Internet Banking Adoption: Integrating Technology Acceptance Model and Trust

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Abstract

Rejection of Internet banking is one of the most important problems that faces banks in developing countries. So far, very few academic studies have been conducted on Internet banking adoption in Arab countries. Hence, this research aims to investigate factors that influence the intention to use Internet banking in Yemen. Cross-sectional data were collected from 1286 respondents through a survey. Structural equation modeling was employed to analyze data. The findings supported the research hypotheses and confirmed that perceived relative advantages, perceived ease of use, trust of the Internet banking all impact attitude toward the intention of adopting Internet banking. This paper makes a contribution to Internet banking literature. It sheds light on the factors that affect Internet banking adoption. The findings made a contribution in terms of understanding the factors that can contribute to the adoption of Internet banking by Yemeni consumers..

Keywords: Internet banking, Technology adoption, trust, Structural equation modeling

1. Introduction

Internet banking (IB) is the most advance channel in financial services. Internet banking offers many benefits to banks, as well as to customers. However, when comparing globally, the percentage of Internet banking in Yemen users is not as high in the USA as in other regions around the world. There can be several reasons behind this phenomenon. Customer's use of Internet banking requires acceptance of the technology, which can be complicated because it involves the changing of behavioral pattern. Moreover, Internet technology could be difficult for some customers understand. Besides that the consumers also need to understand the complex nature of financial services. In addition, Internet banking trust is more important because transactions of this nature include sensitive information and parties concerned in the financial transaction are concerned about access to critical files, and information transferred via the Internet (Bradley and Stewart 2003; Suh and Han 2002). The understanding of factors that effect on intention, could contribute in increasing the acceptance of the Internet banking usage. Internet banking is relatively new, especially in a Yemeni banking environment (Zolait, 2011). Many banks in Yemen invest a huge amount of money in the banking system. Unfortunately, the rate of usage of the Internet banking is still low compared to the European countries and the United States of America. Therefore, Internet banking acceptance is studied by examining the causes behind reluctant customers to use Internet banking. In addition, there is still very few studies that conducted on Internet banking in Arab countries, in general, and in Yemen, in particular. Therefore, this study attempts to fill this gap.

2. Theoretical Background

A great deal of research has been conducted to determine factors that influence the adoption of a new technology. Due to a lack of grounded theory in the information technology (IT) field, researchers have turned to models that have been developed in other areas as a foundation for their research. In the case of predicting an individual's intention to adopt IT, information systems (IS) researchers have borrowed intention models from social psychology as the foundation for their research (Özer and Yilmaz, 2011). The following discussed of literature review serve as a base for the development study model.

2.1 Technology Acceptance Model (TAM)

After an extensive review of the information systems literature, Davis (1989) developed the Technology Acceptance Model (TAM). TAM as it is commonly known was adapted from the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). TAM has been the most influential theoretical tool for explaining the user acceptance

of technology in terms of numbers of the citations it has received (Venkatesh, Davis & Morris, 2007). In fact, TAM has been claimed to have become so influential. TAM's pre-eminence has led scholars to discuss whether it has reached a paradigmatic position (Benbasat & Barki, 2007). At the same time, TAM led to other important aspects of technology adoption behavior being neglected or unnoticed (Lee, Kozar & Larsen, 2003). TAM views perceived usefulness and perceived ease of use as the most salient beliefs influence an individual's decision to adopt new technology.

3. Research Model and Hypotheses Development

This study aims to provide a theoretically justified research model that integrates Internet banking trust with TAM factors. Then the researcher tested the factors' effect on the intention empirically. The research model is presented in Figure 1. The following literature review explains hypotheses and the relationship between variables.
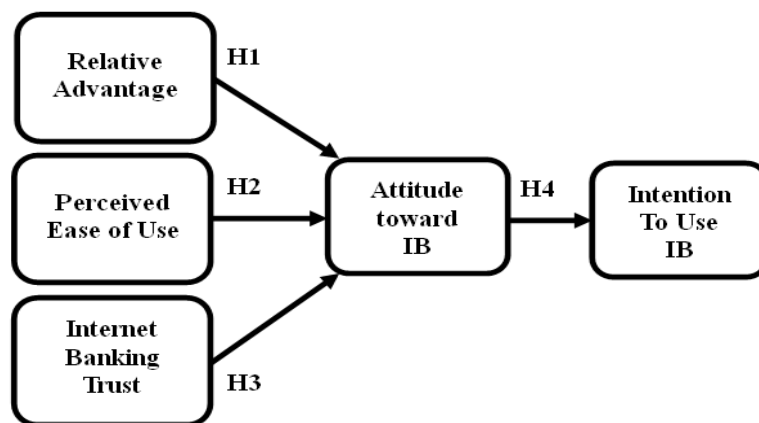.

Figure 1. Research Model

3.1 Relative Advantage

Relative advantage is defined as "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers, 2003, p. 229). Relative advantages refer to the degree to which an innovation provides benefits, which supersede those of it precursor and may incorporate factors such as economic benefits, image enhancement, convenience and satisfaction (Rogers, 2003). This construct was found to be similar to perceived usefulness construes in TAM (Davis, 1989) which was defined as "the degree to which a person believes that using a particular system would enhance his or her job performance." Both constructs relative advantages and perceived usefulness were found to have similar definition and related to two things (improvement in performance). In addition, both constructs were found to have been operationalized in terms of their relative impact on performance (Davis, 1989; Moore & Benbasat, 1991). The positive influence of relative advantage on individuals' intention to adopt Internet banking has been found in several previous studies (e.g., Hernandez and Mazzon, 2007; Kolodinsky, Hogarth and Hilgert, 2004). In this study, we define the relative advantage as the degree to which Internet banking is perceived as being better than the idea it supersedes. Therefore, we posited that:

H 1: Perceived relative advantage of using Internet banking positively affects the attitude toward using the technology

3.2 Perceived Ease of Use

Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 323). Perceived ease of use was found to influence the adoption of Internet banking service (e.g., Huang, 2008; Hsu, Wang & Chiu, 2009; Lee, 2009; Norazah & Norbayah, 2009; Sudha, Singh, Singh & Singh, 2010; Wei, Chong, Ooi & Arumugam, 2009). Generally, when a system is found to be easy to use, users will have the intention to use the system. Here, we define ease of use as the extent to which customer' use of Internet

banking services is perceived as easy or effortless. Accordingly, we hypothesize that:

H 2: Perceived ease of use of using Internet banking positively affects the attitude toward using the technology.

3.3 Trust

Trust is defined as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Mayer, Davis & Schoorman, 1995, p. 712).

Trust has played a significant role in e-commerce activities is the fact that in a virtual setting, the degree of uncertainty of economic transactions is higher than in traditional settings (Md Nor & Pearson, 2007; Rotchanakitumnuai & Speece, 2003). The effect of trust on attitude has been validated in studies related to the Internet banking domain (e.g., Alsajjan & Dennis, 2010; Al-Somali, Gholami & Clegg, 2009; Amoroso & Hunsinger, 2008; Grabner-Krauter & Faullant, 2008; Teo & Liu, 2007). Therefore, in the context of individuals' trust of Internet banking services, it is expected that individuals with a high degree of trust will be more likely to have positive attitude toward Internet banking services than are individuals with less trust. This leads to proposing that:

H 3: Trust significantly and positively influences an attitude toward Internet banking.

3.4 Attitude

Attitude is defined as "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (Ajzen, 1991, p. 188). Attitude plays an important role in influencing individuals' intention to adopt a new technology. In the case of Internet banking adoption, individuals who believe that Internet banking would bring positive consequences would hold a favorable attitude toward Internet banking, while individuals who believe that Internet banking would bring negative consequences would hold an unfavorable attitude toward Internet banking. The effect of attitude on intention has been confirmed in the Internet banking domain (e.g., Agarwal, Rastogi and Mehrotra, 2009; Al-Majali and Nik Mat, 2010; Jaruwachirathanakul and Fink, 2005; Kuisma, Laukkanen and Hiltunen, 2007;   Lee, 2009; Md Nor, AbuShanab and Pearson, 2008; Suh and Han, 2002; Tan and Teo, 2000). It can be concluded that, the attitude has played a significant role in influencing an individual's intention to adopt new technology. Therefore, the following hypothesis is presented:

H4: Attitude about Internet banking positively affects the intention to use the technology.

4. Research Methodology

4.1 Instrument Development

The instrument was designed to evaluate the strength of the relationship. Items to measure behavioral intention, attitude, were generated based on the procedures suggested by Ajzen and Fishbein (1980) and Md Nor and Pearson (2008), containing five items for intention and four items for attitude. Items to measure the relative advantage was adapted from the measurement developed by Tan and Teo (2000), containing four items. Items to measure perceived ease of use was adapted from the measurements developed by Davis et al. (1989), containing four items. Items to measure Internet banking trust was adapted from the measurements developed by Md Nor & Pearson (2008), containing four items. All items designed based on a seven-point Likert's scales, ranging from ''disagree strongly'' (1) to ''agree strongly'' (7).

4.2 Participants and Data collection

Participants in the study were banks' customers who have never used the Internet banking service at four banks that provide the Internet banking service in Yemen. A personally-administered questionnaire method was employed in the survey. The questionnaire was distributed at four banks in Yemen. A total of 1500 questionnaires was distributed in this study. One thousand and four hundred forty-six (1446) questionnaires were returned, indicating a 96.4 percent rate of return. The final count for this study was 1286 cases after excluding incomplete questionnaires, responses from users of Internet banking, missing data and outliers. Sample demographics are depicted in Table 1.

Table 1. Demographic profile of respondents

Variables	Category	Frequency	Percent
Gender	Male	1098	85.4
	Female	188	14.6
Age	18-24	201	15.6
	25-34	420	32.7
	35-44	210	16.3
	45-54	261	20.3
	55 and older	194	15.1
Education	School certificate	144	11.2
	Diploma	315	24.5
	Bachelor	404	31.4
	Master	204	15.9
	Ph.D	184	14.3
	Other	35	2.7
Occupation	Student	205	15.9
	Self-employed	478	37.2
	Officer in government sector	300	23.3
	Officer in a private sector	265	20.6
	Unemployed	34	2.6
	Other	4	0.3
Income (Yemeni Rial)	Less than 40000	224	17.4
	40, 001-70,000	291	22.6
	70,001-100,000	415	32.3
	More than 100,001	356	27.7
IB Knowledge	Yes	897	69.8
	No	389	30.2
IB Awareness	Yes	699	54.4
	No	587	45.6

Eighty-five percent (85%) of the respondents were male and 15% were female. In terms of age, the respondents 16% were in the 18-24 age group; 33% were 25-34 in age; 16% were 35-44 in age, and 20% were 45-54. Few were under the age of 18, or over 55. It can also be observed that the majority of the sample holds a Bachelor qualification 31%, followed by Diploma holders 25%, and Ph.D (14%). Other demographic details can be found in Table 1.

5. Analyses and Result

Structural equation modeling (SEM) was employed to analyze the collected data. The two-step of analysis were used as suggested by Hair, Black, Basin, and Anderson, (2010). First, we examined the measurement model to measure reliability and validity. Then, we examined the structural model to investigate the strength and direction of the relationships among the theoretical constructs.

5.1 Measurement model

A confirmatory factor analysis (CFA) using AMOS version 18 packages was used to test the measurement model. As shown in Table 2, all individual measurement model indices exceed their respective common acceptable levels recommended by previous researchers, thus demonstrating that the measurement model posited a good fit with the data collected (Bryne, 2008; Kline, 2005).

Table 2. Measure of the measurement model fit

Goodness of Fit Measures	Recommended Value	Measurement Model
X^2/df	>1 and < 5	2.040
GFI	≥ 0.90	0.944
NFI	≥ 0.90	0.952
IFI	≥ 0.90	0.959
TLI	≥ 0.90	0.966
CFI	≥ 0.90	0.959
RMSEA	< 0.08	0.056

The measurement quality of these reflective instruments was assessed based on their convergent validity, reliability, and discriminant validity. Convergent validity is suggested if factor loadings (FL) are 0.60 or higher (Hair et al., 2010). As shown in Table 3, all indicators exceed recommended threshold of 0.6. Thus, convergent validity was established. We then assessed the reliabilities of all latent constructs using Cronbach alpha (CA), composite reliability (CR) and average variance extracted (AVE). A scale is considered reliable if it has CA and CR above 0.7 and AVE above 0.5 (Hair et al., 2010; Kline, 2005). As shown in Table 3, all the scales were reliable.

Regarding, discriminant validity the result of AVE is well above 0.5 and is significant at p = 0.001. According to Hair et al., (2010) the correlations between items in any two constructs should be lower than the square root of the average variance shared by items within a construct. Based on the result in Table 3 and 4, discriminant validity is supported for all constructs (Fornell & Larcker, 1981). In brief, the measurement model demonstrated adequate reliability and validity.

Table 3. Cronbach's alpha, Composite reliability and Average variance extracted

Code	Variable	Range Factor Loading	Cronbach's alpha	Composite reliability	Average Variance Extracted
RA	Relative Advantage	0.91-0.96	0.921	0.937	0.753
EU	Perceived Ease of Use	0.81-0.94	0.939	0.949	0.834
TU	Trust	0.89-0.95	0.951	0.965	0.850
AT	Attitude	0.88-0.93	0.905	0.919	0.754
IN	Behavioral Intention	0.85-0.95	0.916	0.924	0.824

Table 4. Discriminant validity

Construct	RA	EU	TU	AT	IN
RA	**0.867**				
EU	0.440	**0.898**			
TU	0.388	0.507	**0.934**		
AT	0.141	0.498	0.201	**0.892**	
IN	0.632	0.319	0.489	0.309	**0.863**

Note: Diagonal elements are square roots of the average variance extracted.

5.2 Structural model

In the second step of the structural equation model, we test structural model. Table 5 present structural model test results. From Table 5, it can be clearly seen that model's key statistics are very good. We can thus safely conclude that the model is valid, and we can continue to analyze the outcome of the hypothesized effects.

Table 5. Measure of the structural model fit

Goodness of Fit Measures	Recommended Value	Structural Model
X^2/df	>1 and < 5	2.436
GFI	≥ 0.90	0.886
NFI	≥ 0.90	0.943
IFI	≥ 0.90	0.948
TLI	≥ 0.90	0.941
CFI	≥ 0.90	0.947
RMSEA	< 0.08	0.061

6. Results of hypothesis testing

The results of this study provide support for the research model and for the hypotheses regarding the directional linkage between the model's variables. The parameter unstandardized coefficients and standard errors for the structural model are shown in Table 6. The results of the structural and the standardized path coefficients between constructs are presented in Figure 2. All paths were significant. In addition, the explanatory power of our research model is estimated that the predictors of behavioral intention explain 56.7 percent of its variance. In other words, the error variance of behavioral intention is approximately 43.3 percent of the variance of behavioral intention itself. Several insightful results could be summarized from our research framework, and these are presented below.

Table 4: Results of structural modeling analysis

Independent	Relationship	Dependent	Estimate	S.E.	C.R.	P	Result
RA	→	AT	0.174	0.019	3.974	***	Supported
EU	→	AT	0.236	0.025	9.723	***	Supported
TU	→	AT	0.243	0.022	10.817	***	Supported
AT	→	IN	0.706	0.023	30.887	***	Supported
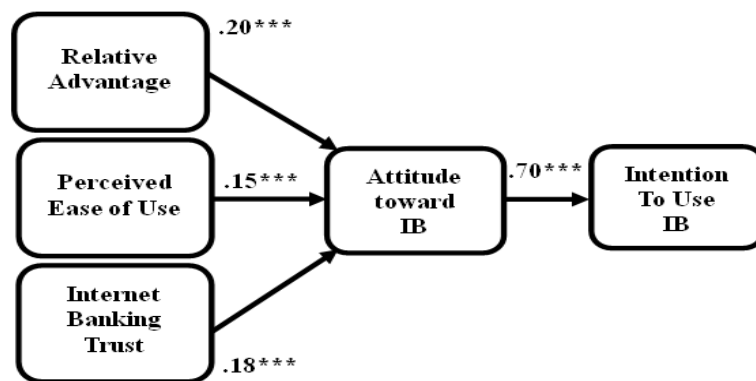
*** P< 0.001

Figure 2. Results of structural modeling analysis

7. Discussion and Implications

Table 6 shows that relative advantage (β = 0.174, p < 0.001) has a direct positive and significant effect on customers' attitude. Thus, H1 was supported where individuals believe that it is convenient to use Internet banking services and also efficient to use it. This result is analogous to Kolodinsky et al. (2004), Hernandez and Mazzon (2007) stating that perceived relative advantage is a major determinant of individuals, attitude toward adopting Internet banking service. The significant effect of the perceived relative advantage on attitude is not surprising given the fact that the extrinsic benefits of using Internet banking are numerous. Banks should publicize these benefits to create a positive attitude among its customer towards Internet banking.

Findings in Table 6 also confirmed that perceived ease of use (β = 0.236, p < 0.001) significantly influence individuals' attitude toward behavior intention to use Internet banking service. Hence, H 2 was verified. The positive attitude to use Internet banking services is due to the reasons that individual's may learn to use Internet banking quickly and unearth that it is easy to use it. This corroborates the finding by Davis et al. (1989), Norazah & Norbayah (2009), and Sudha et al. (2010).

Next, H3 exhibited a significant relationship between Internet banking trust and attitude toward behavioral Intention (β = 0. 0.243, < 0.001). Therefore, H3 was supported. The results of this study are supported by a number of previous studies, which asserts the significant effect of trust on individual attitudes toward adoption of new innovation (Shih, 2007; Md Nor & Pearson, 2007; Grabner & Faullant, 2008). The findings indicate that trust of using the Internet banking is high, and it is considered as one of the main factors influencing the intention, because of the degree of uncertainty of a virtual setting of economic transactions is higher than in traditional settings (Md Nor & Pearson, 2007; Grabner-Kraäter & Faullant, 2008).

The final hypothesis, H4 proposed that attitude will have a positive effect on intention to use Internet banking services. H4 was also supported as (β = 0.706, p < 0.001). The attitude had a strong positive and highly significant influence on Intention to use Internet banking services. This finding was consistent with past studies (e.g., Agarwal et al., 2009; Al-Majali and Nik Mat, 2010; Jaruwachirathanakul and Fink, 2005; Kuisma, Laukkanen and Hiltunen, 2007; Lee, 2009; Md Nor, AbuShanab and Pearson, 2008; Suh and Han, 2002; Tan and Teo, 2000). Encouragingly, banks' customers believe that using the Internet banking would be a pleasant experience for them, as it is a good idea. They would be able to use the Internet banking well because they have the resources, knowledge and ability to use it successfully.

8. Conclusion

This paper has examined the relationship between perceived relative advantages, perceived ease of use, Internet banking trust, attitude and customers' intention to use Internet banking service. The results provide evidence for the theoretical model embracing TAM, and the constructs perceived Internet banking trust. The results support the view that perceived relative advantages, perceived ease of use, Internet banking trust are predicting variables. They have played a significant role in influencing individuals' attitudes toward adoption of Internet banking. At the same time, the result showed that attitude has a significant and positive effect on individuals' intention to adopt Internet banking services. All hypotheses were supported. As it is clear from the key fit statistics, the model testing yielded a set of fit indices with an overall well-fit, indicating that the model fitted well with the data. The results of hypothesis testing provide satisfactory support for the integrated TAM with trust through the SEM analysis. Overall, the results indicate that the model provides a good understanding of factors that influence the intention to use Internet banking. The model explains approximately 56.7 % of the variance on the individuals' behavioral intention.

9. Limitations and future studies

There are several limitations in this study. Firstly, this study has examined only the determinants of behavioral intention. Although beyond the scope of this research, future study can enhance the research model, and include the determinants of re-intention or continue of using new technology. Secondly, our research is conducted specifically in Yemen. However, it would be interesting to test this model in other countries and compare the results with this study. Such cross comparison studies would allow us to have a better understanding of the factors that affect Internet banking adoptions. Thirdly, there are various activities available to customers when using Internet banking, e.g. transfers between accounts, check balances, conduct financial transaction and, etc. An investigation into these specific activities instead of adoption will bring this research to the next stage, which allows Internet banking

providers to understand the factors that affect the usage of specific Internet banking activities. Fourthly, future study can also consider using the demographic variables in this research as control variables and compare the effects with the ones found in the present research.

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