
Adoption intention (1)	0.93									
Attitude (2)	0.60	0.83								
Perceived behavioral control (3)	0.59	0.38	0.82							
Social norm (4)	0.33	0.42	0.19	0.89						
Perceived ease of use (5)	0.62	0.54	0.59	0.33	0.85					
Perceived risk (6)	-0.07	-0.07	0.07	-0.15	-0.00	0.83				
Perceived usefulness (7)	0.55	0.50	0.34	0.24	0.69	-0.03	0.86			
Regulatory support (8)	0.39	0.28	0.32	0.34	0.37	-0.04	0.29	0.91		
Self-efficacy (9)	0.50	0.50	0.41	0.42	0.46	-0.19	0.37	0.36	0.76	
Technology support (10)	0.65	0.45	0.57	0.22	0.54	-0.05	0.51	0.43	0.42	0.81

Table 5. Structural model results and t-statistic for multi-group analysis

Criterion	Predictors	Combined		Males		Females		$\beta_1 - \beta_2$	t-value
		(n=189)		(n=116)		(n=73)			
		Path coefficient (β)	t-value	Path coefficient (β_1)	t-value	Path coefficient (β_2)	t-value		
Attitude	Perceived usefulness	0.24	2.28*	0.18	1.10ns	0.36	3.53***	0.18	0.79
	Perceived ease of use	0.37	3.82***	0.36	2.35*	0.45	3.98***	0.09	0.43
Adoption intention	Perceived risk	-0.06	0.81ns	-0.03	0.33ns	-0.12	1.27ns	0.09	0.64
	Attitude	0.41	5.28***	0.39	6.58***	0.44	2.85***	0.05	0.32
	Perceived behavioral control	0.42	5.19***	0.56	9.42***	0.27	2.18*	0.29	2.38*
Perceived behavioral control	Social norm	0.08	1.28ns	-0.01	0.23ns	0.19	1.71 ^a	0.21	1.79 ^a
	Self-efficacy	0.20	2.27*	0.23	2.40*	0.19	1.05ns	0.04	0.24
	Regulatory support	0.05	0.63ns	0.11	1.16ns	-0.05	0.30ns	0.16	0.92
	Technology support	0.46	5.48***	0.52	5.77***	0.36	2.57**	0.16	0.97

*** Significant at $p < 0.001$ level (two-tailed test) **Significant at $p < 0.01$ (two-tailed test) *Significant at $p < 0.05$ (two-tailed test)

^aSignificant at $p < 0.05$ (one-tailed test) ns: Not significant

Table 6. Explained variance R^2

Criterion	R^2			R^2 Males - R^2 Females	t-value
	Combined (n=189)	Males (n=116)	Females (n=73)		
Attitude	0.33	0.27	0.54	0.27	2.15*
Adoption intention	0.52	0.65	0.48	0.17	1.96*
Perceived behavioral control	0.36	0.52	0.20	0.32	3.03***

*** Significant at $p < 0.001$ level (two-tailed test) **Significant at $p < 0.01$ (two-tailed test) *Significant at $p < 0.05$ (two-tailed test)