

The Mediating of Perceived Usefulness and Perceived Ease of Use: The Case of Mobile Banking in Yemen

Ahmed Mohammed Mutahar, Faculty of Business Management, Universiti Teknologi Mara (UiTM), Shah Alam, Malaysia

Norzaidi Mohd Daud, Faculty of Business Management, Universiti Teknologi Mara (UiTM), Shah Alam, Malaysia

Ramayah Thurasamy, School of Management, Universiti Sains Malaysia, Penang, Malaysia

Osama Isaac, Graduate Business School, Universiti Teknologi Mara (UiTM), Shah Alam, Malaysia

Rasheed Abdulsalam, Faculty of Dentistry, Lincoln University College, Petaling Jaya, Malaysia

ABSTRACT

While there are a wide range of business opportunities available via mobile technologies, mobile banking services have not been widely accepted by bank clients in Yemen. This article aims to test the mediation effect of TAM core constructs between the external factor self-efficacy and the intention. Questionnaire survey data collected from Four hundred and eighty-two valid responses from bank clients. SEM via AMOS was utilized to determine the importance levels of associations and interactions between the factors tested. The proposed model evidenced by goodness of fit of the model to the data, explained 81% of the variance in intention. The findings of the multivariate analysis reveal that self-efficacy has had a significantly positive affect on the perceived usefulness, and perceived ease of use. In addition, ease of use and usefulness has a positive important direct influence on the intention. Also, usefulness and ease of use mediated the relation between self-efficacy and intention. The results of the current article might give further insights into mobile banking strategies.

KEYWORDS

Intention to Use Mobile Banking Services, Mediation, Mobile Banking, Self-Efficacy, Technology Acceptance Model (TAM)

INTRODUCTION

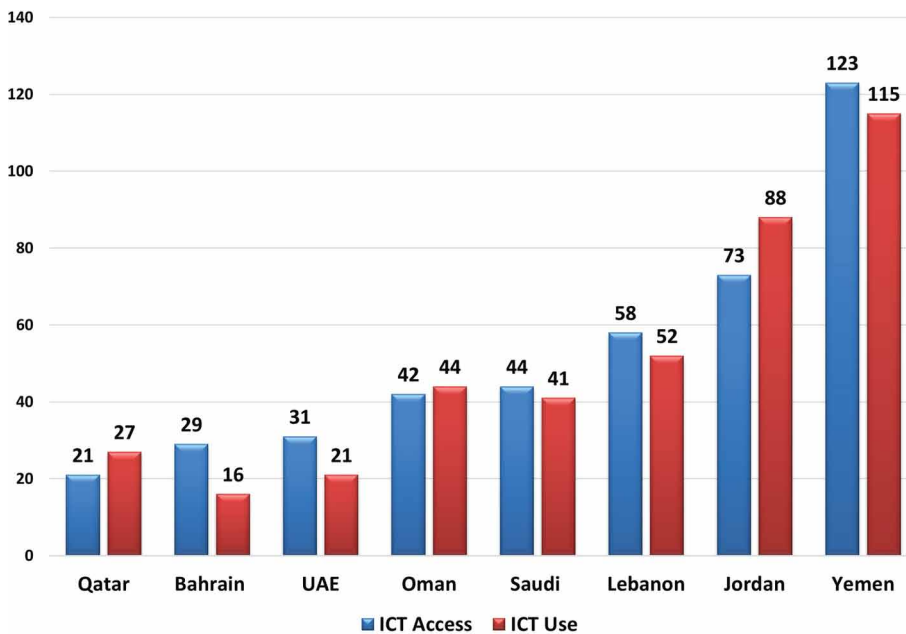
E-commerce is changing how firms design, produce and deliver their products and services. In banking industry, rather than traditional banking channels, mobile banking is one of the e-services that delivers banking services via ICT (Information and communication technology) (Barnes & Corbitt, 2003; Turban, King, Lee, & Viehland, 2006). Mobile banking refers to the ability to use a mobile device to conduct financial transactions such as balance inquiries of bank account, money transfers, bill payments via mobile devices like cell phones, smartphones, PDAs, and tablets without time and place limitations (Elbadrawy & Aziz, 2012; Koenig-Lewis, Palmer, & Moll, 2010; Lin, 2011; Zhou, 2012). Even with the advantages of Mobile banking for instance cost savings, efficiency, ubiquity,

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convenience, and interactivity (G. Kim, Shin, & Lee, 2009; Lin, 2013), above and beyond, it requires little or no infrastructure (Khraim, Shoubaki, & Khraim, 2011); the rates of usage worldwide is not as much as the level expected by the experts of this industry (Kleijnen, de Ruyter, & Wetzels, 2004; Laukkanen & Cruz, 2009; S.-G. Lee, Trimi, & Kim, 2013; Luarn & Lin, 2005; Luo, Li, Zhang, & Shim, 2010; Riivari, 2005; Suoranta & Mattila, 2004). In Yemen, mobile technology has evolved significantly over recent years; this is proved by the increasing penetration rate of the mobile service which had climbed to almost 70% by 2014 (World Development Indicators, 2016). Therefore, under intense competition, mobile banking has received particular attention from the Yemeni banks as 10 banks out of 18 are providing mobile banking services. However, the evolution in mobile banking services is not in line with the thriving of mobile technology (Shaikh & Karjaluo, 2015), statistics provided by some of the largest banks in Yemen (CAC bank, and IBY bank) suggest that only 27% of Yemeni banks clients have adopted mobile banking up to 2014 (Quality Assurance reports in CAC bank, and IBY bank, 2014). Therefore, Yemeni banks have begun to express concern regarding the low adoption rate of mobile banking services. Regardless of the availability of technology and applications. Therefore, studies are required to understand consumers' willingness to use the new technology (Sindhu Singh, Srivastava, & Srivastava, 2010).

According to the Global Innovation Index (2015), Yemen is one of the weakest countries in ICT access and ICT use among Arab countries. Meanwhile Qatar ranks 21 and 27 in term of ICT access and use respectively in the world, and the highest among the Arab world; Yemen ranks 123 and 115 out of 141 countries in the world (see Figure 1). On the other hand, Saudi Arabia ranks 44 and 41 in the world, while United Arab Emirates ranks 31 and 21 in term of information and communication access and use, meanwhile Jordan ranks 73 and 61 in information and communication technology access and use. That shows a big concern and gap that Yemen is lagging behind in using ICT (O. Isaac, Abdullah, Ramayah, & Mutahar, 2017), which hinders Yemen from ICT benefits. In addition, through the Global competitiveness report 2014 (World Economic Forum, 2014); Yemen ranks as the

Figure 1. ICT access and use: Yemen vs. Arab countries by The Global Innovation Index (2015)



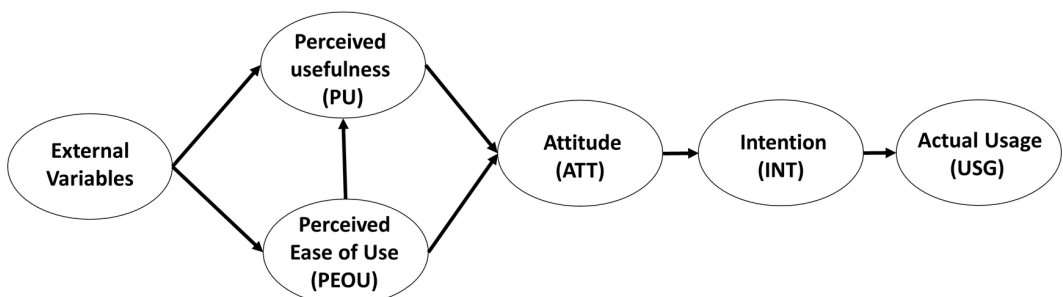
(Source: The Global Innovation Index, 2015)

145 out of 148 countries which indicates that Yemeni citizens has lack of skills in using technology because many reasons such as education, training, economic state of the country.

Davis (1989) technology acceptance model (TAM) has received major attention in IS literature. It has proven to be a powerful, valid, and parsimonious model for predicting user acceptance (Venkatesh And Davis, 2000). Existing literature showed that TAM was the predominant model used in predicting and explaining the IS adoption (Amin, Supinah, Aris, & Baba, 2012; Jaradat, M. R., & Twaissi, 2010; Lindsay, R., Jackson, T. W., & Cooke, 2011; S. Liu & Yuan, 2005; Z. Liu & Min, 2009; Oliveira, Martins, & Lisboa, 2011; Shen, Huang, Chu, & Hsu, 2010; Singh et al., 2010; SRIPALAWAT, THONGMAK, & NGRAMYARN, 2011; Tobbin, 2012), the core constructs of TAM are perceived usefulness, and perceived ease of use. However, one of the TAM weakness is that it did not cover all aspects that could affects individual behavioral intention and actual behavior in IT adoption. Davis (1989) has suggested to examine the effect of external variables on the main construct of TAM in the original model (Figure 2: Original TAM model). Based on former studies, as a mediator, the attitude construct was included in the original TAM model between user perceptions of ease of use, usefulness and behavioural intention (Davis, 1989) but recently, researches have omitted attitude from the original TAM model, due to its weak role between the aforementioned constructs (Abdullah, Ward, & Ahmed, 2016; Y. Chen, Lin, & Lou, 2013; Giovanis, Binioris, & Polychronopoulos, 2012; Hussein, Aditiawarman, & Mohamed, 2007; Macharia & Nyakwende, 2009; Ngai, 2007) reported that there is a weak relationship between PU and attitude, on the other hand, a strong relationship between perceived usefulness and behavioural intention and hence uninvolved attitude in TAM model in their studies. While TAM focused on technology characteristics through perceived usefulness and perceived ease of use, it has neglected the impact of individual characteristics such as self-efficacy, which plays a major role in determining the clients' intention (Khalifa & Shen, 2008; Luarn & Lin, 2005; Zolait, 2010) to use mobile banking services in Yemen.

Many banks' clients possibly will choose not to use the wireless/mobile banking service because of the lack of skills, ability, or required knowledge to use the new application of IT, therefore, in this research self-efficacy is introduced to the original TAM as an external variable that affects the fundamental factors of TAM (Perceived Ease of Use and Perceived Usefulness) as suggested by Davis (1989), while it was not in the original Model. A significant review of literature of researches conducted in non-eastern countries, on determinants of the mobile banking adoption. These countries have different government strategy, socio-economic, industrial and cultural settings. Developing countries were not given much attention such as Yemen, especially in the banking service industry. Researches from the Western world have limited applicability to developing countries such as Yemen (Norzaiddi et al., 2011). The main objective of this research is to fill in the gap of examining the external variables that could influence the main constructs of TAM in the context of mobile banking technology in Yemen, and to investigate the mediation effect of perceived usefulness, and perceived ease of use between self- efficacy and intention to use mobile banking services. This model usage

Figure 2. Original TAM model by (Davis, 1989)



could give some answers to questions related to acceptance of mobile banking services. Moreover, it is essential for the banks management to better understand how self-efficacy play a major role in mobile banking acceptance in Yemen.

THEORETICAL FRAMEWORK

Self-Efficacy

It is defined as “Individual belief that he/she has the required knowledge, skill or ability to use mobile banking” (Luarn & Lin, 2005). Prior studies have affirmed the importance of the self-efficacy in IS researches to understand individual’s response to information system (Cudjoe, Anim, & Nyanyofio, 2015; Hsu & Chiu, 2004; M.-C. Lee, 2009; M. Kocaleva, 2014; Wang, Lin, & Luarn, 2006). The relationship proposed between self-efficacy and perceived ease of use is constructed on the theoretical argument by Davis (1989). According to Wang, Wang, Lin, & Tang (2003), who postulated that prior experience in using computer will influence PU and PEOU, and confirmed that self-efficacy has a positive effect on the perceived usefulness and ease of use in using internet banking. Similarly, Guriting & Ndubisi (2006) proved the same results on the same application in Malaysia. Moreover, in e-learning context Park (2009) also empirically proved the significance effect of SE on PU and PEOU. Extensive studies have been conducted in different IS applications that approved the significance impact of SE on the perceived ease of use (Al-somali, A, & Clegg, 2009; Brown, 2002; HONG, THONG, WONG, & TAM, 2002; B. G. Kim, Park, & Lee, 2007; Venkatesh, 2000; Alrajawy, Mohd Daud, Isaac, & Mutahar, 2016). Contrastingly, Al-Haderi (2013) has reported that self-efficacy does not influence the perceived Usefulness. Therefore, in this study, self-efficacy will be included to study its effect on the fundamental constructs of TAM in mobile banking services usage in Yemen.

Consequently, the following two hypotheses were proposed:

H1: Self-efficacy has a positive effect on perceived usefulness.

H2: Self-efficacy has a positive effect on perceived ease of use.

Perceived Usefulness

Perceived usefulness is defined by Davis (1989) as “the extent to which a person believes that using a particular system will enhance his or her job performance”. There is broad research in the IS community that give evidence of the substantial effect of perceived usefulness on the adoption intention (Bhatiasevi & Yoopetch, 2015; Davis, 1989; Lian, 2015; Martins, Oliveira, & Popovič, 2014; E. Park & Kim, 2014; Raman et al., 2014; Rana, Dwivedi, Williams, & Weerakkody, 2014; Venkatesh & Davis, 1996; Venkatesh And Davis, 2000; Venkatesh Viswanath & Morris, 2000; Mutahar, Mohd Daud, Ramayah, Isaac, & Alrajawy, 2017). The critical reason behind people exploit e-banking systems, is that they find them useful to their banking transactions.

Consequently, the following hypotheses is proposed:

H3: Perceived usefulness has a positive effect on the intention to use mobile banking services.

Perceived Ease of Use

Davis (1989) has defined the PEOU as the degree of the user’s belief that the usage for a particular system will be out of effort. enormous researches has been conducted over the past years provides empirical proof of the important effect of PEOU on behavioral intention, either directly or indirectly through its effect on perceived usefulness (Akturan & Tezcan, 2012; Amin, Rizal, Hamid, Lada,

& Anis, 2008; Gu, Lee, & Suh, 2009; Hanafizadeh, Behboudi, Abedini Koshksaray, & Jalilvand Shirkhani Tabar, 2012; Koenig-Lewis et al., 2010; Z. Liu & Min, 2009; Mawona & Mpogole, 2013; Norzaidi et al., 2011; Tan, Leby, Tan, & Lau, 2016; Yu, 2012), and PEOU positively influence PU (Isaac, Abdullah, Ramayah, Mutahar, & Alrajawy, 2016; Mutahar et al., 2016). Mobile banking system need to be easy to learn and easy to use to avoid the “under-used” useful system problem. When IT applications are easy to use, clients will be less intimidated to use it (Moon & Kim, 2001). This indicates that perceived ease of use construct is likely to have a positive influence on users’ perception of usefulness in their interaction with the mobile banking systems. In addition to its direct influence on the intention to use mobile banking services.

Consequently, the following hypotheses is proposed:

H4: Perceived ease of use has a positive effect on perceived usefulness.

H5: Perceived ease of use has a positive effect on the intention to use mobile banking services.

Mediation Effect of Perceived Usefulness and Perceived Ease of Use

According to TAM by (Davis, 1989), behavioural intention to use technology is affected by two mediators: perceived ease of use and perceived usefulness. Agarwal & Prasad (1999), Sánchez & Hueros (2010), and Venkatesh (2000) has shown a strong evidence that perceived usefulness and perceived ease of use, fully mediating the effect of external variables on the usage intention. Furthermore, some studies reveals the significant relationship between the external variables in this study (self-efficacy) with the intention to use systems (Burton-Jones & Hubona, 2006; H.-R. Chen & Tseng, 2012; Chuo, Tsai, Lan, & Tsai, 2011; Sentosa, 2012; Tarcan, Varol, & Toker, 2010; Wang et al., 2006). Based on the review of literature, in this study, a test of the mediation effect of the TAM core constructs between self-efficacy and intention to use mobile banking services in Yemen.

Consequently, the following hypotheses is proposed:

H6: Perceived Usefulness mediates the relationship between self-efficacy and the intention to use mobile banking.

H7: Perceived ease of use mediates the relationship between self-efficacy and the intention to use mobile banking.

OVERVIEW OF THE PROPOSED RESEARCH MODEL

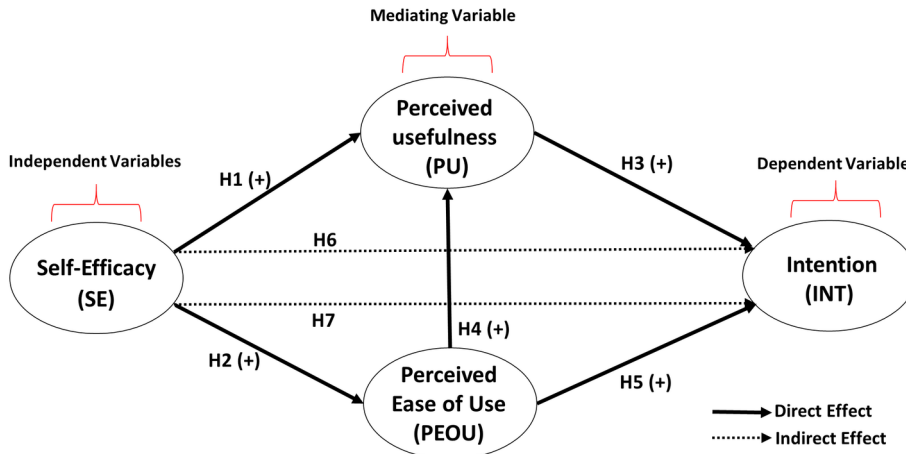
The current study developed the proposed research model that simultaneously investigates factors that elucidate clients’ intention to use mobile banking services in Yemen based on TAM (Davis, 1989), this study extended TAM by adding an individual characteristics (self-efficacy) into the model as external variable (see Figure 3) which has found to play a major role in the technology context (Al-Haderi, 2013; Ariff, Yeow, Zakuan, Jusoh, & Bahari, 2012; Chuo et al., 2011) as discussed previously. Moreover, the proposed model will examine the mediation influence of TAM core constructs PU and PEOU between self-efficacy and the individual’s intention to use mobile banking services in Yemen.

RESEARCH METHOD

Development of Instrument

Collection of data for this research, was used via a questionnaire survey instrument. It is especially designed to measure all the main factors of the proposed study model. The questionnaire contained close-ended questions that were tested and translated into Arabic language since the targeted

Figure 3. The proposed research model



respondents are from Yemen. The questionnaire is divided into two parts. The first part measures four core factors using seven-point Likert scale ranging from 1 strongly disagree to 7 strongly agree (Please refer to Table 2 for the instruments) while second part covered the profile of demographic of the respondents and measured using nominal or ordinal scale.

Data Collection

The respondents of this study are Yemeni banks' clients who currently have an opened bank account, have mobile phone and, non-user of mobile banking services. A non-probability sampling technique known as snowball sampling that is adopted to reach potential subjects among Yemeni Banks clients in the capital city of Yemen-Sana'a, which is appropriate when the targeted population is difficult to reach (Al-Qeisi, 2009) as banks' clients are difficult to reach and their information is hard to get. Four hundred and eighty-two valid usable responses were received and analysed, the first part was analysed via multivariate analysis process using Structural Equation Modelling (SEM) using analysis of moment structures (AMOS) software v. 21.0. The reason behind using AMOS is because of its simplicity and technically advanced nature (Miles, 2000). Moreover, it offers more precise assessment of discriminant validity of an instrument than exploratory analysis (Bagozzi & Phillips, 1982). However, the second part was analysed through Statistical Package for the Social Sciences (SPSS) v. 22.0.

DATA ANALYSIS AND RESULTS

Respondents Demographics Profile

In this Study, seven categories of the demographic characteristics of 482 respondents of this study are analysed, which are: gender, marital status, age, education, occupation, income, and banking experience. In term of gender, 71.0% of the respondent are male, while 29.0% are female, which indicates that there are more male than female respondents. 300 of the respondents are married, meanwhile 127 of respondents are still single. In term of age groups, 13 respondents are less than 20 years old, however 449 are between 20 - 49 years of total respondents and only 20 are 50 years old and above of total respondents. For the banking experience, only 20.3 percent use the banking services for a year while the majority 57.0 per cent are banks clients for 2-7 year, and 22.6 percent equals to 109 respondents are banking services users for more than 7 years.

Descriptive Analysis

In this study, Table 1 shows the mean and standard deviation of each core variable. The results indicate that, that the level of perceived ease of use is high among respondents, which indicates that respondents think that when mobile banking service is effort free compared to other banking channel, their intention to use such a service will increase. Furthermore, level of self-efficacy about using mobile banking services is moderate which leads to better understand of the usefulness of services and its easiness to use, therefore the intention will be raised. These results show that the respondents expect that their ability qualify them to extract the flexibility and good use of mobile banking to accept using mobile banking services. Moreover, the Intention of using mobile banking services in the future is good (4.77 out of 7).

Table 1. Mean and standard deviation

Construct	Item	Source	Loading (> 0.5)	M	SD	α (> 0.7)	CR (\geq 0.7)	AVE (> 0.5)
SE	SE1: I could use mobile banking if I could call someone for help if I got stuck.	(Yu, 2012)	0.84	3.50	1.81	0.900	0.901	0.752
	SE2: I could conduct my banking transactions using the mobile banking systems if I had just the built-in help facility for assistance.	(Luarn & Lin, 2005)	0.90					
	SE3: I could conduct my banking transactions using the mobile banking systems if someone showed me how to do it first.	(Luarn & Lin, 2005)	0.86					
PU	PU1: I think Mobile banking would enable me to improve performance of utilizing banking services.	(Al-somali et al., 2009)	0.92	4.72	1.80	0.947	0.947	0.857
	PU2: In General, I would find mobile banking useful.	(Akturan & Tezcan, 2012)	0.92					
	PU3: I think that Using mobile banking services will enhances my effectiveness in conducting my banking tasks.	(Lee et al., 2012)	0.94					
PEOU	PEOU1: I would find mobile banking easy to use	(Yu, 2012)	0.82	4.94	1.76	0.876	0.886	0.723
	PEOU2: Learning to use mobile phone banking would be easy	(Hanafizadeh et al., 2012)	0.91					
	PEOU3: I would find mobile banking services to be flexible to interact with.	(G. Liu, Huang, & Zhu, 2008)	0.82					
INT	INT1: Assuming I have access to mobile banking system, I intend to use it.	(Venkatesh And Davis, 2000)	0.94	4.77	1.88	0.839	0.964	0.900
	INT2: I would use the Mobile banking for my banking needs.	(Nasri & Charfeddine, 2012)	0.96					
	INT3: If I have access to the mobile banking system, I want to use it as much as possible.	(S. Al-Haderi, 2012)	0.84					

M = Mean; SD = Standard Deviation. The measurement used is seven-point scale ranging from 1 (strongly Disagree) to 7 (strongly Agree).

Key: SE: Self-Efficacy, PU: Perceived Usefulness, PEOU: Perceived Ease of Use, INT: Intention to Use Mobile Banking.

Measurement Model

Absolute fit indices determine how well and a priori model fits the sample data (McDonald & Ho, 2002). Based on the results of Confirmatory Factor Analyses (CFA) (Please see Appendix A), the Absolute fit indices show that the chi-square is not significant which is justifiable by the high sample size (Byrne, 2010), however model fit reported in RMSEA coefficient is .078, indicating good fit. Other indicators are not fit with GFI (.937). Meanwhile, Adjusted Goodness of Fit Index AGFI (.899) is fit, and Incremental fit indices indicate that both tests are fit since the NFI and CFI obtained are .970 and .977 respectively. Finally, Parsimony fit indices also indicate fit since the PGFI is .588 and PNFI is .720, thus the model fits well. In addition, thus the model fits well (Byrne, 2010; Kline, 2011). CFA model in this study, tested all variables simultaneously, not individually; because the hypothesised model integrates a small number of items for each of the latent variables. Generally, the goodness-of-fit statistics (see Table 2) support the integrity of the overall model. In the current study, the overall model fit reported in Table 2 shows that the overall fit indices for the CFA model are acceptable (Byrne, 2010; Hair, Hult, Ringle, & Rstedt, 2014; Kline, 2011), since Incremental fit indices and Parsimony fit indices are fulfilled.

Items used in this study are shown in Table 2, as well convergent validity was tested on CFA model before hypotheses testing. The convergent validity of the measurement model was tested by examining the factor loading, composite reliability, and Average Variance Extracted (AVE). High loadings (at least .50) on a factor indicate that the items converge on the same common point (Hair et al., 2014). The composite reliability is the same acceptable cut-off for the Cronbach's alpha (at least .70). High AVE values (greater than 0.5) show that the latent variables have high convergent validity (Hair et al., 2014). Results in Table 2 of composite reliability demonstrate values greater than 0.7 and AVE values more than 0.5, therefore, all variables have convergent validity (Hair, Black, Babin, & Anderson, 2010).

Table 2. Goodness-of-fit indices for the measurement model

Fit Index	Cited	Admissibility	Result	Fit (Yes/No)
X ²			192.791	
DF			49	
P value		>.05	.000	No
X ² /DF	(Kline, 2010)	1.00 - 5.00	3.935	Yes
RMSEA	(Steiger, 1990)	<.08	.078	Yes
GFI	(Jöreskog & Sörbom, 1993)	>.90	.937	Yes
AGFI	(Jöreskog & Sörbom, 1993)	>.80	.899	Yes
NFI	(Bentler & G.Bonnet, 1980)	>.80	.970	Yes
PNFI	(Bentler & G.Bonnet, 1980)	>.05	.720	Yes
IFI	(Bollen, 1990)	>.90	.977	Yes
TLI	(Tucker & Lewis, 1973)	>.90	.969	Yes
CFI	(Byrne, 2010)	>.90	.977	Yes
PGFI	(James, Muliak, & Brett, 1982)	>.50	.588	Yes

Note: X² = Chi Square, DF = Degree of freedom, GFI = Goodness-of-fit, NFI = Normed fit index, IFI = the increment fit index, TLI = Tucker-Lewis coefficient Index, CFI = Comparative-fit-index, RMSEA = Root Mean Square Error of Approximation, PNFI = Parsimony Normed Fit Index, AGFI = Adjusted Goodness of Fit Index

***The indexes in bold are recommended since they are frequently reported in literatures (Awang, 2014)

The Fornell-Larcker criterion is a more conservative approach to assess discriminant validity. It compares the value of the AVE with the latent variable correlations. Precisely, AVE should exceed the correlation with any other construct (Hair et al., 2014). The Fornell-Larcker criterion for the current study shown in Table 3; shows that AVE exceeds the correlation with any other construct.

Structural Model and Hypotheses Testing

Hypotheses proposed in this study were tested using structural equation modelling using AMOS software v. 21.0 as shown in Figure 4. Table 4 shows the structural model fit which provides the indication of testing the hypotheses. The p-values associated with each standardized path estimate are used to determine significance at an alpha level of .05.

Table 4 shows the results of the seven hypotheses built for this study. The structural equation modelling (SEM) analysis indicates that self-efficacy significantly predicts perceived ease of use ($\beta = .664, p < 0.001$) and also is significantly predicting the perceived usefulness ($\beta = .567, p < 0.001$), hence, H1 and H2 are supported. On the other hand, H3, is supported as the perceived usefulness notably influenced the intention to use mobile banking services. Moreover, perceived ease of use with

Table 3. Results of discriminant validity by Fornell-Larcker criterion

	Factors	1	2	3	4
		SE	PU	PEOU	INT
1	SE	0.867			
2	PU	0.782	0.926		
3	PEOU	0.652	0.721	0.850	
4	INT	0.806	0.874	0.752	0.949

Note: Note: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations.
 Key: SE: Self-Efficacy, PU: Perceived Usefulness, PEOU: Perceived Ease of Use, INT: Intention to Use Mobile Banking.

Figure 4. Research structural model results

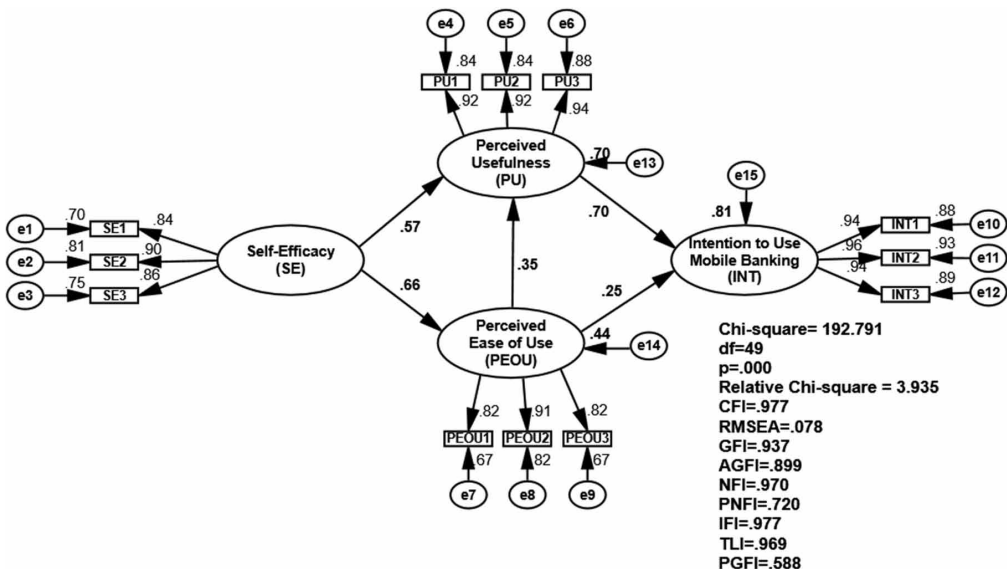


Table 4. Structural path analysis result

	Dependent Variables		Independent Variables	Relation	Std. Beta	S.E	C.R. t-Value	Finding
H1	PU	<---	SE	Positive	.567	.062	12.081***	Supported
H2	PEOU	<---	SE	Positive	.664	.0510	13.458***	Supported
H3	INT	<---	PU	Positive	.700	.041	17.257***	Supported
H4	PU	<---	PEOU	Positive	.347	.058	7.647***	Supported
H5	INT	<---	PEOU	Positive	.252	.052	6.349***	Supported

Note: SE: Self-Efficacy, PU: Perceived Usefulness, PEOU: Perceived Ease of Use, INT: Intention to Use Mobile Banking.
 ***p < .000; **p < .01; *p < .05; S.E = Standard Error, C.R = Critical Ratio

beta values $\beta = .347$, and $\beta = .252$ considerably predicts the perceived usefulness and the clients' intention to use mobile banking respectively, hence, H4 and H5 are supported.

Coefficient of Determination for the research proposed model shows, self-efficacy, and perceived ease of use explained 70% of the variance in perceived usefulness, whereas, self-efficacy explain 44% of the variance in perceived ease of use of using mobile banking services. Furthermore, 81% of the variance of intention to use mobile banking are explained by self-efficacy, perceived usefulness and perceived ease of use. According to Chin (1998) the R^2 of the perceived value of using mobile banking services in the current study is considered substantial.

Mediation Assessment

To test the mediation hypothesis H6 and H7 the Preacher & Hayes (2004) and Preacher & Hayes (2008) method of bootstrapping the indirect effect was applied.

H7: Perceived usefulness mediates the relationship between self-efficacy and the intention to use mobile banking.

The bootstrapping analysis showed that the indirect effect was significant with a t-value of 11.678 and $P = 0.001$ (** $p < 0.01$). As such, Preacher & Hayes (2008) indicated the indirect impact of self-efficacy on the intention through perceived usefulness, with 95% Boot CI: [LL = 0.263, UL = 0.683] does not straddle a 0 in between indicating there is mediation. Thus, we can conclude that the mediation effect is statistically significant, indicating that H6 was also supported (see Table 5).

H7: Perceived ease of use mediates the relationship between self-efficacy and the intention to use mobile banking.

Table 5. Mediation effect analysis

Hypothesis	Relationship	Std. Beta	S.E	C.R. t-Value	Finding
H6	SE → PU → INT	.712	.061	11.678**	Supported
H7	SE → PEOU → INT	.618	.093	6.642**	Supported

Source: (Preacher & Hayes, 2004, 2008)

Note: SE: Self-Efficacy, PU: Perceived Usefulness, PEOU: Perceived Ease of Use, INT: Intention to Use Mobile Banking.

**p < 0.01

In the same line, for hypothesis H7, the method used to test the Mediation effect is the method of bootstrapping via AMOS, based on (Preacher & Hayes, 2004, 2008); the indirect effect was applied. The bootstrapping analysis showed that the indirect effect was significant with a t-value of 6.642 and $P = 0.001$ (** $p < 0.01$). As such, Preacher & Hayes (2008) indicated the indirect effect of the self-efficacy on the intention over perceived ease of use, with 95% Boot CI: [LL = 0.263, UL = 0.683] does not straddle a 0 in between indicating there is mediation. Thus, we can conclude that the mediation effect is statistically significant, indicating that H7 is likewise supported (see Table 5).

DISCUSSION

In this study, the main objective was met, including the self-efficacy factor as an individual characteristic on TAM. The specific objective is to examine the influence of self-efficacy impact on the perceived usefulness and perceived ease of use and, therefore on the clients' intention to use mobile banking services among Yemeni banks' clients. Through testing hypotheses H1 and H2. Self-efficacy impact on the perceived usefulness, and perceived ease of use is found to have positive significant relationship with both constructs, with respect to β values, PEOU was the highest to be influenced by SE with ($\beta.667$) while PU ($\beta.567$). Thus, it is highly perceived that clients have the ability and knowledge to accept mobile banking services, this could be explained by the former experience of using similar technology as mobile phones and different banking channels. Consequently, this perception is increasing the perception of how useful and flexible the mobile banking services are. The finding comes in line with Abdullah et al. (2016) in their meta-analysis, who have explored the influence of SE in different applications, thirty-three of these reviewed researches showed that SE positively and significantly affected PEOU. Moreover, some studies (Hussein et al., 2007; Park, 2009) actually found a significant positive relationship between SE and students' perception of usefulness.

Like any emerging technology, potential users are worried about the time and effort required to learn and use mobile banking. If mobile banking usage is not easy to utilize, has no fast response, difficult to understand and learn then it will have very weak advantage. Consequently, banks' clients would take into account the technical knowledge required in using the mobile banking services when forming opinions about accepting it. The results in this research back to TAM, which found that ease of use construct is more notable in the early stages of adoption when obstacles are presented by process issues, and need to be overcome.

Alike to previous empirical studies on the adoption of technology, perceived usefulness is the highest concern for mobile banking potential users when determining the intention to use the service. One of the possible explanation for this finding could be that banks' clients are certain of the benefits and convenience of mobile banking over other e-banking channels and it satisfies their need. So, bank customers would already have perception that the service is useful; thus, they have higher intention to use the service.

Regarding the mediation test, findings have revealed promising mediating between self-efficacy and intention to use mobile banking services via perceived usefulness and perceived ease. It is found that perceived usefulness and perceived ease of use mediated the link between self-efficacy and intention. This finding has given special evidence of support to the original TAM in eastern setting. This increases the appropriateness of using original TAM specifically in mobile banking application. The adoption in a special setting: mobile banking in Yemen and the TAM has put a challenge to test in this unique environment, resulting in a model fit which gives original TAM a thumb's up. In sum, these results are justified, as has been suggested by the previous studies in the literature on technology usage; SE, PEOU, and PU are critical for the behavioural intention buildings.

IMPLICATION

As discussed earlier, Yemen has low ICT access and use comparing to the Arab world and the world. Results of this study gives providers of mobile banking services an insight of the importance of SE in affecting the Yemenis clients' intention to use mobile banking. The findings suggest that providers should focus more on self-efficacy and training for customers to improve their ability and confidence in using such a service. In addition, usefulness, and ease of use should be taken in account to improve mobile banking intention to adopt. More precisely, marketers need to make sure that mobile banking services are easier and more useful than using traditional banking channels.

There is a considerable potential market for mobile banking services but there are knowledge gaps in the market regarding the service that prevent the acceptance levels. To draw more people to use mobile banking, need to take practical proceedings such as, training and guidance to improve their ability, perception of its usefulness, and how easy the mobile banking services, that will lead to more uptake of mobile banking among clients.

The underpinning theory in this current research is the Technology Acceptance Model (TAM). Based on TAM, the conceptual model validates the self-efficacy as an individual characteristic to drive the perceived ease of use, and perceived usefulness, which therefore affect the behavioural intention to use mobile banking services. The results of the current study can be added to the body of literature for researches on mobile banking in Yemen.

The findings of the current research have remarkable suggestions that will be very helpful for the banking sector and also beneficial for the governmental related authorities to draw more clients and users for banking services.

LIMITATIONS AND SUGGESTIONS

Any study's contribution must be evaluated in light of its limitations, and this study is no exception. First, there are many constructs that affect the behavioural intention to adopt e-services. This study only focused on the self-efficacy. More variables that affect the mobile banking services acceptance need to be studied i.e. trialability and observability. Second, this study was embedded in the context of mobile banking specifically in Yemen, and no other electronic banking services. So, it is suggested to include other e-banking services to measure the perception of its acceptance and adoption behaviour among clients.

CONCLUSION

As Yemeni organizations have poor efficiency (Osama Isaac, Masoud, Samad, & Abdullah, 2016), face a challenge on how to increase the number of ICT user (Osama Isaac, Abdullah, Ramayah, & Mutahar Ahmed, 2017), as the studies show that ICT use lead to more productivity and effectiveness (Osama Isaac, Abdullah, Ramayah, Mutahar, & Alrajawy, 2017) and according to Altayar, (2016) there is a public awareness in developing countries in term of the importance of ICT usage, this study can provide banking industry in Yemen with important insights on how to make a more successful approach to design and implementation of information technology within organizations which probably lead to increased productivity and effectiveness (Osama Isaac, Abdullah, Ramayah, & Mutahar, 2017). The main objective of this study is to examine the effect of external variables that could affect the main constructs of TAM (PU, PEOU) in the context of Yemen to accept mobile banking services. Nevertheless, of the limitations of this study, results have managed to shed some lights on new variables of the intention to use mobile banking services in Yemen, which is encouraging results. In summary, self-efficacy increases the ease of use and usefulness perception of using mobile banking, since it positively affects both core constructs of

TAM. In addition, Mobile banking services have to present something new to the banks' clients among services that compete in the same category (E-banking services). Perceived usefulness has a great impact on the intention to use mobile banking services. As demonstrated by this study, after the banks' clients evaluate the mobile banking services based on their perceptions on its ease of use, usefulness, associated with their ability; their decision toward intention to use mobile banking services will be higher. The study results clearly show that SE is significant an antecedent of PU, and PEOU and therefore predicts the intention to use mobile banking services.

REFERENCES

- Abdullah, F., Ward, R., & Ahmed, E. (2016). Investigating the influence of the most commonly used external variables of TAM on students' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of e-portfolios. *Computers in Human Behavior, 63*, 75–90. doi:10.1016/j.chb.2016.05.014
- Agarwal, R., & Prasad, J. (1999). Are Individual Differences Germane to the Acceptance of New Information Technologies? *Decision Sciences, 30*(2), 361–391. doi:10.1111/j.1540-5915.1999.tb01614.x
- Akturan, U., & Tezcan, N. (2012). Mobile banking adoption of the youth market: Perceptions and intentions. *Marketing Intelligence & Planning, 30*(4), 444–459. doi:10.1108/02634501211231928
- Al-Haderi, S. (2012). *A framework to study factors influencing the acceptance of information technology in Yemen Government*. Universiti Utara Malaysia.
- Al-Haderi, S. M. S. (2013). The Effect of Self-Efficacy in the Acceptance of Information Technology in the Public Sector. *International Journal of Business and Social Science, 4*(9), 188–198.
- Al-Qeisi, K. I. (2009). *Analyzing the Use of UTAUT Model in Explaining an Online Behaviour: Internet Banking Adoption A*.
- Al-somali, S. A., Gholami, R., & Clegg, B. (2009). An investigation into the acceptance of online banking in Saudi Arabia. *Technovation, 29*(2), 130–141. doi:10.1016/j.technovation.2008.07.004
- Alrajawy, I., Mohd Daud, N., Isaac, O., & Mutahar, A. M. (2016). Mobile Learning in Yemen Public Universities: Factors Influence student's Intention to Use. In *Proceedings of the 7th International Conference on Postgraduate Education, Universiti Teknologi MARA (UiTM)*, Malaysia (pp. 1050–1064).
- Altayar, M. (2016). Investigating the Use of Web 2.0 Technologies and their Presence in Saudi Government Agencies' Websites. *International Journal of Technology Diffusion, 7*(2), 18–36. doi:10.4018/IJTD.2016040104
- Amin, H., Rizal, M., Hamid, A., Lada, S., & Anis, Z. (2008). The adoption of mobile banking in Malaysia. *The case of Bank Islam Malaysia Berhad, 9*(2), 43–53.
- Amin, H., Supinah, R., Aris, M. M., & Baba, R. (2012). Receptiveness of mobile banking by Malaysian local customers in Sabah. *Journal of internet banking and commerce, 17*(1), 1–12.
- Ariff, M. S. M., Yeow, S. M., Zakuan, N., Jusoh, A., & Bahari, A. Z. (2012). The Effects of Computer Self-Efficacy and Technology Acceptance Model on Behavioral Intention in Internet Banking Systems. *Procedia: Social and Behavioral Sciences, 57*, 448–452. doi:10.1016/j.sbspro.2012.09.1210
- Awang, Z. (2014). *Structural Equation Modeling Using AMOS*. Shah Alam, Malaysia: Universiti Teknologi MARA Publication Center.
- Bagozzi, R. P., & Phillips, L. W. (1982). Representing and Testing Organizational Theories : A Holistic Construal. *Administrative Science Quarterly, 27*(3), 459–489. doi:10.2307/2392322
- Barnes, S. J., & Corbitt, B. (2003). Mobile banking: Concept and potential Mobile banking : concept and potential. *International Journal of Mobile Communications, 1*(3), 273. doi:10.1504/IJMC.2003.003494
- Bentler, P. M., & Bonnet, G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*(3), 588–606. doi:10.1037/0033-2909.88.3.588
- Bhatiasevi, V., & Yoopetch, C. (2015). The determinants of intention to use electronic booking among young users in Thailand. *Journal of Hospitality and Tourism Management, 23*, 1–11. doi:10.1016/j.jhtm.2014.12.004
- Bollen, K. A. (1990). Overall fit in covariance structure models: Two types of sample size effects. *Psychological Bulletin, 107*(2), 256–259. doi:10.1037/0033-2909.107.2.256
- Brown, I. T. J. (2002). Individual and technological factors affecting perceived ease of use of web-based learning technologies in a developing country.
- Burton-Jones, A., & Hubona, G. S. (2006). The mediation of external variables in the technology acceptance model. *Information & Management, 43*(6), 706–717. doi:10.1016/j.im.2006.03.007

- Byrne, B. M. M. (2010). *Structural Equation Modeling with AMOS (second ED)*. Routledge.
- Chen, H.-R., & Tseng, H.-F. (2012). Factors that influence acceptance of web-based e-learning systems for the in-service education of junior high school teachers in Taiwan. *Evaluation and Program Planning*, 35(3), 398–406. doi:10.1016/j.evalprogplan.2011.11.007 PMID:22321703
- Chen, Y., Lin, Y., & Lou, S. (2013). Examining factors affecting college students' intention to use web-based instruction systems: towards an integrated model. *The Turkish Online Journal of Educational Technology*, 12(2), 111–121.
- Chin, W. W. (1998). Commentary: Issues and Opinion on Structural Equation Modeling. *Management Information Systems Quarterly*, 22(1), vii–xvi.
- Chuo, Y., Tsai, C., Lan, Y., & Tsai, C. (2011). The effect of organizational support, self efficacy, and computer anxiety on the usage intention of e-learning system in hospital. *African Journal of Business Management*, 5(14), 5518–5523. doi:10.5897/AJBM11.725
- Cudjoe, A. G., Anim, P. A., & Nyanyofio, J. G. N. T. (2015). Determinants of Mobile Banking Adoption in the Ghanaian Banking Industry: A Case of Access Bank Ghana Limited. *Journal of Computer and Communications*, 3(02), 1–19. doi:10.4236/jcc.2015.32001
- Davis, F. D. (1989). perceived Usefulness, Perceived ease of use, and User Acceptance of information technology. *MIS quarterly*, 13(3), 319–340.
- Elbadrawy, R., & Aziz, R. A. (2012). Mobile Banking Contexts and Prospects in Egypt: A Framework. In *Proceedings of the 2012 International Conference for Internet Technology And Secured Transactions* (pp. 766–771).
- Giovanis, A. N., Biniotis, S., & Polychronopoulos, G. (2012). An extension of TAM model with IDT and security / privacy risk in the adoption of internet banking services in Greece. *EuroMed Journal of Business*, 7(1), 24–53. doi:10.1108/14502191211225365
- Gu, J.-C., Lee, S.-C., & Suh, Y.-H. (2009). Determinants of behavioral intention to mobile banking. *Expert Systems with Applications*, 36(9), 11605–11616. doi:10.1016/j.eswa.2009.03.024
- Guriting, P., & Ndubisi, N. O. (2006). Borneo online banking: Evaluating customer perceptions and behavioural intention. *Management Research News*, 29(1/2), 6–15. doi:10.1108/01409170610645402
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis (7th Editio)*. Prentice Hall.
- Hair, J. F., Hult, T., Ringle, C., & Rstedt, M. S. (2014). *Partial least squares structural equation modeling (PLS-SEM)*.
- Hanafizadeh, P., Behboudi, M., Abedini Koshksaray, A., & Jalilvand Shirkhani Tabar, M. (2012). Mobile-banking adoption by Iranian bank clients. *Telematics and Informatics*, 31(1), 62–78. doi:10.1016/j.tele.2012.11.001
- Hong, W., Thong, J. Y. L., Wong, W.-M., & Tam, K.-Y. (2002). Determinants of User Acceptance of Digital Libraries. *An Empirical Examination of Individual Differences and System Characteristics*, 18(3), 97–124.
- Hsu, M.-H., & Chiu, C.-M. (2004). Internet self-efficacy and electronic service acceptance. *Decision Support Systems*, 38(3), 369–381. doi:10.1016/j.dss.2003.08.001
- Hussein, R., Aditiawarman, U., & Mohamed, N. (2007). *E-Learning acceptance in a developing country : A case of the Indonesian Open University*. German E-Science.
- Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017). Internet usage, user satisfaction, task-technology fit, and performance impact among public sector employees in Yemen. *International Journal of Information and Learning Technology*, 34(3), 210–241. doi:10.1108/IJILT-11-2016-0051
- Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017). Internet Usage and Net Benefit among Employees Within Government Institutions in Yemen: An Extension of Delone and Mclean Information Systems Success Model (DMISM) with Task-Technology Fit. *International Journal of Soft Computing*, 12(3), 178–198. doi:10.3923/ijscmp.2017.178.198

- Isaac, O., Abdullah, Z., Ramayah, T., Mutahar, A. M., & Alrajawy, I. (2016). Perceived Usefulness, Perceived Ease of Use, Perceived Compatibility, and Net Benefits: an empirical study of internet usage among employees in Yemen. In *Proceedings of the 7th International Conference Postgraduate Education (ICPE7)* (pp. 899–919).
- Isaac, O., Abdullah, Z., Ramayah, T., Mutahar, A. M., & Alrajawy, I. (2017). Towards a Better Understanding of Internet Technology Usage by Yemeni Employees in the Public Sector: An Extension of the Task-Technology Fit (TTF) Model. *Research Journal of Applied Sciences*, *12*(2), 205–223. doi:10.3923/rjasci.2017.205.223
- Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar Ahmed, M. (2017). Examining the Relationship Between Overall Quality, User Satisfaction and Internet Usage: An Integrated Individual, Technological, Organizational and Social Perspective. *Asian Journal of Information Technology*, *16*(1), 100–124. doi:10.3923/ajit.2017.100.124
- Isaac, O., Masoud, Y., Samad, S., & Abdullah, Z. (2016). The Mediating Effect of Strategic Implementation Between Strategy Formulation and Organizational Performance Within Government Institutions in Yemen. *Research Journal of Applied Sciences*, *11*(10), 1002–1013. doi:10.3923/rjasci.2016.1002.1013
- James, L. R., Muliak, S. A., & Brett, J. M. (1982). *Causal analysis: Models, assumptions and data*. Beverly Hills, CA: Sage.
- Jaradat, M. R., & Twaissi, N. M. (2010). Assessing the introduction of mobile banking in Jordan using the Technology Acceptance Model. *International Journal of Interactive Mobile Technologies*, *4*(1), 14–22.
- Jöreskog, K., & Sörbom, D. (1993). *LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language*. Chicago, IL: Scientific Software International Inc.
- Khalifa, M., & Shen, K. N. (2008). Explaining the adoption of transactional B2C mobile commerce. *Journal of Enterprise Information Management*, *21*(2), 110–124. doi:10.1108/17410390810851372
- Khraim, H., Shoubaki, Y., & Khraim, A. (2011). Factors affecting Jordanian consumers' adoption of mobile banking services. *International Journal (Toronto, Ont.)*, *2*(20), 96–105. Retrieved from http://ijbssnet.com/journals/Vol_2_No_20_November_2011/10.pdf
- Kim, B. G., Park, S. C., & Lee, K. J. (2007). A structural equation modeling of the Internet acceptance in Korea. *Electronic Commerce Research and Applications*, *6*(4), 425–432. doi:10.1016/j.elerap.2006.08.005
- Kim, G., Shin, B., & Lee, H. G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, *19*(3), 283–311. doi:10.1111/j.1365-2575.2007.00269.x
- Kleijnen, M., de Ruyter, K., & Wetzels, M. (2004). Consumer adoption of wireless services: Discovering the rules, while playing the game. *Journal of Interactive Marketing*, *18*(2), 51–61. doi:10.1002/dir.20002
- Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.
- Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling* (3rd ed.). London: The Guilford Press.
- Kocaleva, M., I. S. Z. Z. (2014). Research on UTAUT Application in Higher Education Institution. In *Proceedings of the International Conference on Information Technology and Development of Education*.
- Koenig-Lewis, N., Palmer, A., & Moll, A. (2010). Predicting young consumers' take up of mobile banking services. *International Journal of Bank Marketing*, *28*(5), 410–432. doi:10.1108/02652321011064917
- Laukkanen, T., & Cruz, P. (2009). Comparing Consumer Resistance to Mobile Banking in Finland and Portugal. In *Proceedings of the International Conference on E-Business and Telecommunications* (pp. 89-98). Springer.
- Lee, M.-C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, *8*(3), 130–141. doi:10.1016/j.elerap.2008.11.006
- Lee, S.-G., Trimi, S., & Kim, C. (2013). The impact of cultural differences on technology adoption. *Journal of World Business*, *48*(1), 20–29. doi:10.1016/j.jwb.2012.06.003
- Lee, Y.-K., Park, J.-H., Chung, N., & Blakeney, A. (2012). A unified perspective on the factors influencing usage intention toward mobile financial services. *Journal of Business Research*, *65*(11), 1590–1599. doi:10.1016/j.jbusres.2011.02.044

- Lian, J. (2015). Critical factors for cloud based e-invoice service adoption in Taiwan: An empirical study. *International Journal of Information Management*, 35(1), 98–109. doi:10.1016/j.ijinfomgt.2014.10.005
- Lin, H.-F. (2011). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. *International Journal of Information Management*, 31(3), 252–260. doi:10.1016/j.ijinfomgt.2010.07.006
- Lin, H.-F. (2013). Determining the relative importance of mobile banking quality factors. *Computer Standards & Interfaces*, 35(2), 195–204. doi:10.1016/j.csi.2012.07.003
- Lindsay, R., Jackson, T. W., & Cooke, L. (2011). Adapted technology acceptance model for mobile policing. *Journal of Systems and Information Technology*, 13(4), 389–407. doi:10.1108/13287261111183988
- Liu, G., Huang, S., & Zhu, X. (2008). User acceptance of Internet banking in an uncertain and risky environment. In *Proceedings of the 2008 International Conference on Risk Management & Engineering Management* (pp. 381–386). doi:10.1109/ICRMEM.2008.82
- Liu, S., & Yuan, C. (2005). Applying the technology acceptance model and flow theory to online e-learning users' acceptance behavior. *Issues in Information Systems*, VI(2), 175–181.
- Liu, Z., & Min, Q. (2009). An Empirical Study on Mobile Banking Adoption: The Role of Trust. In *Proceedings of the Second International Symposium on Electronic Commerce and Security ISECS '09* (Vol. 2, pp. 7-13). doi:10.1109/ISECS.2009.150
- Luarn, P., & Lin, H.-H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, 21(6), 873–891. doi:10.1016/j.chb.2004.03.003
- Luo, X., Li, H., Zhang, J., & Shim, J. P. (2010). Examining multi-dimensional trust and multi-faceted risk in initial acceptance of emerging technologies: An empirical study of mobile banking services. *Decision Support Systems*, 49(2), 222–234. doi:10.1016/j.dss.2010.02.008
- Macharia, J., & Nyakwende, E. (2009). Factors affecting the adoption and diffusion of Internet in higher educational institutions in Kenya. *Journal of Language, Technology & Entrepreneurship in Africa*, 1(2), 6–23.
- Martins, C., Oliveira, T., & Popovič, A. (2014). Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, 34(1). doi:10.1016/j.ijinfomgt.2013.06.002
- Mawona, A., & Mpogole, H. (2013). ICT and Financial Inclusion: Adoption of Mobile Phone Banking Among Small Business Owners in Iringa, Tanzania.
- Mcdonald, R. P., & Ho, M. R. (2002). Principles and Practice in Reporting Structural Equation Analyses. *Psychological Methods*, 7(1), 64–82. doi:10.1037/1082-989X.7.1.64 PMID:11928891
- Miles, J. N. (2000). Statistical software for microcomputer: AMOS 4.0. *British Journal of Mathematical & Statistical Psychology*, 53(1).
- Moon, J. W., & Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information and Management*, 38(June 2000), 217–230.
- Mutahar, A. M., Daud, N. M., Ramayah, T., Putit, L., Isaac, O., & Alrajawy, I. (2016). The Role of Trialability, Awareness, Perceived Ease of Use, and Perceived Usefulness in Determining the Perceived Value of Using Mobile Banking in Yemen. In *Proceedings of the 7th International Conference Postgraduate Education (ICPE7)* (pp. 884–898).
- Mutahar, A. M., Mohd Daud, N., Ramayah, T., Isaac, O., & Alrajawy, I. (2017). Integration of Innovation Diffusion Theory (IDT) and Technology Acceptance Model (TAM) to Understand Mobile Banking Acceptance in Yemen: The Moderating Effect of Income. *International Journal of Soft Computing*, 12(3), 164–177. doi:10.3923/ijscmp.2017.164.177
- Nasri, W., & Charfeddine, L. (2012). Factors affecting the adoption of Internet banking in Tunisia: An integration theory of acceptance model and theory of planned behavior. *The Journal of High Technology Management Research*, 23(1), 1–14. doi:10.1016/j.hitech.2012.03.001

Ngai, E. W. T., Poon, J. K. L., & Chan, Y. H. C. (2007). Empirical examination of the adoption of WebCT using TAM. *Computers & Education*, 48(2), 250–267. doi:10.1016/j.compedu.2004.11.007

Norzaidi, M. D., Ezalin, N., Kassim, M., Seri, W., Wan, R., Said, M., & Noor, M. M. (2011).. . *Determining Critical Success Factors of Mobile Banking Adoption in Malaysia*, 5(9), 252–265.

Oliveira, T., Martins, M. F., & De Lisboa, U. N. (2011).. . *Literature Review of Information Technology Adoption Models at Firm Level*, 14(1), 110–121.

Park, E., & Kim, K. J. (2014). An Integrated Adoption Model of Mobile Cloud Services: Exploration of Key Determinants and Extension of Technology Acceptance Model. *Telematics and Informatics*, 31(3), 376–385. doi:10.1016/j.tele.2013.11.008

Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning research hypotheses. *Journal of Educational Technology & Society*, 12(3), 150–162.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717–731. doi:10.3758/BF03206553 PMID:15641418

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891. doi:10.3758/BRM.40.3.879 PMID:18697684

Raman, A., Don, Y., Khalid, R., Hussin, F., Omar, M. S., & Ghani, M. (2014). Technology Acceptance on Smart Board among Teachers in Terengganu Using UTAUT Model. *Asian Social Science*, 10(11). doi:10.5539/ass.v10n11p84

Rana, N. P., Dwivedi, Y. K., Williams, M. D., & Weerakkody, V. (2014). Investigating success of an e-government initiative: Validation of an integrated IS success model. *Information Systems Frontiers*, 17(1), 127–142. doi:10.1007/s10796-014-9504-7

Riivari, J. (2005). Mobile banking: A powerful new marketing and CRM tool for financial services companies all over Europe. *Journal of Financial Services Marketing*, 10(1), 11–20. doi:10.1057/palgrave.fsm.4770170

Sánchez, R. A., & Hueros, D. (2010). Motivational factors that influence the acceptance of Moodle using TAM. *Computers in Human Behavior*, 26(6), 1632–1640. doi:10.1016/j.chb.2010.06.011

Sentosa, I. (2012). A structural equation modeling of internet banking usage in Malaysia. *Journal of Arts, Science & Commerce*, III(1), 75–86.

Shaikh, A. A., & Karjaluo, H. (2015). Mobile banking adoption: A literature review. *Telematics and Informatics*, 32(1), 129–142. doi:10.1016/j.tele.2014.05.003

Shen, Y.-C., Huang, C.-Y., Chu, C.-H., & Hsu, C.-T. (2010). A benefit–cost perspective of the consumer adoption of the mobile banking system. *Behaviour & Information Technology*, 29(5), 497–511. doi:10.1080/01449290903490658

Singh, S., Srivastava, V., & Srivastava, R. K. (2010). Customer Acceptance of Mobile Banking: A Conceptual Framework. *Journal of Vascular Surgery*, 7(1), 55–64. doi:10.1016/j.jvs.2013.03.003 PMID:20620765

Sripalawat, J., Thongmak, M., & Ngramyarn, A. (2011). M-banking in metropolitan Bangkok and a comparison with other countries.

Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25(2), 173–180. doi:10.1207/s15327906mbr2502_4 PMID:26794479

Suoranta, M., & Mattila, M. (2004). Mobile Banking and Consumer Behaviour. New Insights into the Diffusion Pattern. *Journal of Financial Services Marketing*, 64(2), 354–366. doi:10.1057/palgrave.fsm.4770132

Tan, E., Leby, J., Tan, E., & Lau, J. L. (2016). Behavioural intention to adopt mobile banking among the millennial generation. *Young Consumers*, 17(1), 18–31. doi:10.1108/YC-07-2015-00537

- Tarcan, E., Varol, E., & Toker, B. (2010). A study on the acceptance of information technologies from the perspectives of the academicians in Turkey. *Ege Akademik Bakış [Ege Academic Review]*, 10(3), 791–812.
- The Global Innovation Index. (2015). *ICT Access and Use: Yemen Vs. Arab Countries*.
- Tobbin, P. (2012). Towards a model of adoption in mobile banking by the unbanked: A qualitative study. *Info*, 14(5), 74–88. doi:10.1108/14636691211256313
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38(1), 1–10. doi:10.1007/BF02291170
- Turban, E., King, D., Lee, J. K., & Viehland, D. (2006). *Electronic Commerce 2006: A Managerial Perspective* (4th ed.). Prentice Hall.
- Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information Systems Research*, 11(4), 342–365. doi:10.1287/isre.11.4.342.11872
- Venkatesh, V., & Davis, F. D. (1996). A Model of the Antecedents of Perceived Ease of Use: Development and Test. *Decision Sciences*, 27(3), 451–481. doi:10.1111/j.1540-5915.1996.tb01822.x
- Venkatesh, V., & Morris, M. G. (2000). Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior. *Management Information Systems Quarterly*, 24(1), 115–139. doi:10.2307/3250981
- Venkatesh And Davis, F. (2000). A Theoretical Extension of the Technology Acceptance Model: Four longitudinal field studies. *Management science*, 46(2), 186–204.
- Wang, Y.-S., Lin, H.-H., & Luarn, P. (2006). Predicting consumer intention to use mobile service. *Information Systems Journal*, 16(2), 157–179. doi:10.1111/j.1365-2575.2006.00213.x
- Wang, Y.-S., Wang, Y.-M., Lin, H.-H., & Tang, T.-I. (2003). Determinants of user acceptance of Internet banking: An empirical study. *International Journal of Service Industry Management*, 14(5), 501–519. doi:10.1108/09564230310500192
- World Development Indicators. (2016). *Mobile Subscription Among Arab Countries*, World Bank. The World Bank; doi:10.1596/978-1-4648-0163-1
- World Economic Forum. (2014). *The Global Competitiveness Report*.
- Yu, C. (2012). Factors affecting individuals to adopt mobile banking: empirical evidence from the Utaut model. *Journal of Electronic Commerce Research*, 13(2), 104–121.
- Zhou, T. (2012). Understanding users' initial trust in mobile banking: An elaboration likelihood perspective. *Computers in Human Behavior*, 28(4), 1518–1525. doi:10.1016/j.chb.2012.03.021
- Zolait, A. H. S. (2010). An examination of the factors influencing Yemeni Bank users' behavioural intention to use Internet banking services. *Journal of Financial Services Marketing*, 15(1), 76–94. doi:10.1057/fsm.2010.1

Ahmed Mohammed Mutahar holds a degree in Computer Information Systems from Mutah University, Jordan. He received his master degree in Computer science from UPM, University Putra Malaysia, Malaysia, and is a PhD candidate at the Faculty of Business Management, Universiti Teknologi Mara UITM, Malaysia. His research focuses on the acceptance of mobile banking.

Norzaidi Mohd Daud holds a PhD in Management (Human-Technology Interaction) from Multimedia University, Malaysia under the Universiti Teknologi MARA Graduate Scholarship. He holds a Master of Management from International Islamic University, Malaysia Bachelor of Science in Business Administration (International Business/ Finance), Bowling Green State University, Ohio, USA. His publications have appeared in: Information Management & Computer Security, Industrial Management & Data Systems, Australian Journal of Basic and Applied Sciences, and Journal of Computer Information Systems, Recently, he has published 7 books and over 100 articles in ISI WOS/WOK, SCOPUS, ERA journal outlets, as well as conference proceedings.

Ramayah Thurasamy is currently a Professor of Technology Management at the School of Management, Universiti Sains Malaysia, Visiting Professor King Saud University, Kingdom of Saudi Arabia and Adjunct Professor at Sunway University, Multimedia University and Universiti Tenaga Nasional, Malaysia. He has taught courses in Statistics, Operations Management, Research Methods, Forecasting and Computer Literacy at undergraduate level. He has supervised numerous PhD/MA/MBA students in the fields of Information Systems, Operations Management, Marketing Management and Organizational Behavior. He is also currently supervising numerous students at the MA and PhD levels. His areas of interest include Technology Management and also the use of quantitative methods in management research. His publications have appeared in Information & Management, International Journal of Operations & Production Management, Tourism Management, Journal of Travel Research, Internet Research, Journal of Environmental Management, Technovation, Information Systems, Journal of Business Ethics, Journal of Business Economics and Management, Computers in Human Behavior, Resources, Conservation and Recycling, International Journal of Information Management, Evaluation Review, Information Research, Asian Journal of Technology Innovation, Social Indicators Research, Quantity & Quality, Service Business, Knowledge Management Research & Practice, Journal of Medical System, International Journal of Production Economics, Personnel Review, and Telematics and Informatics, among others. His full profile can be accessed here: <http://www.ramayah.com>.

Osama Isaac holds a degree in Computer Science from Mutah University, Jordan. He received his master degree in Computer science specialized on multimedia from UPM, University Putra Malaysia, Malaysia, and is a Doctoral researcher in the Arshad Ayub Graduate Business School (AAGBS) at Universiti Teknologi MARA (UiTM), His research on the area of Management Information Systems focus on the antecedents and consequences of Technology usage within organizations.

Rasheed Abdulsalam obtained his degree in dentistry from Kiev and Master degree from Baghdad-Iraq. His PhD is from University Malaya. He is currently the dean of dentistry at Lincoln University College.