EVALUATION OF INTERNET BANKING SERVICE ADOPTION AMONG YEMENI CUSTOMERS

[1]Ali Al-Ajam, [2]Khalil Md Nor

[1]Department: Business Administration, Al-Hodeidah University, Yemen
[2]Department of Management, Universiti Teknologi Malaysia

Abstract

The main aim of this study is to examine empirically the factors that affect the adoption of Internet banking. Although Internet banking has been widely adopted in various developed countries, consumers' adoption of this service in developing countries has been slower than anticipated. That is, in developing countries, Internet banking services has not been used as much as they could or should have been. There is sill a limited empirical research on Internet banking service in developing countries. There is a clear need to investigate the factors that influence customers' intention to adopt Internet banking. Identifying influential factors that influence customer's intention to adopt Internet banking service is crucial. This study extended Innovation Diffusion Theory by trust. Data collected from 1286 respondents in Yemen. Structural equation modelling was used for data analysis. The results indicate that perceived relative advantage, perceived ease of use, perceived compatibility, perceived trialability, and trust are salient determinants of customers' adoption of Internet banking. The findings of this study provide several important implications for Internet banking adoption research and practice.

Keywords: Internet banking, Technology acceptance, Innovation diffusion theory, Structural equation modelling, Trust.

1. INTRODUCTION

Continued information technology (IT) innovation and widespread usage of Internet communication have altered people's lifestyles and social behavior, especially in terms of money management. Internet banking (IB) is considered as an online revolution of the traditional banking services. IB is defined as "the use of technology to communicate instructions and receive information from a financial institution where an account is held. This service includes the system that enables financial institution customers, individuals or business to access accounts transact business, or obtain information on financial products and services through a public or private network" [1]. IB which, offers customers the greatest expediency for performing banking transactions via the Internet [2]. All banks, especially the large banks and mutual banks, have gradually increased their number of Internet banking services available to customers over the past decades. The most popular Internet banking services are viewing balances and transactions, fund transfers and payment of bills [3]. Internet banking service innovation has been implemented in the Republic of Yemen banking sector since the year 2002. In doing so, Yemeni banks have spent a huge amount of money to upgrade their internet technology services [4]. However, previous studies indicated that adoption of Internet banking service is still very low in this country [5,6]. However, there is a few studies on Internet banking in Arab countries in general. At the same time, studies have not paid sufficient attention to the success factors that have a direct impact on individuals'

intention to adopt the Internet banking service. This study intends to use the Innovation Diffusion Theory (IDT) [7] as the underpinning theory since it has not been used in the Republic of Yemen or in the Middle East. Thus, this study intends to fill this gap by investigating the influential factors (relative advantage, perceived ease of use, compatibility, trilability, and trust) on behavioral intention to use Internet banking service in Yemen. This study begun with an overview of internet banking use in Yemen and continues with a theoretical background of innovation adoption, followed by research model and hypotheses regarding the adoption of internet banking in Yemen. The study then describes data and methods and concludes with results and discussion followed by lmplications, conclusions and future research.

2. THEORETICAL BACKGROUND

2.1 Overview of Internet Banking in Yemen

The operating banks in Yemen have made great effort to adopt new technologies that could update services in government, private organizations, and individuals' services as well [8]. This requires the bank itself to adopt new technologies through its infrastructural development in order to be able to meet customer needs in areas such as e-commerce activities and Internet technology service to satisfy customers' need in both the public and private sectors [5]. Even though Yemeni Internet banking services was started by two banks the Arab Bank (AB) and Yemen Gulf Bank (YGB) in 2002, this service has not been fully utilized in the country. Generally speaking, there are four banks that provide Internet banking services in Yemen.

2.2 Innovation Diffusion Theory (IDT)

Innovation diffusion theory (IDT) investigates "the process by which an innovation is communicated through certain channels over time among the members of a social system" [7]. It can be evaluated at multiple levels of analysis: organizational, external environment and individual. IDT frame innovation diffusion as a process driven by uncertainty reduction. Rogers [7] defined five attributes that persuade an individual to adopt the innovation, these are; relative advantage, compatibility, complexity, trialability, and observability. IDT's model of innovation has, up until now, been considered as one of the most well-known theories associated with the adoption of new technology.

Several studies have used IDT as a framework to determine influencing factors on individuals' intention to adopt Internet banking services, while other researchers have extended IDT by other variables. Several studies found a significant relationship between IDT's dimensions and the acceptance of Internet banking [9,10,11].

2.3 Research model

The research framework was adapted from IDT, but it is not exactly the same as the of IDT model. The purpose of this study is to investigate empirically the influence of perceived trust, together with some of the attributes of the IDT on Internet banking adoption. This is so because several past studies have found that perceived risk has a significant relationship with Internet banking adoption. We used Internet banking as the targeted technology. With the exception of observability, we have included and tested all other beliefs of IDT in this study. Observability was excluded in this study, mainly due to the nature of the targeted technology chosen i.e., Internet banking. We feel individuals typically do banking transactions privately. The acts are not observable and visible to others [12]. The research model for this study is

shown in Fig. 1. The following literature review will explain hypotheses and the relationship between variables.

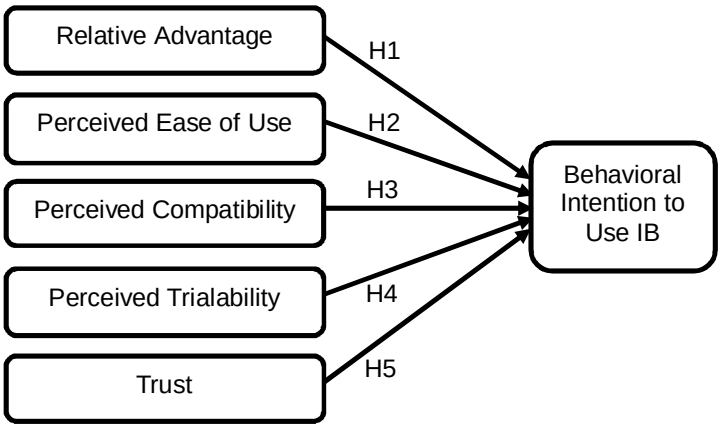

Fig. 1. Research Model

2.4 Hypothesis development

2.4.1 Relative advantage

Relative advantage is defined as, "the degree to which an innovation is perceived as being better than the idea it supersedes" [7]. Relative advantage shows the individual's evaluation of the benefits that can be obtained through the acceptance or use of Internet banking [12, 13, 14]. The positive influence of relative advantage on individuals' intention to adopt Internet banking has been found in several previous studies [15, 16]. The following hypotheses was proposed:

H 1: The perceived relative advantage of using Internet banking positively affects the Intention to use the technology.

2.4. 2 Perceived ease of use

Perceived ease of use is defined as, "the degree to which the prospective user expects the target system to be free of effort" [17]. People expect if a new technology is easy using, will create a positive attitude toward it. In the Internet banking acceptance context perceived ease of use appears as an important factor was employed in several past studies [18, 19, 20]. Hence, this study hypothesizes positive linkage as follows:

H 2: Perceived ease of using Internet banking positively affects the intention to use the technology.

2.4.3 Compatibility

Compatibility refers to the extent individuals perceive that new products or services have no conflict with their needs, beliefs, values and experiences (Rogers, 2003). Compatibility is considered as one of the main determinants for the innovation spread process with the high compatibility perceived by the individual leading to the speedy adoption of any new

technologies. Several researchers have shown that perceived compatibility has a significant direct influence on individuals' intention to adopt Internet banking services [16, 21]. The following was proposed:

H 3: Perceived compatibility of Internet banking with one's values positively affects the intention to use the technology.

2.4.4 Trialability

Trialability is defined as, "the degree to which an innovation may be experimented with on a limited basis, which allows individuals to test drive an innovation before it is being adopted" [7]. Also previous studies indicate that if the user got the chance to try a new technology, this would lessen his/her feelings of fear concerning the usage of this technology [12]. The relationship between trilability and behavioral intention has been also found significant and positive influence in the Internet banking domain [16, 22]. Therefore, in this study, the researcher hypothesizes a positive relationship between trialability and individuals' behavioral intention as follows:

H 4: Trialability of Internet banking positively affects the intention to use the technology.

2.4.5 Trust

In the social psychology realm, trust is define as "perceptions about others' attributes and a related willingness to become vulnerable to others" [7] .In this sense, consumers might not use e-commerce because they lack trust in Internet businesses. In addition, many studies indicated that trust has played a significant role in influencing individuals' intention to use Internet banking service [22, 23, 24]. Therefore, the following hypothesis was proposed:

H 5: Trust significantly and positively affects the intention to use the technology.

3. RESEEARCH METHODOLOGY

3.1 Data collection

In order to collect banks' customer information, we first required the permission of four banks that provide Internet banking services in Yemen to express our need for the information research purposes. The final count for this study was 1286 cases after excluding incomplete questionnaires, responses from users of IB, missing data and outliers. Sample demographics are depicted in Table 2.

Table 2: 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	.3
Income	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

3.2 Measurement development

The instrument was designed to include the constructs of perceived relative advantage, perceived ease of use, compatibility, trialability and perceived risk, and intention to adopt IB. Relative advantage was adapted from the measurements developed by [12], containing four items. Perceived ease of use was adapted from the measurements developed by [17], containing four items for each construct. Compatibility, trialability, trust and behavioral intention were adapted from the measurements developed by [25], containing four items for each construct. All items designed based on seven-point Likert's scales, ranging from ‘‘disagree strongly” (1) to ‘‘agree strongly” (7).

4. RESULT

4.1 Measurement model

Structural equation modelling (SEM) was employed as the main statical technique to analyse data with confirmatory factor analysis (CFA) using AMOS 18. The initial confirmatory factor analysis showed an acceptable overall model fit. The measurement model results are shown in Table 3.

Table 3: Fit Indices for the Measurement Model

Model	X^2	df	X^2/df	NFI	RFI	IFI	TLI	CFI	RMSEA
Measurement Model	607.118	197	3.081	0.968	0.960	0.974	0.973	0.975	0.050

To evaluate the reliability and validity of the final measurement model, three criteria were used: All indicator factors loading should be significant and exceed 0.5; Construct reliabilities (Cronbach Alpha) should exceed 0.7; Average variance extracted (AVE) by each construct should exceed the variance due to measurement error for the construct (e.g. AVE should exceed 0.5) [26]. The CFA results for measurement model are shown in Table 4.

Table 4: Summarizes the CFA results for measurement model.

Code	**Cronbach alpha**	**Compost reliability**	**Average variance extracted**	**Range of Factor loading**
Relative Advantage	0.954	0.945	0.823	0.79-0.95
Perceived Ease of Use	0.951	0.932	0.810	0.75-0.90

Perceived ompatibility	0.944	0.928	0.809	0.80-0.92
Perceived Trialability	0.936	0.926	0.819	0.89-0.91
Trust	0.923	8.982	0.790	0.78-0.94
Intention	0.913	0.904	0.820	0.90-0.95

From Table 4 it can be seen that all indicator factors loading values in the confrmatory factor analysis of the measurement model exceeded 0.70, which was higher than the benchmark of 0.70 as recommended by [27]. Composite reliabilities of constructs ranged from 8.982 to 0.945 AVE, ranging from 0.790 to 0.823, was greater than the variance due to measurement error. Therefore, all three conditions for convergent validity were met. Discriminant validity assesses the extent to which a concept and its indicators differ from another concept and its indicators [28]. The result of AVE is well above 0.5 and is significant at p = 0.001. This means that discriminant validity is supported for all constructs. 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.

Table 5: Discriminant validity.

Construct	TU	RA	EU	CO	TL	IN
TU	0.894					
RA	0.110	0.875				
EU	0.260	0.396	0.901			
CO	0.224	0.341	0.397	0.923		
TL	0.270	0.355	0.472	0.396	0.881	
IN	0.326	0.304	0.517	0.418	0.454	0.894

Note: All correlations significant at $p < 0.05$. Diagonal elements are square roots of the average variance extracted.

As shown in Table 5, the square root of the variance shared between a construct and its items was greater than the correlations between the construct and any other construct in the model, satisfying criteria for discriminant validity. All diagonal values exceeded the inter-construct correlations. Thus validity was stablished for this study.

4.2 Structural model

Same common fit indices that used with measurement model are designed to identify structural model goodness-of-fit. In this study, seven common measures of model fit were chosen as shown in Table 5. Confirmatory factor analysis was conducted on the structural model. The results of structural equation modeling obtained for the proposed conceptual model revealed that our model fit data very well.

Table 5: Fit statistics of structural model

Model	**X^2**	**df**	**X^2/df**	**NFI**	**RFI**	**IFI**	**TLI**	**CFI**	**RMSEA**
Structural model	490.367	160	3.064	0.955	0.948	0.961	0.956	0.961	0.046

4.3 Hypotheses testing

A structural equation modeling (SEM) approach was adopted in our data analysis. The regression weights are reported in Table 6. Fig. 2 presents the results of the structural and the standardized path coefficients between constructs. From Fig.2 and Table 6, it can be easily observed that the results of the SEM analysis show that all hypotheses were supported. Intention to use Internet banking in this study was jointly predicted by relative advantage (β = 0.244, $p < 0.05$), perceived ease of use (β = 0.091, $p < 0.001$), compatibility (β = 0.305, $p < 0.001$), Trialability (β = 0.177, $p < 0.001$), trust (β = 0.251$p < 0.001$) and these variables together explained 59% of the variance of intention to adopt Internet banking.

Table 6: Regression Weights

Independent	Relationship	Dependent	Estimate	S.E.	C.R.	P
RA	→	**IN**	0.244	0.020	9.507	***
EU	→	**IN**	0.091	0.026	2.576	***
CO	→	**IN**	0.305	0.029	11.082	***
TL	→	**IN**	0.177	0.016	8.448	***
TU	→	**IN**	0.251	0.022	10.605	***

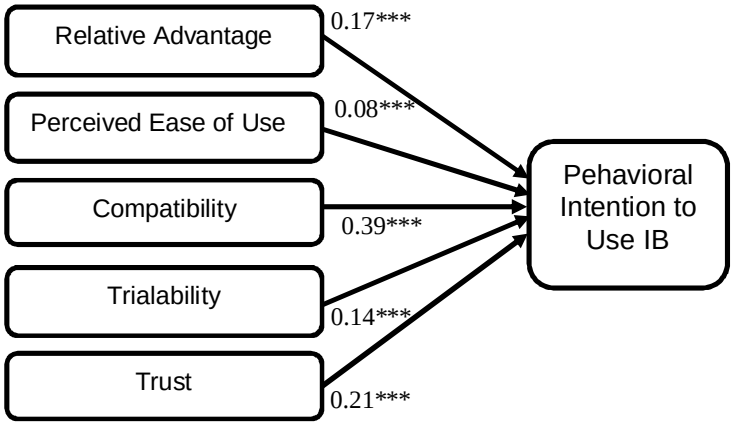

Fig. 2. Results of structural modeling analysis.

5. DISCUSSION AND IMPLICATIONS

The results of this study provide support for the research model As shown in Fgure 3 and for the hypotheses regarding the directional linkage among the model's variables. The overall

explanatory power of our research model had an R-square of 59% for behavioral intention to adopt the Internet banking service. Several insightful results could be summarized from our research framework.

Our results also support the idea that the inclusion of compatibility significantly improves the prediction about the intention to adopt the Internet banking service. Compatibility ($\beta = 0.305$), appears to be the first positive determinant of a consumer's intention to adopt Internet banking service in Yemen. Among the beliefs, perceived compatibility has the strongest impact on Internet banking adoption. In order to increase the customers' adoption rate of Internet banking, banks should make the new (i.e., Internet banking) services more compatible with potential customers' lifestyles and needs.

The relationship between trust and the behavioural intention (($\beta = 0.251$) has a significant and positive effect. The findings indicate that trust of using the IB 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.

Perceived relative advantage ($\beta = 0.305$) also has positive influence individuals' intention to adopt Internet banking. Thus, banks offering Internet banking services should continuously improve the usability of systems in order to offer users both useful banking services and rich financial information. In addition to enhancing this service usability, it is crucial for banks to help potential users understand the functionality of the new IT. Given that the Internet banking system provides all traditional banking services. The focus of promoting Internet banking adoption should be on enhancing potential customers' perceptions of the relative advantages of Internet banking through advertising.

Perceived ease of use ($\beta = 0.091$) was found to have a significant positive effect on the intention to use Internet banking. The reason is that effort saved by improved perceived ease of use can enable people to do a better job or accomplish more at work, thus enhancing their job performance. Other things being equal, the easier a certain IT (i.e., internet banking) can be learned or used, the more useful it will be perceived. Therefore, the higher perceived ease of utilizing a particular Internet banking makes it more likely that the individual will have a positive feeling toward using it. Banks should make Internet banking ease to use.

Finally, trialability also has a significant impact ($\beta = 0.177$) on the consumers' intention to adopt Internet banking. This finding suggests that a positive effect on intention to adopt IB can be formed if potential users have the opportunity to test-drive the technology. To encourage the acceptance, banks should allow potential customers to try Internet banking by providing a step-by-step demonstration on how to use Internet banking on their website.

6. CONCLUSION AND FUTURE RESEARCH

This study aims to develop an extended IDT to predict and explain customers' behavioral intentions with regard to adopting Internet banking. The proposed model includes four dimensions of IDT in addition to, trust to provide a more comprehensive investigation covering the most important issues aspects of Internet banking. The results show that the proposed model has good explanatory power and confirms its robustness in predicting customers' intentions to adopt Internet banking.

As with any research, care should be taken when generalizing the results of study. Since this study has been conducted in the Republic of Yemen to investigate factors (IDT's dimensions and trust) that influence consumers' adoption of Internet banking, it is important to recognize

the cultural and national limitations of these findings. This is because cultural differences have played a significant role in influencing individuals with respect to how people respond to uncertainty. In other words, the customers' adoption of Internet banking may be indirectly influenced by cultural differences. However, this phenomenon needs further investigations and validations. Hence, the replication of this study on a wider scale with different national cultures is essential for the further generalization of the findings. Finally, the conclusions drawn from our study are based on cross-sectional data. With our cross-sectional data, we only took a snapshot of this model. A stricter test of our argument, however, could be employed by using a longitudinal study to evaluate this aspect.

REFERENCES

[1] Prakash, A. and Malik, G. (2008). Empirical Study of Internet Banking in India. Internet research 12(5), pp. 83-92.
[2] Ratnasingam, P., Gefen, D. and Pavlou, P. A. (2005). The role of facilitating conditions andinstitutional trust in electronic marketplaces. Journal of Electronic Commerce in Organisations 3(3), pp. 69-82.
[3] Giordani,G., Floros, C. and Judge, G. (2009). Internet banking services and fees: The case of Greece. International Journal of Electronic Finance, 3(2), pp. 177-198.
[4] Cooperative & Agricultural Credit Bank (CAC), Annual Report (2010). Internet banking services.
[5] Alhariry, K. H. A. (2007). Requirements of adoption of the banks in Yemen Republic for the Internet banking and attitudes of the banks leaders toward Internet banking. Doctor Philosophy, Suez Canal University, Suez Canal.
[6] Zolait, A. H. S., Sulaiman, A. and Alwi, S. F. S. (2008). Prospective and challenges of Internet banking in Yemen: an analysis of bank websites. International Journal Business Excellence 1(3), pp. 353-373.
[7] Rogers, E. M. (2003). Diffusion of Innovations, 5th edition. New York: Free Press.
[8] Paul Budde Communication Pty Ltd. (2011), Research and Markets: Yemen - Telecoms, Mobile, Broadband and Forecasts, 2011 Edition. Retrieved September 12, 2011, from: http://www.researchandmarkets.com/research/2dafcd/yemen_telecoms
[9] AL-Majali, M. and Nik Mat, N. K. (2011). Modeling the antecedents of internet banking service adoption (IBSA) in Jordan: A Structural Equation Modeling (SEM) approach. Journal of Internet Banking and Commerce 16(1), pp. 1-15.
[10] Eriksson, K., Kerem, K. and Nilsson, D. (2008). The adoption of commercial innovations in the former Central and Eastern European markets the case of internet banking in Estonia. International Journal of Bank Marketing 26(3), pp. 154-169.
[11] Md Nor, K. and Pearson, J. M., and Altaf, A.(2010). Adoption of internet banking theory of the diffusion of innovation. International Journal of Management Studies (IJMS) 17(1), pp. 69-85.

[12] Tan, M. and Teo, T. S. H. (2000). Factors Influencing the Adoption of Internet Banking. Journal of the Association for Information Systems 1(5), pp. 1-42.
[13] Karjaluoto, H., Mattila, M. and Pento, T. (2002), Factors underlying attitude formation towards online banking in Finland. International Journal of Bank Marketing 20(6), pp. 261-72.
[14] Polatoglu, V.N. and Ekin, S. (2001). An empirical investigation of the turkish consumers' acceptance of internet banking services. International Journal of Bank Marketing 19(4), pp. 156-65.

[15] Kolodinsky, J. M., Hogarth, J, M. and Hilgert, M. A. (2004). The adoption of electronic banking technologies by US consumers. The International Journal of Bank Marketing, 22 (4), pp. 238-259.
[16] Hernandez, J. M. C. and Mazzon, J. A. (2007). Adoption of internet banking: proposition and implementation of an integrated methodology Approach. International Journal of Bank Marketing 25(2), pp. 72-88.
[17] Davis, F.D., Bagozzi, R.P. and Warshaw, P.R., (1989). User acceptance of computer technology: a comparison of two theoretical models. Management Science 35 (8), pp. 982–1003.
[18] Ramayah, T., Mohd, Y. Y., Jamaludin, N. and Ibrahim, A. (2009). Applying the Theory of Planned Behavior (TPB) to Predict Internet Tax Filing Intentions. International Journal of Management 26(2), pp. 272-284.
[19] Lee, M. (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, pp. 130-141.
[20] Wu, J. and Wang, S. (2005). What drives mobile commerce? An empirical evaluation of the revised technology acceptance model. Information & Management 42, pp. 719-729.
[21] Kleijnen, M., Wetzels, M. and Ruyter, Ko. (2004). Consumer acceptance of wireless finance. Journal of Financial Services Marketing 8(3), pp. 206-217.
[22] Md Nor, K. and Pearson, J. M. (2007). The Influence of Trust on Internet Banking Acceptance. Journal of Internet Banking and Commerce 12(2), pp. 1-10.
[23] Grabner-Kraäter, S. and Faullant, R. (2008). Consumer acceptance of internet banking: the influence of internet trust. International Journal of Bank Marketing 26(7), pp. 483-504.
[24] Al-Somali, S. A., Gholami, R. and Clegg, B. (2009). An investigation into the acceptance of online banking in Saudi Arabia. Technovation, 29, pp. 130-141.
[25] Md Nor, K. AbuShanab, E and Pearson, M. (2008). Internet banking acceptance in Malaysia based on the theory of Reasond Action. Journal of Information Systems and Technology Management. 5(1), pp. 03-14.
[26] Fornell, C. and Larcker, D. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research 18(1), pp. 39–50.
[27] Bagozzi R.P. Yi, Y. and Phillips L.W. (1991). Assessing construct validity in organizational research. Admin Sci Quarts 36(3), pp. 421–30.
[28] Hair, J. F., Black, W. C., Basin, B. J. and Anderson, R. E. (2010). Multivariate data Analysis. 7th ediion. New Jersey: Upper Saddle River, Pearson Prentice Hall.