New determinants of ease of use and perceived usefulness for mobile banking adoption

Syed Ali Raza, Amna Umer* and Nida Shah

Department of Management Sciences,
IQRA University,
Block-2, Gulshan-e-Iqbal,
Karachi 75300, Pakistan
Email: syed_aliraza@hotmail.com
Email: amna.umer@live.com
Email: nidashah_18@hotmail.com
*Corresponding author

Abstract: This research centres the variables affecting the intention of individuals to continue using mobile banking in Pakistan through using a model of technology acceptance model (TAM). Relevant information was collected through a structured instrument while the sample size included 300 users of mobile banking. Furthermore, statistical tools applied as a part of a study were reliability analysis and partial least square-SEM = Structural Equation Modelling in order to check the effect of those factors with the intention of the users. Outcomes suggest that resistance is significantly and negatively associated with perceived ease of use while it is significantly and positively associated with perceived usefulness. Also, perceived risk and compatibility have positive significant relationships with both perceived ease of use and perceived usefulness. However, awareness is positively and significantly connected with perceived ease of use and an insignificant relationship with perceived usefulness. Perceived ease of use has a significant positive relationship with both perceived usefulness and attitude, while perceived usefulness has a positive significant relationship with attitude and intention towards adopting mobile banking. Finally, attitude is also positively and significantly linked with the intention of using mobile banking. The results of this study provide useful information about the users' pattern of using the technology, which will be helpful for the financial institutions.

Keywords: attitude; awareness; compatibility; intention to continue using; mobile banking; Pakistan; perceived ease of use; perceived risk; perceived usefulness; resistance.

Biographical notes: Syed Ali Raza is associated with IQRA University as the Director Academics and Director Research and Publications. His areas of interest include financial economics, energy economics, tourism economics and corporate finance, social sciences. He has published numerous papers in international referred journals including *Tourism Management*, *Energy Policy*, *Economic Modelling*, *Social Indicators Research*, *Current Issues in Tourism*, *Physica A*, *Quality and Quantity*, *International Migration*, *Total Quality management and Business Excellence*, *Journal of Business Economics and*

Management, *Studies in Higher Education*, *Journal of Transnational Management*, *Transition Studies Review*, *Global Business Review*, *Journal of Chinese Economic and Foreign Trade Studies* and others.

Amna Umer is associated with IQRA University as a Research Associate. She completed MBA in Human Resource Management from IQRA University. Currently, she is pursuing PhD from IQRA University. Her areas of interest are human resource management, training and development, strategic performance management, social sciences and behavioural sciences.

Nida Shah is associated with IQRA University as a Research Associate. She received MBA in Finance from IQRA University. Currently, she is pursuing PhD in Finance from IQRA University. Her areas of interest are corporate finance, energy economics, financial economics, international economics and behavioural sciences.

1   Introduction

At the moment, the rapid growth and innovation in technology, including the introduction of mobile phones, has created various opportunities for the potential business which can be utilised (Barnes and Corbitt, 2003). Considering the innovations in the financial sector, mobile banking (M-banking) is one of those inventions which has made the life of the consumers much easier by adding the immense flexibility in the consumption of services and by allowing them an easy access to the banking services even in the regions with less economic growth (Raza and Hanif, 2013; Oliveira et al., 2014; van der Boor et al., 2014; Anderson, 2010). Financial institutions, helped by these technological advancements, have reacted to the challenges by embracing a new tactic which focuses on the attempt to create customer satisfaction by proposing advanced good services while simultaneously cutting the operational cost (Sohail and Shanmugham, 2003).

M-banking, also known as cell phone banking, is the utilisation of mobile terminals like cell phone and handheld devices to approach financial networks through wireless application protocol (Zhou, 2010). Consumers of M-banking can easily access the services of banks like transfer of funds, information inquiry, bill payment, etc. (Luarn and Lin, 2005). Consumers of M-banking can carry out banking activities like obtaining the real-time information about their accounts or making payments whenever and wherever they want (Zhou et al., 2010). According to Shaikh and Karjaluoto (2015) M-banking is the product and facility proposed by a financial institute (bank), a microfinance organisation or a mobile network operator for carrying out many monetary (fund transfer) and non-monetary (balance inquiry) dealings through mobile devices. M-banking is recognised as an essential electronic banking medium (Aderonke, 2010). It is basically availing the services of banking by using handheld and wireless devices (Riquelme and Rios, 2010). Individuals using M-banking regard mobility as its most valued attribute (Suoranta and Mattila, 2004), while those customers of M-banking who are time-sensitive regard its 24-h functionality as the most vital element (Singh et al., 2010).

M-banking, during its efforts of attracting potential customers, is unavoidably facing various issues which are ultimately making its usage quite uncertain (Lin, 2011). According to Zhang et al. (2012), M-banking is in its initial phase and is yet unsuccessful in gaining the trust of potential customers. Recent studies carried out by Shaikh and

Karjaluoto (2015) and Dineshwar and Steven (2013) have indicated that carrying out financial transactions and accessing financial information by using a cell phone is not as prevalent as anticipated. Financial institutions, in the developing economies, are encountering many issues regarding the implementation of M-banking. When weighted against established countries, where these problems have been mentioned to a larger extent, even the speedy acceptance of these technologies by emerging economies following the track of developed economies, has not allowed sufficient consideration to handle complications vis-à-vis mobile banking technology implementation. Literature related to the emerging economies is found to be scarce and are greatly required at this point in time (Kim et al., 2009; Lin, 2011).

Previously, various researches have been carried out on M-banking adoption (Lu et al., 2015; Luarn and Lin, 2005; Gu et al., 2009; Zhou et.al, 2010). Many studies have been carried out to investigate the driving factors of M-banking acceptance (Al-Jabri and Sohail, 2012; Hanafizadeh et al., 2014; Alalwan et al., 2016) for instance perceived ease of use (PEOU) and PU (Mohammadi, 2015; Shaikh and Karjaluoto, 2015; Aldas-Manzano et al., 2009; Shin, 2009; Jung et al., 2009; Ha et al., 2007), relative advantage, compatibility (Hsu et al., 2007; Chen et al., 2009; Wu and Wang, 2005) and interactivity (Lee, 2005), while few research also studied the barriers which could hinder the adoption of M-banking (Mohammadi, 2015). Studies have shown that certain factors such as resistance and risk can negatively influence the attitude and intention to adopt mobile banking (Mohammadi, 2015). However, only a few studies have been carried out in which adoption of M-banking is investigated in developing countries (Al-Somali et al., 2009; Afshan and Sharif, 2016, Mohammadi, 2015).

Considering M-banking in Pakistan, it is greatly ruled by short messaging service banking. In accordance with the reports of the State Bank of Pakistan (2014), three-month branchless banking report, Jan-Mar-2014 and State Bank of Pakistan (2014), three-monthly Payment systems review, Jan-Mar-2014), 24 banks proposed the services of internet banking and 13 offered the services of M-banking exceeding 1.6 million recorded M-banking clienteles. It is then discovered through these reports that these M-banking customers (1.6 million) carried out approximately 1.7 million transactions equalling up to Rs. 17.2 billion, which formed the volume share of only 1.6% along with the value share of 0.2% of the total e-banking (electronic banking) transactions carried out in Pakistan. These stats reveal that a large number of potential customers of M-banking are yet to be discovered and more importantly, the exploration of those determinants which have an impact on the intention, adoption and practice of M-banking is yet to be made. Hence, the aim of this research is to explore the elements which can affect the intention of the people of Pakistan towards the usage of M-banking. The insights of this study would help the financial institutions to pinpoint the bottlenecks, obstructing the adoption, along with finding the judgemental factors which could brighten their services.

Moreover, this study is concerned with the progressive facilities provided by the financial institutions to sway the intentions of individuals towards the adoption of mobile banking. It is believed that this study would provide a unique path regarding the acknowledgement of Pakistan through the usage of mobile banking. With respect to the factors influencing the adoption decision of mobile banking, this research would allow recognising other variables which could ultimately influence clients' loyalty through innovation. Furthermore, the acceptance of technology is quite uncertain in Pakistan; this

research is conducted to figure out whether the technical innovative facilities like mobile banking are accepted in this country or not.

The rest of the paper will be as follows: Section 2 explains the literature review, Section 3 describes the methodology, Section 4 presents the data analysis and discussion of the results and Section 5 presents the conclusion and recommendations.

2 Literature review

2.1 Theoretical background

Davis (1989) proposed technology acceptance model known as TAM, which is by far the extensively utilised frameworks concerning the attitudes and adoption of technology. This framework is utilised in various research to investigate the factors influencing people's use and adoption of latest technology (Venkatesh and Davis, 2000). According to Davis (1989), the link to, opinion, belief, purpose and conduct in technology acceptance model allows us to anticipate the handling of innovative technologies. TAM is basically a modified version of another theory known as the theory of reasoned action or TRA proposed by Ajzen and Fishbein (1967). According to TRA, perceived ease of use and perceived usefulness are the variables which define a person's viewpoint towards his intention to operate a technology where intention actually acts a mediator in utilising the system (Ali et al., 2017). Also, PEOU directly affects PU. TAM model has extensively been used in many research (Venkatesh and Davis, 2000; Davis et al., 1992; Thong et al., 2006; Venkatesh et al., 2003; Lee et al., 2007). Nevertheless, TAM does not include economic, demographic and exogenous variables which have constrained the use of this model in determining the attitude and intention of an individual towards M-banking adoption (Venkatesh and Davis, 2000). Hence, research carried out on M-banking adoption usually modify the model of TAM by incorporating variables like personal innovativeness and relative advantage (Chitungo and Munongo, 2013), perceived security (Hsu et al., 2011) and perceived cost of use and perceived risk (Hanafizadeh et al., 2014). TAM actually allows the incorporation of external factors as the determinants of PU and PEOU (Davis, 1989). Furthermore, the adoption of technology by the consumers can act as a chief determinant of the victory of any key technology employment initiative (Sharma et al., 2017).

2.2 Empirical studies

2.2.1 Mobile banking

Mobile banking or M-banking is the progression of electronic banking (e-banking) which authorises users to finish financial transactions by using mobile of handheld gadgets (Oliveira et al., 2014; van der Boor et al., 2014; Lin, 2013). These gadgets enable people to link up with the server, execute verification and authorisation, carry out payments and then ensure the finalised transactions (Kim et al., 2010). M-banking may assist banks in achieving competitive advantage; this is why problems linked to its extensive employment are of massive importance (Dineshwar and Steven, 2013; Au and Kauffman, 2008). Therefore, individuals' attitudes and intentions concerning the usage of

M-banking are extremely significant for the analysts, since it assists banks and other financial service providers to acquire advantage by getting an elevated comprehension of the main aspects which influence the intention of using M-banking. Moreover, the apps of mobile banking reduce the cost. Facilities provided by mobile banking help families in setting budgets, particularly in the unfavourable circumstances. According to (Asongu and Nwachukwu, 2017), mobile banking not only decreases in the cost by reducing the cost of conveyance and transaction but it also provides a forum for women to develop and run businesses.

2.2.2 Resistance

Talking about innovation, it is considered as an alteration in the life of an individual. Innovation in technology and its adoption require an alteration in the present habits and practices of an individual and also make them exploit new habits. This whole adoption process often creates resistance considered to be a usual response of an individual (Mohammadi, 2015). Usually, the more alteration, innovation in a technology involves, the more is the individual's resistance (Laukkanen et al., 2008). As explained by researchers, individuals are inclined towards resisting the change in their existing means of functioning and embracing up-to-date technologies (Agarwal et al., 2009) like M-banking and as a result of which, financial institutes start lacking revenues from their investments (Hernandez-Murillo et al., 2010). As Al-Somali et al. (2009) put it, the condition for individuals to be encouraged to move on from the conventional ways of working towards latest technologies like M-banking, is the fulfilment of their needs by such technologies and this ultimately weakens their reluctance of accepting a technology (Hanafizadeh et al., 2014). Consequently, the higher the reluctance, concerning the use of M-banking, the more negative will be the behaviour towards it (Mohammadi, 2015). This research, however, studies the influence of resistance on PEOU and PU, hence it can be hypothesised that

> H_{1a}: *Resistance has a significant impact on perceived ease of use.*

> H_{1b}: *Resistance has a significant impact on perceived usefulness.*

2.2.3 Perceived risk

Perceived risk (RIS) can be defined as the extent to which risk is involved in an innovation (Laukkanen et al., 2007; Ram and Sheth, 1989). Risk or uncertainty is innate in innovations and so technologies do have some level of risk associated with them. Also, the risk is what a consumer perceives rather than an attribute of a product (Fain and Roberts, 1997). According to Akturan and Tezcan (2012), perceived risk has an important impact on the attitude of consumers PEOU and PU. Hanafizadeh et al. (2014) suggest that mobile banking is comparatively more associated with risk than other devices as it displays a distant connection and the provision of secured monetary transaction would result in the success of M-banking. Hence, the greater is the risk associated with M-banking, the negative will be the attitude of consumer towards it. According to Brown et al. (2003), a significant relationship exists between perceived risk of a consumer and the acceptance of M-banking. However, the influence of RIS on attitude is evaluated through PEOU and PU, in this research. Hence, it can be hypothesised that

H$_{2a}$: Perceived risk has a significant impact on perceived ease of use.

H$_{2b}$: Perceived risk has a significant impact on perceived usefulness.

2.2.4 Compatibility

Compatibility (COM) indicates the level to which consumers suppose that the technology is compatible with their opinions, actions and ways of living (Hernandez and Mazzon, 2006). Through various research, it is noted that in the adoption of M-banking, compatibility is one of the factors which has a significant impact on it (Chen, 2013; Shaikh and Karjaluoto, 2015; Wessels and Drennan, 2010). Koenig-Lewis et al. (2010) investigated the adoption of M-banking by younger consumers in England and found similar outcomes. Compatibility increases the likelihood of adoption of a technology (Wu and Wang, 2005), since it permits advancements to be perceived in a more common manner (Ilie et al., 2005). According to Hanafizadeh et al. (2014), compatibility not only has a major impact on the adoption of M-banking but it is also regarded as one of the factors influencing PEOU and PU. Hence, the higher the compatibility of M-banking with an individuals' other bank accounts, the more constructive is their attitudes towards its adoption (Mohammadi, 2015). Moreover, Sharma et al. (2017) posit that a favourable association between compatibility and the acceptance can be linked to the decreased uncertainty and risk. However, the influence of compatibility on attitude is evaluated through PEOU and PU, in this research. Hence, it can be hypothesised that

H$_{3a}$: The compatibility has a significant impact on perceived ease of use.

H$_{3b}$: The compatibility has a significant impact on perceived usefulness.

2.2.5 Awareness

M-banking is a fresh encounter to the majority of consumers; therefore, a decreased level of awareness (AWA) turns out to be the hurdle in the reception and adoption of M-banking (Al-Somali et al., 2009). Moreover, awareness is considered to be a significant variable leading to the adoption of M-banking by influencing the attitude (Chen, 2013). Also, awareness is the factor which decreases all aspects of perceived risk (Hanafizadeh and Khedmatgozar, 2012). Awareness of virtual banking and its advantages significantly impact PEOU and PU of virtual banking (Al-Somali et al., 2009). Hence it can be hypothesised that

H$_{4a}$: Awareness has a significant impact on perceived ease of use.

H$_{4b}$: Awareness has a significant impact on perceived usefulness.

2.2.6 Perceived ease of use

Perceived ease of use as explained by Davis (1989) and Venkatesh and Davis (2000) is the extent to which the use of M-banking is free of effort. It is actually the opinion of an individual's assessment of the effort utilised on account of using a technology (Davis, 1989). PEOU can also be described as people's perception about the use of technology that it would be without mental stress and people would not need to allocate much of their time and efforts while using the technology. PEOU influences the viewpoint of an individual towards using a technology (Rauniar et al., 2014) and also it predicts the

perceived usefulness (Nysveen et al., 2005a, 2005b, Davis, 1993). Therefore, the hypothesis, on account of analysing the effect of PEOU would be

> H_{5a}: *Perceived ease of use has a significant impact on users' attitude.*

> H_{5b}: *Perceived ease of use has a significant impact on perceived usefulness.*

2.2.7 *Perceived usefulness*

Perceived usefulness (PU), in the opinion of an individual, can be explained as the level to which the performance of his or her job is enhanced by utilising a certain technology (Rauniar et al., 2014). Perceived usefulness, explained in the context of an organisation, is the betterment in the output which may lead to monetary and non-monetary benefits (Rauniar et al., 2014). PU clearly indicates or pinpoints those variables which affect the actual use and intention to continue using technology (Awa et al., 2014). According to TAM, PU is believed as a key determinant of technology followed by PEOU (Igbaria and Iivari, 1995). Both PEOU and PU influence the attitude of an individual towards the intention to utilise a technology and in this case, M-banking (Rauniar et al., 2014). According to Davis et al. (1992), PU is highly associated with the intention to use technology. Hence, it can be hypothesised that

> H_{6a}: *Perceived usefulness has a significant impact on users' attitude.*

> H_{6b}: *Perceived usefulness has a significant impact on users' intention to continue using M-banking.*

2.2.8 *Attitude (ATT) and intention to continue using M-banking*

Intention (INT) to continue using M-banking, the key dependent factor of research in which TAM is incorporated, are, basically, the chances of a person to utilise a technology. The key precursor and the main mediating variable of the influence of other factors on the usage intention are the attitudes (ATTs) of a person in the direction of utilising a technology (Schierz et al., 2010). Attitude plays a significant part in influencing the usage technology (Davis, 1989). Analysts, in acceptance perspective, have investigated the association of attitude and intention and it is observed by Yang and Yoo (2004) that attitude dwells in the psyche, leads and creates conduct and hence used to anticipate intention. Cao and Mokhtarian (2005) pinpoint that determinants of attitude determine most of the change in e-intention. Many research show that attitude positively impacts the intention of consumers to continue using M-banking. Therefore, attitude is anticipated to be a significant factor which predicts consumers' intention towards the usage of M-banking and hence it can be hypothesised that

> H_7: *Attitude has a significant impact on users' intention to continue using M-banking.*

3   Methodology

The conceptual framework, represented in Figure 1, consists of four variables of TAM perceived ease of use, perceived usefulness, attitude and intention, while four are the exogenous factors incorporated in this model. These external variables are resistance,

perception of risk, compatibility and awareness. This study explores the factors which impact the adoption intention of mobile banking in Pakistan.

Figure 1 Conceptual framework (see online version for colours)
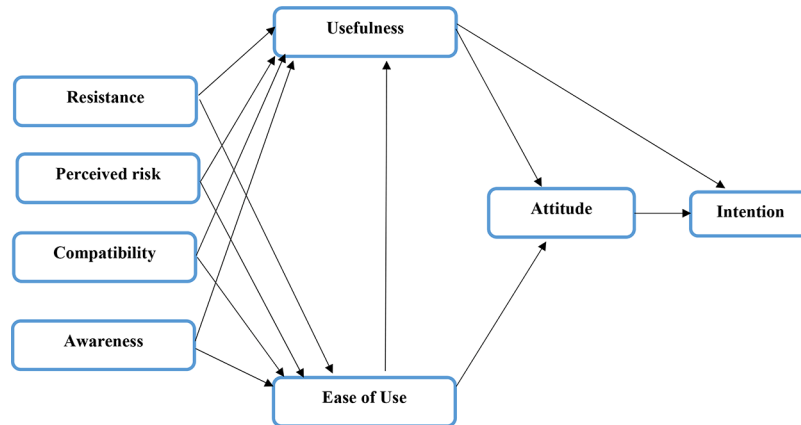
3.1 Measurement instrument

The instrument used in this study is a survey questionnaire which is validated by market professionals. To begin the analysis, pilot testing was performed on account of validating the questionnaire. The instrument used in this paper is created on a five-point Likert scale. Moreover, the items of PU and PEOU were adopted from Kim et al. (2010), resistance and awareness from Al-Somali et al. (2009), perceived risk from Huang et al. (2011), perceived compatibility and intention to use from Lin (2011) and attitude from Schierz et al. (2010). In order to carry out this research, sample characteristics were gathered along with the data which included gender, age, education and occupation, and the data were collected through a convenience sampling technique (non-random sampling technique).

The sample of 300 responses was collected from the M-banking users of Pakistan, through the questionnaire comprising 32 items. Considering the factor analysis, a sample of 50, 300, 500 and 1,000 is regarded as poor, good, very good and excellent, respectively (Raza et al., 2016; Ali and Raza, 2017; Comrey and Lee, 1992). This instrument meets the requirement of having at least 25 items in the questionnaire given by Hair et al. (2006). Also, the responses given by the participants were voluntary and it was assured that the information shared by them would be kept confidential.

3.2 Demographics

Table 1 represents the demographic characteristics of the sample in which the data of 300 responses contain 187 males making up to approximately 62%, while females were 113 making up to approximately 38% of the sample. Through the statistics gathered, it can be analysed that majority of M-banking users are aged between 25 and 35 constituting 49% of the total users, while only 17% of the users of M-banking are aged 46 or above. The majority of the M-banking users are postgraduate making up to approximately 47%. It can also be determined through the given states that the majority of the M-banking

users belong to private sector constituting nearly 69% (206 respondents), while users of M-banking belong to public sector make up only 15%.

Table 1   Profile of respondents

Demographic items	Frequency	Percentage
Gender		
Male	187	62
Female	113	38
Age		
25–35	148	49
36–45	101	34
46 or above	51	17
Education		
Graduate	136	44
Post graduate	138	47
MPhil	22	7
PhD	4	2
Occupation		
Semi-private	24	8
Public sector	47	15
Private sector	206	69
Self-employee	23	8

4   Data analysis and results

SEM in Smart PLS 3.2.3 (Ringle et al., 2014) is the technique applied in this study together with the resampling technique of 5000 subsamples (Hair et al., 2011). The technique PLS-SEM is accurate for the measurement of a multifaceted framework so PLS is applied to assess the measurement and structural model (Henseler et al., 2014; Hair et al., 2011) and also for the precise evaluation of the framework (Hair et al., 2011). Partial least square (PLS), introduced by Wold (1975, 1980) and Joreskog and Wold (1982), is the technique which describes the connection among latent variables. A latent variable (LV) can be described as an unobserved or hidden construct which is responsible for the connection, among other assessed constructs (Aibinu and Al-Lawati, 2010). PLS has the ability to work with the hidden variables and it also has the ability to deduce the measurement error in the improvement of hidden constructs (Chin, 1998).

This research involves perception-based items, created on a Likert scale, having undisclosed distribution and normality. For the assessment of the effectiveness of the model, two measures are taken into consideration, convergent validity (Cook and Campbell, 1979) and discriminant validity (Campbell and Fiske, 1959).

On account of evaluating single-item reliability, standardised loadings or simple correlation is examined. As suggested by Tabachnick and Fidell (2007), for the items to be reliable, their Cronbach's alpha should be at least 0.55 as it is the cut-off point and so it can be concluded from Table 2 that all the items meet the requirement and are declared as reliable.

Table 2 Measurement model results

Constructs	Items	Loadings	Cronbach's α	Composite reliability	Average variance extracted
Resistance	RES1	0.947	0.88	0.927	0.809
	RES2	0.815			
	RES3	0.93			
Perceived risk	RIS1	0.889	0.813	0.889	0.728
	RIS2	0.888			
	RIS3	0.788			
Compatibility	COM1	0.937	0.908	0.939	0.837
	COM2	0.881			
	COM3	0.925			
Awareness	AWA1	0.77	0.703	0.833	0.625
	AWA2	0.779			
	AWA3	0.804			
Perceived ease of use	PEOU1	0.837	0.586	0.829	0.707
	PEOU2	0.845			
Perceived usefulness	PU1	0.879	0.839	0.888	0.667
	PU2	0.695			
	PU3	0.783			
	PU4	0.895			
Attitude	ATT1	0.875	0.837	0.902	0.753
	ATT2	0.886			
	ATT3	0.842			
Intention to adopt	INT1	0.925	0.88	0.926	0.806
	INT2	0.892			
	INT3	0.877			

In order to determine convergent validity, PLS considers two criteria, suggested by Fornell and Larcker (1981):

1   Cronbach's alpha and composite reliability

2   the average variance extracted (AVE).

Table 2 shows that all the variables are considered to be reliable since they meet the benchmark set by Tabachnik and Fidell (2007). Moreover, the variables also fulfil the criteria of composite reliability, i.e. composite reliability should be greater than 0.7,

proposed by Nunnally (1978). For the determination of convergent validity, AVE should exceed 0.5 (Fornell and Larcker, 1981) and all the variables in the proposed framework fulfil this requirement.

Furthermore, discriminant validity is determined by taking the following considerations into account:

1   square root of the AVE

2   cross loadings

3   heterotrait-monotrait (HTMT) ratio of correlations.

Table 3 displays the correlation matrix in which the square root of AVE should be greater than the correlation of latent constructs (Fornell and Larcker, 1981) and through the table, it can be observed that this criterion is met. Table 4 shows the factor loadings of each item. For discriminant validity to be determined, the cross loading of each item should be greater than the loading of its relative construct, while the difference between cross loadings should exceed 0.1 thus fulfilling the standards set by Gefen and Straub (2005). The third requirement for discriminant validity is fulfilled through HTMT ratio of correlations for which all the values should not exceed 0.85 (Henseler et al., 2015; Raza et al., 2016) (Table 5). Hence, discriminant validity is determined as all three criteria are met.

Table 3   Summary statistics

				Correlation matrix				
	ATT	*AWA*	*COM*	*PEOU*	*INT*	*RES*	*RIS*	*PU*
ATT	**0.868**							
AWA	0.406	**0.790**						
COM	0.115	0.193	**0.915**					
PEOU	0.213	0.348	0.174	**0.841**				
INT	0.224	0.293	0.179	0.260	**0.898**			
RES	0.439	0.293	0.161	-0.028	0.175	**0.899**		
RIS	0.240	0.313	0.265	0.277	0.079	-0.069	**0.853**	
PU	0.385	0.343	0.296	0.276	0.271	0.492	0.220	**0.817**

> *Notes:*   ATT, attitude; PEOU, perceived ease of use; PU, perceived usefulness; RES, resistance; RIS, perceived risk; COM, compatibility; AWA, awareness; INT, intention to adopt M-banking. The diagonal elements (bold) represent the square root of average variance extracted (AVE)

Table 4 Loadings and cross loadings

	ATT	*AWA*	*COM*	*PEOU*	*INT*	*RES*	*RIS*	*PU*
ATT1	**0.875**	0.327	0.063	0.181	0.192	0.432	0.124	0.266
ATT2	**0.886**	0.396	0.083	0.197	0.234	0.367	0.312	0.366
ATT3	**0.842**	0.326	0.151	0.173	0.154	0.352	0.164	0.357
AWA1	0.362	**0.770**	0.231	0.272	0.221	0.245	0.223	0.290
AWA2	0.309	**0.797**	0.144	0.183	0.265	0.244	0.288	0.256
AWA3	0.292	**0.804**	0.087	0.344	0.218	0.209	0.240	0.265
COM1	0.127	0.236	**0.937**	0.186	0.146	0.156	0.261	0.208
COM2	0.100	0.175	**0.881**	0.098	0.168	0.096	0.261	0.185
COM3	0.094	0.139	**0.925**	0.174	0.176	0.170	0.223	0.360
PEOU1	0.139	0.316	0.237	**0.837**	0.228	0.008	0.234	0.207
PEOU3	0.217	0.270	0.058	**0.845**	0.209	−0.055	0.232	0.256
INT1	0.210	0.313	0.125	0.299	**0.925**	0.108	0.086	0.213
INT2	0.245	0.302	0.130	0.225	**0.892**	0.166	0.083	0.211
INT3	0.153	0.183	0.221	0.182	**0.877**	0.192	0.048	0.299
RES1	0.438	0.261	0.067	−0.077	0.177	**0.947**	−0.120	0.395
RES2	0.332	0.201	0.299	−0.042	0.107	**0.815**	−0.074	0.391
RES3	0.410	0.313	0.088	0.026	0.182	**0.930**	−0.009	0.520
RIS1	0.168	0.363	0.196	0.277	0.151	−0.119	**0.889**	0.176
RIS2	0.178	0.166	0.215	0.228	0.067	−0.126	**0.888**	0.235
RIS3	0.293	0.278	0.286	0.200	-0.039	0.108	**0.778**	0.145
PU1	0.260	0.267	0.302	0.298	0.244	0.206	0.267	**0.879**
PU2	0.428	0.315	0.125	0.109	0.181	0.774	0.044	**0.695**
PU3	0.241	0.210	0.277	0.234	0.214	0.199	0.184	**0.783**
PU4	0.216	0.272	0.311	0.309	0.244	0.142	0.290	**0.895**

Notes: ATT, attitude; PEOU, perceived ease of use; PU, perceived usefulness; RES, resistance, RIS, perceived risk; COM, compatibility; AWA, awareness; INT, intention to adopt M-banking, Bold values show that the loadings of all items are higher on their respective constructs than on the other constructs. Also the differences of cross-loadings are greater than the suggested threshold (Gefen and Straub, 2005)

**Table 5** Heterotrait-monotrait ratio results

	ATT	*AWA*	*COM*	*PEOU*	*INT*	*RES*	*RIS*	*PU*
ATT								
AWA	0.524							
COM	0.132	0.251						
PEOU	0.301	0.525	0.257					

Table 5   Heterotrait-monotrait ratio results (continued)

	ATT	*AWA*	*COM*	*PEOU*	*INT*	*RES*	*RIS*	*PU*
INT	0.261	0.380	0.196	0.365				
RES	0.514	0.367	0.180	0.083	0.194			
RIS	0.292	0.421	0.323	0.398	0.119	0.166		
PU	0.409	0.420	0.330	0.412	0.310	0.460	0.296	

Notes: ATT, attitude; PEOU, perceived ease of use, PU, perceived
usefulness; RES, resistance, RIS, perceived risk; COM, compatibility;
AWA, awareness; INT, intention to adopt M-banking

The explanatory strength of the model can be evaluated by estimating the level of inconsistency in the dependent variable which can be predicted by the model. Adjusted R^2 is thought to be vital for the assessment of a structural model (Breiman and Friedman, 1985). Figure 2 shows four adjusted R^2 for each dependent variable. 16.1% for PEOU shows that 16.1% of changes in PEOU occur due to four independent variables resistance, perceived risk, compatibility and awareness, while these four independent variables predict perceived usefulness 36.9%. Attitude is predicted 15.5% by PEOU and PU while attitude predicts intention to adopt M-banking 8.4%.

Figure 2   Results of path analysis (see online version for colours)
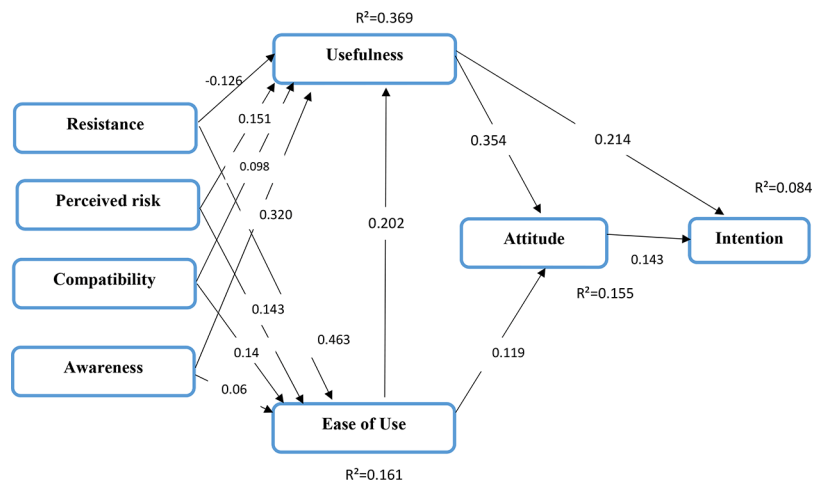
4.1   Path analysis

Table 6 demonstrates path analysis while Figure 2 exhibits the relation of each path along with the hypothesis. According to Wixom and Watson (2001), the sign, size and significance of the coefficients define the hypotheses between dependent and independent variables. The degree of impact of independent variables on dependent variables is represented by the value of coefficient, while the significance of hypotheses is determined through *p*-values. Hypotheses will be considered to be significant when these *p*-values remain under 0.1. Hence, it can be deduced from Table 6 and Figure 2 that all

hypotheses are accepted at 0.1 significance level except H4b and coefficients of all paths are positive except for the path showing the impact of resistance on PEOU.

Table 6 Standardised regression weights for the research model

Hypothesis	Regression path	Effect type	SRW	Remarks
H1a	RES → PEOU	Direct effect	−0.126**	Supported
H1b	RES → PU	Direct effect	0.463***	Supported
H2a	RIS → PEOU	Direct effect	0.151**	Supported
H2b	RIS → PU	Direct effect	0.143***	Supported
H3a	COM → PEOU	Direct effect	0.098*	Supported
H3b	COM → PU	Direct effect	0.144**	Supported
H4a	AWA → PEOU	Direct effect	0.320***	Supported
H4b	AWA → PU	Direct effect	0.066	Not supported
H5a	PEOU → PU	Direct effect	0.202***	Supported
H5b	PEOU → ATT	Direct effect	0.119*	Supported
H6a	PEU → ATT	Direct effect	0.354***	Supported
H6b	PEU → INT	Direct effect	0.214***	Supported
H7	ATT → INT	Direct effect	0.143**	Supported

***$p < 0.01$, **$p < 0.05$, *$p < 0.10$

> *Note:* SRW, standardised regression weight

4.2 Discussion

The aforementioned outcomes infer that all the hypotheses are supported except for one. The path showing the connection between RES and PEOU is negative and significant ($\beta = -0.126$, $p < 0.05$), while the path linking RES and perceived usefulness are positive and significant ($\beta = -0.463$, $p < 0.01$) hence, both H1a and H1b are supported. The results imply that RES impacts PEOU negatively, while it has a great positive effect on PU. These results are congruent with the research carried out by Mohammadi (2015).

H2a and H2b show the path linking risk with PEOU and risk with PU, respectively. These both hypotheses are accepted since they are positive and significant ($\beta = 0.151$, $p < 0.05$) and ($\beta = 0.143$, $p < 0.01$). Results show that risk influences PEOU and PU positively.

H3a and H3b represent the path connecting compatibility with PEOU and compatibility with PU, respectively. They both are accepted as they are significant. Outcomes suggest that compatibility influences PEOU positively but has a lesser impact ($\beta = 0.098$, $p < 0.1$) as compared to its effect on PU ($\beta = 0.144$, $p < 0.05$). These results are congruent with the research carried out by Koenig-Lewis et al. (2010), Lin (2011) and Hanafizadeh et al. (2014). This shows that the services provided by M-banking are consistent with the ways customers handle their finances and they are appropriate to customers' standard of living and so they are more willing to adopt M-banking. Koenig-Lewis (2010) suggested that compatibility can increase the PEOU of mobile banking as less exertion is needed.

H4a shows the association between awareness and PEOU ($\beta = 0.320$, $p < 0.01$) and H4b represents the association between awareness and PU ($\beta = 0.066$, $p > 0.1$). The results indicate that H4a is accepted and awareness impacts positively on PEOU while the relationship of awareness and PU is insignificant. These results are consistent with the findings of Laukkannen and Kiviniemi (2010), Huang et al. (2011), Hanafizadeh and Khedmatgozar (2012) and Al-Somali et al. (2010). Awareness is said to be an essential contributor in enhancing the customer's readiness towards the adoption since the absence of management and deficiency of information regarding mobile banking are the factors which strongly inhibit its adoption (Qazi et al., 2016).

The hypotheses H5a and H5b represent the paths connecting perceived ease of use with perceived usefulness ($\beta = 0.202$, $p < 0.01$) and PEOU with attitude ($\beta = 0.119$, $p < 0.1$). Both the hypotheses are accepted as they are significant and these outcomes are in line with the studies of Thakur (2014), Dabholkar and Bagozzi (2002), Venkatesh et al. (2003), Wessels and Drennan (2010), Luarn and Lin (2005), Hanafizadeh et al. (2014). The outcomes here indicate that PEOU influences positively and significantly on both attitude and perceived usefulness. These outcomes show that since M-banking is a user-friendly application and very basic skills are required to use this application; customers are willing to embrace M-banking services. According to Davis (1989), technology becomes useful when its usage becomes easy, and PEOU determines perceived usefulness. Hence, it is estimated that the technology which appears to be convenient and easy facilitates its usage rather than the system which appears to be complicated. Otherwise stated, technology convenient to use will create the best cost/benefit ratio for the achievement-oriented people (Venkatesh and Morris, 2000).

H6a and H6b show the connection of perceived usefulness with attitude ($\beta = 0.354$, $p < 0.01$) and intention to adopt M-banking ($\beta = 0.214$, $p < 0.01$), respectively. Findings show that both these hypotheses are accepted and these results are similar to the ones suggested by Thakur (2014), Koenig-Lewis et al. (2010), Wessels and Drennan (2010) and Hanafizadeh et al. (2014). The results imply that M-banking is considered to have significant advantages for both the financial institutions and customers. From the viewpoint of banks, M-banking is cost efficient and through the viewpoint of customers, the usefulness of M-banking lies in its 24×7 availability without the direct interaction with the bank personal.

H7 displays the connection between attitude and intention to embrace mobile banking which is accepted as the impact of attitude is positive and significant ($\beta = 0.143$, $p < 0.05$). These outcomes are analogous to the findings of many other researchers (Stoel and Lee, 2003; Cviko et al., 2012, Aldunate and Nussbaum, 2013). Since attitude is the essential factor in influencing the intention, individuals having a positive attitude towards M-banking will ultimately intend to adopt it. According to Schierz et al. (2010), attitude is the key precursor of determining the intention of an individual to adopt any technology. Attitude plays a significant part in influencing the usage technology (Davis, 1989). Analysts, in acceptance perspective, have investigated the association of attitude and intention and it is observed by Yang and Yoo (2004) that attitude dwells in the psyche, leads and creates conduct and hence used to anticipate intention.

5   Conclusion and managerial implications

In this era, a vast increase has been observed in the use of mobile devices so this study is conducted to analyse those factors which affect the consumer attitude to use the mobile banking. To explore the better understanding of the user's intention, we used usefulness and ease of use as mediators. The result of this study will give information on the user's patterns to use the technology, which will be helpful for the financial institutions.

The empirical outcomes displayed chief conclusions and based on these results the inferences are discussed below. The result of resistance shows that it significantly but negatively affects PEOU. So, the financial institutions can minimise the resistance of the user by providing the platform to the users for tracking their online transactions, trying to maximise the bank's brand image in the mind of the users and help the consumer in improving their knowledge of mobile banking. The other perceived risk factor also shows that it influences PEOU and PU, positively. The impact of risk can be minimised by designing and implementing a secure system, i.e. incorporating facial characteristics, voice prints or fingerprints in systems as this will increase the user's confidence. The users should also be given information that how they can protect their personal information to avert any false transaction. The customer satisfaction can be increased by informing the role of the bank in case of any false transaction take place.

People, nowadays, are looking for the technology, which fulfils their requirements, harmonious with other systems, easier to use and proves to be useful. Hence, the perceived ease of use and perceived usefulness are essential factors for IS research (Chong et al., 2012).

Moreover, the significant impact of perceived ease of use on attitudes towards the intention of individuals to adopt mobile banking indicates that the acknowledgement of improvement in the banking styles by the clients would lead to the enhanced adoption of mobile banking. Likewise, the more clients think that mobile banking could be learned easily, the more they would think its usage to be helpful (Mehrad and Mohammadi, 2016).

System compatibility shows a significant effect on PEOU and PU. To increase the compatibility with the mobile banking, more features should be added on in the system. The system should be interlinked with the online shopping portal to ease the customers' shopping needs. The banks should timely upgrade their systems with the latest technologies so the customers enjoy speedier transactions. The banks should invest in research and development because through R&D competitive ideas can be generated which can be used to improve the system's compatibility.

Awareness is also an important determinant that affects the customer's attitude via PEOU. The banks should increase the consumer awareness by educating them or informing them through mass media or social networking sites. Another way by which the consumer awareness can be increased by offering training courses to the banks free of cost. The PEOU and usefulness have a significant effect on the attitude which ultimately affect the user's intention to use the M-banking. So, the banks should further ease their M-banking portal by adding features like M-shopping, M-ticketing, etc., linking their system with an online support system which should be available to the users in a single, expand the mobile banking services by giving high speed for data transferring and high bandwidth sites so the system should not be detached during transactions. Moreover, the tutorial on how to use M-banking should also be available for the users as this will help to increase their intention to use this technology.

Thus, to keep the users motivated to use M-banking, the banks should establish a feedback mechanism on which the users can share their views and problems related to the M-banking services and the banks should ensure to deliver the higher customer values.

5.1   Limitation and recommendations for future study

This study has some limitations as well. The first limitation of this study is that it focuses on the consumers while non-consumers are ignored. The study targets the young individuals only, however, the perception and preferences of others are ignored. Therefore, future research should be conducted to analyse the factors which are creating a hindrance for the non-users in adopting the M-banking. Furthermore, the study should also be conducted by taking the effect of culture because different elements have a dissimilar impact on diverse cultures. The research should be further expanded by taking the impact of variables like M-loyalty, E-readiness and M-learning to explore the customer's perception related to the use of technology.

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