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EMPIRICAL ANALYSIS OF INTERNET BANKING ADOPTION IN TUNISIA

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ABSTRACT

This paper aims to identify empirically the factors influencing the intention to use Internet Banking in Tunisia. The impact of perceived usefulness, perceived ease of use, awareness, social norm, security and privacy, and computer self efficacy on intention to use Internet banking is tested through structural equation modelling techniques. The 284 self-administrated questionnaires were collected from Tunisian's customers who are using banking services in Tunisia. The findings of the study suggest that customer' intention to use Internet banking can be affected by perceived usefulness and perceived ease of use of Internet banking. In turn, perceived usefulness can be affected by both perceived ease of use and influence social. Customers' perceived ease of use can be determined by security and privacy and customers' self-efficacy, and social influence. These findings may provide for banks useful guidelines for developing Internet banking systems in order to deliver services effectively.

Keywords: Internet banking, Intention, Customer, Tunisia.

Contribution/ Originality

This study contributes in the existing literature by formulating and validating Extended Technology Acceptance Model (TAM) to identify the factors that encourage customers to adopt Internet Banking in Tunisia and to use the study's findings to develop guidelines for bank management on how to maximize the rate of adoption of Internet Banking.

1. INTRODUCTION

The rapid development of Internet and Electronic Business has stimulated the banking and financial sectors towards encouraging customers to bank on-line. The new banking environment, Internet banking is increasingly managed as an operational activity and an important component of

a multi-channel strategy (Black *et al.*, 2002). Internet Banking, defined as the delivery of banking services through the open-access computer network (the Internet) directly to customers' home or private address (Lau, 1997). Internet banking refers to the use of the Internet as a delivery channel for banking services, including traditional banking services such as balance enquiry, printing statements, fund transfers to other accounts and bill payments (Frust *et al.*, 2000).

Internet banking offers many benefits to banks and their customers. The main benefits to banks are cost saving, reaching new segments of the population, efficiency, enhancement of the bank's reputation and better customer's service and satisfaction (Jayawardhena and Foley, 2000). From the customer's perspective, Internet banking facilitates a convenient and effective approach to manage personal finances, as it is accessible 24 hours a day and 365 days in a year without visiting the bank and from any locations (Rotchanakitumnuai and Spence, 2003; Sonja and Rita, 2008). Furthermore, Internet banking provides customer rapid updating, richness-information (Shapiro, 1999; Palmer, 2002), speedy transaction access (Mavri and Ioannou, 2006) and absolute self-service (Eriksson and Nilsson, 2007). In this way, Internet banking save time and money, provides convenience and accessibility, and has a positive impact on customer satisfaction (Karjaluoto *et al.*, 2002). However, despite the continuing increase in the number of Internet users and despite all the apparent advantages of Internet banking for customers, in many countries the growth rate of Internet users who adopt internet banking has not risen as strongly as expected (White and Nteli, 2004).

In order to grow consumer Internet banking demand, banks must make key improvements that address consumer concerns. Some researchers have mentioned that the success of Internet banking is not purely relies on the banks' strategies but rather considers on customers' adoption of it (Mols, 1998; Pikkarainen *et al.*, 2004).Thus, it would behoove financial institutions to gain an understanding of the key factors that influence consumer Internet banking adoption.

The primary objective of this research is to identify the factors affecting the adoption of Internet banking by Tunisian consumers which the constructs defined by the TAM model have been used to predict the intention to use Internet banking services. A new constructs (consumer awareness of services and benefits of Internet banking, social influence, security and privacy, and computer self efficacy) were proposed to enhance the understanding of an individual's acceptance behaviour of Internet banking. By explaining intention to use Internet Banking, the findings of this research will not only help Internet banking authorities to formulate appropriate strategies to ensure rapid migration of customers to online banking, but also provide insights into how to present the new technology to potential users.

The paper is structured as follows. The first and the second section contain introduction and a literature review on Internet banking and information systems acceptance. The third section presents the research methodology used in this work. The fourth section is comprised of the results and analysis in which data is analyzed using Structured Equating Modeling (SEM). The fifth section includes discussion of results. The final section contains the conclusions, implications, limitations and future research.

For the purposes of this paper, Internet banking includes monitoring accounts, balance enquiry, and printing statements.

2. LITERATURE REVIEW

Researchers have applied numerous theories to identify potential factors which influence the people to adopt Internet banking. Some of the theories include: Innovation Diffusion Theory (Rogers, 1983), Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975), Technology Acceptance Model (TAM) (Davis, 1989; Venkatesh and Davis, 2000), Theory of Planned Behavior (TPB) (Ajzen, 1985), and Decomposed Theory of Planned Behavior (DTPB) (Taylor and Todd, 1995). In this research the model consists of three factors that probably have an effect on intention to use Internet banking in the Tunisian context. They are perceived usefulness (adopted from TAM), perceived ease of use (adopted from TAM), consumer awareness of services and benefits of Internet banking, social influence, security and privacy, and computer self efficacy. The logic for this is as follows.

2.1. Perceived Usefulness

TAM posits that perceived usefulness is a significant factor affecting acceptance of an information system (Davis *et al.*, 1989). Davis defined perceived usefulness as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989). Perceived usefulness has been confirmed as an important variable that influences users' technology acceptance and therefore has received a great deal of attention from previous researchers. Therefore, in this study, it is defined as the extent to which a person believes that using Internet Banking will create value for them. Therefore we propose the following hypotheses:

H1. Perceived usefulness has a positive effect on intention to use Internet banking services.

2.2. Perceived Ease of Use

Perceived ease of use refers to the degree to which a consumer believes that no effort will be required to use the system, with effort being understood to include both physical and mental effort, and how easy it is to learn to use the system (Davis *et al.*, 1989). Perceived ease of use refers to the user's perception of the level of easiness to use the system (Black *et al.*, 2002). A considerable amount of prior studies supported the significant effect of perceived ease of use on behavioral intention, either directly or indirectly through perceived usefulness (Davis *et al.*, 1989; Agarwal and Prasad, 1999). Thus, customers are more likely to accept the Internet banking services if there is ease of use in operation/process which can be instrumental to the utilization of technology and contribute to the individual by reducing transfer costs and improving work performance. Therefore we propose the following hypotheses:

H2. Perceived ease of use has a positive and significant impact on perceived usefulness to use Internet banking services.

H3. Perceived ease of use has a positive and significant impact on behavioural intention to use Internet banking services.

2.3. Awareness of Services and Its Benefits

According to Pikkarainen *et al.* (2004) the amount of information about Internet banking and its benefit is a determinant factor in motivating customers to use Internet banking services. Moreover, Sathye (1999) found that low awareness about the benefits of Internet banking is a critical factor in causing customers not to adopt Internet banking. In addition, Howcroft *et al.* (2002), found that lack of awareness of Internet banking services and its benefits are found to be reasons for consumers' reluctance to use Internet banking services. Therefore we propose the following hypotheses:

H4. Awareness of services and its benefits has a positive effect on customer's perceived usefulness to use Internet banking services.

2.4. Social Norm

Social norm refers to the person's perception that most people who are important to him think he should or should not perform the behavior in question (Fishbein and Ajzen, 1975). In Technology Acceptance Model, social norm was found to have influence on perceived usefulness and behavioral intention to use technology. Venkatesh and Davis (2000) demonstrated that social norm had a direct or indirect impact on perceived usefulness in operation systems. In the present context, if any group such as parents, colleagues and even friends recommends that use of internet as a banking channel might be useful, a person may also believe that it is actually useful, and in turn form an intention to use it (Ankit and Shailendra, 2011). Therefore we propose the following hypotheses:

H5. Social norm has a positive effect on the perceived usefulness to use Internet banking services.

2.5. Security and Privacy

Protection of personal information, or specifically consumers' perception of the ability of the bank to protect personal information from unauthorized use or disclosure; impossibility of the transmitted or stored data to be changed by third parties without permission is very important in the acceptance of Internet banking (Flavian *et al.*, 2006). Perceived security and privacy is also defined as users' perception of protection against security threats and control of their personal data information in an online environment (Muniruddeen, 2007). Security and privacy to the acceptance of Internet banking has been noted in many banking studies (Sathye, 1999; Tan and Teo, 2000; Black *et al.*, 2002). The perceived ease of use may not fully reflect customer acceptance of Internet banking, if perceived privacy, thus security is low (Suh and Han, 2003). Therefore we propose the following hypotheses:

H6. Security and privacy have a positive effect on perceived ease of use to use Internet banking services.

2.6. Computer Self-Efficacy

Computer self-efficacy is defined as the judgment of one's ability to use Internet banking. Taylor and Todd (1995) state that that the higher the level of self-efficacy the more likely the adoption of an information technology. Previous studies have shown that there is empirical evidence on the effect of computer self-efficacy on perceived usefulness and perceived ease of use that has been documented (Igbaria and Iivari, 1995; Venkatesh and Davis, 1996; Agarwal *et al.*, 2000). The proposed relationship between computer self-efficacy and perceived ease of use is based on the theoretical and empirical argument by Davis (1989), Wang *et al.* (2003), Guriting and Ndubisi (2006), Venkatesh and Davis (1996); Igbaria and Iivari (1995) and Agarwal *et al.* (2000). Therefore we propose the following hypotheses:

H7. Computer self-efficacy have a positive effect on the perceived ease of use to use Internet banking services.

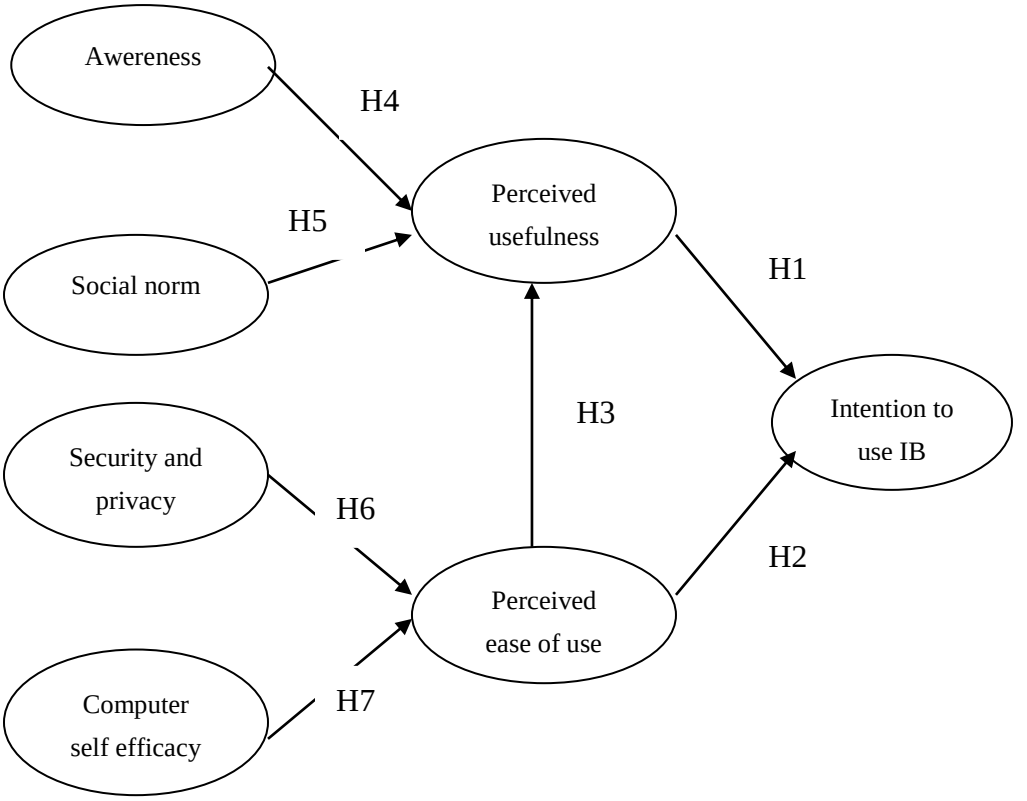

Figure-1. The proposed research model

3. METHODOLOGY

3.1. Sample and Demographics

The survey method was used for collecting the data to test the research model. All participants were commercial bank customers selected randomly from universities, companies, and employees in public and private organisations. The questionnaire was administered by meeting the respondents on a one-to-one and were asked to circle the response which best described their level of agreement with the statements.

A total of 350 approaches were made to obtain 284 completed surveys. The reason for non participation was mainly due to a lack of time to complete the survey. The profile of respondents is shown in Table 1. The total sample was composed of 61.6 per cent men and 38.4 per cent women. This finding supports the literature where Flavian *et al.* (2006) indicated that women were less likely to conduct their banking activities online. A large percentage of the sample were aged between 18 and 30 (45.7 per cent), and 31 and 40 (32.3 per cent). This is consistent with Tan and Teo (2000) study in which 64.1% of respondents were between 20-29 and supported by Teo and Lim (1999) and Nasri and Charfeddine (2012) findings that the majority of Internet users are youths and young adults.

When examining the professional backgrounds of the respondents, (74.3 percent) were employees in public and private organisations and (25.7 percent) were university and high school students. In terms of educational backgrounds, the majority of the respondents were well educated, which 48.2% of the respondents were post graduate degrees and 25% were under graduate degrees. This is in line with the previous studies (Sathye, 1999; Venkatesh *et al.*, 2003; Nasri and Charfeddine, 2012) which, indicated that adopters of Internet banking tend to be more highly educated.

3.2. Measurement Development

The questionnaire items were adapted from different sources (see Appendix). Perceived usefulness, perceived ease of use, and intention items were adapted from Cheng *et al.* (2006) and Lai and Li (2005), containing four items for perceived usefulness, three items for perceived ease of use and intention to use. Security and privacy were adapted from Pikkarainen *et al.* (2004), and included six items.

The ten items scales for the computer self efficacy survey items were adapted from Compeau and Higgins (1995). Social norm was adapted from the measurements defined by Wu and Cheng (2005), containing three items. Awareness of services and its benefits were adopted from the measurements defined by Sabah *et al.* (2009) containing four items.

Thus, measurement instrument was consisted of 33 items. Each item was measured using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The demographics characteristics were measured in terms of gender, age, education, and occupation and were adapted from (Yang, 2005).

4. DATA ANALYSIS AND RESULTS

4.1. Measurement Model Analysis

The test of the measurement model includes the estimation of internal consistency and the convergent and discriminant validity of the instrument items. As shown in Table 2, all factor loadings were significant (loading> 0.50) and substantial, the construct reliabilities were large (composite reliability α>0.73 and Average Variance Extracted (AVE >0.65), and indicate good convergent and discriminant validity (Fornell and Larcker, 1981). After deleting items (SP6, SCE3, SCE4, SCE5, SCE6, SCE9, SCE10 and AWS4), the Confirmatory Factor Analysis model depicted acceptable model fit. The results of the final Confirmatory Factor Analysis are reported in Table 2 and suggest that our final measurement model provides a good fit to the data on the basis of a number of fit statistics ($\chi 2$/df = 1.85; RMSEA = 0.078; RMR = 0.086; NNFI=0.93; CFI = 0.94; IFI=0.94; AIC = 613.38; CAIC = 905.35; and ECVI = 4.38).

Table-1. Confirmatory Factor Analysis Results for Measurement Model

Constructs	Items	Factor laoding	Average Variance Extracted	Cronbach alpha
Percevied usefulness	PU1	0.633	63.854	0.803
	PU2	0.729		
	PU3	0.581		
	PU4	0.611		
Perceived ease of use	PEOU1	0.751	71.478	0.797
	PEOU2	0.796		
	PEOU3	0.592		
Security and privacy	SP1	0.715	67.411	0.879
	SP2	0.657		
	SP3	0.784		
	SP4	0.613		
	SP5	0.601		
Social norm	SN1	0.846	85.687	0.916
	SN2	0.850		
	SN3	0.875		
Self efficacy	SCE3	0.629	71.893	0.869
	SCE4	0.644		
	SCE5	0.823		
	SCE6	0.779		
Awareness (AW)	AW1	0.565	65.820	0.734
	AW2	0.662		
	AW3	0.748		
Intention to use IB	INT1	0.719	77.779	0.856
	INT2	0.831		
	INT3	0.783		

Table-2. Measurment Model (Goodness of Fit)

Absolute indices	**Estimated value**	**Expected value**
χ^2/dl	1.85 (465.38/251)	<2
RMSEA	0.078	<0.08
RMR	0.086	Near zero
Incremental indices	**Estimated value**	**Expected value**
NNFI	0.93	>0.9
IFI	0.94	>0.9
CFI	0.94	>0.9
Parsimony indices	**Estimated value**	**Expected value**
AIC	613.38	≤ saturated AIC, smaller than AIC for comparison model
CAIC	905.35	smaller than CAIC for comparison model
EVCI	4.38	smaller than ECVI for comparison model

AIC of saturated and independent models is respectively 650.0 and 4031.85.

CAIC of saturated and independent models is respectively 1933.35 and 4130.85

EVCI of saturated and independent models is respectively 4.64 and 28.80.

4.2. Structural Model: Measurement of Research Hypothesis

After judging the reliability and validity of these seven constructs, a structure model was estimated to examine the research hypothesis. The results, as listed in Table 3, show that all eight fit indices for our testing model ($\chi 2/df = 1.72$; RMSEA = 0.072; RMR = 0.09; NNFI=0.93; CFI = 0.94; IFI=0.94; AIC = 533.37; CAIC = 778.19; and ECVI = 3.81) have clearly exceeded the minimum recommended values suggested for a good model fit, implying the adequacy of our model for further statistical analysis, including its causal link evaluation.

Table-3. Structural Model (Goodness of Fit)

Absolute indices	**Estimated value**	**Expected value**
χ^2/dl	1.72 (409.37/238)	<2
RMSEA	0.072	<0.08
RMR	0.080	Near zero
Incremental indices	**Estimated value**	**Expected value**
NNFI	0.93	>0.9
IFI	0.94	>0.9
CFI	0.94	>0.9
Parsimony indices	**Estimated value**	**Expected value**
AIC	533.37	≤ saturated AIC, smaller than AIC for comparison model
CAIC	778.19	smaller than CAIC for comparison model
EVCI	3.81	smaller than ECVI for comparison model

AIC of saturated and independent models is respectively 533.37 and 600

CAIC of saturated and independent models is respectively 1784.636 and 3763.06.

EVCI of saturated and independent models is respectively 4.29 and 26.20.

Table 4 presents the standardized path coefficients and associated t-values for all relationships in the structural model. All of the hypothesized paths in our model are significant at the pb.001and.05 level and in the expected direction.

Table-4. Results of hypothesis testing

Hypothesis	Hypothesized relationship	Path coefficient	p-value	Result
H1	PU → BI	0.59**	0.01	Supported
H2	PEOU → BI	0.30*	0.03	Supported
H3	PEOU → PU	0.44**	0.01	Supported
H4	AW → PU	- 0.13*	0.03	Supported
H5	SN → PU	0.13*	0.02	Supported
H6	SP → PEOU	0.63**	0.01	Supported
H7	CSE → PEOU	0.28**	0.01	Supported

Notes: *p < 0.05, **p < 0.01

5. DISCUSSION

The result shows (Table 4) that perceived usefulness has a significant impact on intention to use Internet banking (β = 0.59, p>0.01) thus, H1 was supported. This result is consistent with previous studies on TAM. It implies that if users/potential users perceive Internet Banking to be useful, they will be more likely to continue-use/adopt the Internet Banking services. On the other hand, perceived ease of use has a significant influence on intention to use to use Internet banking (β = 0.30, p<0.05) thus, H2 was supported. This is consistent with the original Technology Acceptance model (Davis, 1989).

Looking at the antecedents of perceived usefulness, perceived ease of use was found to have a significant influence on perceived usefulness on intention to use to use Internet banking (β = 0.44, p<0.01) thus, H3 was supported. These findings confirm the TAM relationships hypothesized by Davis (1986) and also previous studies, which supports that perceived ease of use as an antecedent of perceived usefulness (Venkatesh and Davis, 2000; Wang *et al.*, 2003). Awareness was found to be a statistically significant negatively related to perceived usefulness on intention to use Internet banking (β = -0.13, p>0.05) thus, H4 was not supported. This result contradicts the prior studies (Rogers and Shoemaker, 1971; Sathye, 1999; Pikkarainen *et al.*, 2004), which found that the adoption or rejection of an innovation begins when the consumer becomes aware of the product and its benefits. Social norm was found to have a significant influence on perceived usefulness to use to use internet banking (β = 0.13, p<0.01), thus, H5 was supported. The result is confirmed with the results reported by Davis (1989) and Venkatesh and Davis (2000), who founded that subjective norm, had a direct or indirect impact on perceived usefulness in operation systems.

Security and privacy (β = 0.63, p<0.01), and computer self-efficacy (β = 0.28, p<0.01), were found to have a significant influence on perceived ease of use of Internet banking. Thus hypothesis H6 and H7 were also supported. This is in line with the research of Muniruddeen (2007) which found that security and privacy influenced perceived ease of use. For computer self efficacy, this result is consistent with Wang *et al.* (2003), which have found a positive relationship between self

efficacy and on perceived ease of use. This finding implies that individuals with higher computer self-efficacy will perceive Internet Banking as easier to use.

6. CONCLUSION, IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

This study aims to identify empirically the factors influencing the intention to use Internet Banking in Tunisia. The results show that intention to adopt Internet banking can be predicted by perceived usefulness and perceived ease of use. Perceived usefulness appeared to be an important predictor of intention to use Internet banking than perceived ease of use. Customers' perceived usefulness can be determined by perceived ease of use, awareness of services and its benefits and social influence, while their perceived ease of use can be affected by security and privacy, and self computer efficacy. The study provides a conceptual model that explains and predicts the factors that influence the adoption of Internet banking in Tunisia.

The findings of this research have implications for developing Internet banking systems and for marketing Internet banking services. When Internet banking is perceived as useful and ease of use, customer's intention to adopt it would be greater. In order to promote a customer's perception of perceived usefulness and perceived ease of use of Internet banking banks need to develop the beliefs of the customers regarding the usefulness, ease of use, and secure, and private for their users of Internet banking.

As Internet banking services are still new in Tunisia, banks should use effective media advertising such as radio and TV advertisement, leaflets, brochures, and web pages to introduce Internet banking services to a wider audience and educate potential customers about how to become Internet banking users, the range of services Internet banking provides, and the benefits of Internet banking Cyril *et al.* (2011). They can also launch campaigns to raise awareness to more people about time saving, convenience at anywhere any time, low costs, and information availibility. The campaigns can be used to mostly educate more on the relative advantage of using the system as well as show how to handle and protect themselves regarding security and privacy issues (Cyril *et al.*, 2011). Campaigns can also be used to boost the general computer self-efficacy of the consumers through demonstrations at bank branches using a one-on-one consultancy system

The study has few important limitations that affect generalizations of the findings. The first limitation concerns the sample, which comprised of only one socio-economic status and occupation, teaching and professionals. This has an effect on the generalization of the findings. Secondly, this study empirically examined seven factors that may influence consumers'inention to use Internet banking. However, there may be some other factors that can impact on customers'intention to use Internet banking but were not identified in this study. Further research is required to identify other factors that may impact on consumers'inention to use Internet banking.

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Appendix Measurement scales

Constructs		Measures
Perceived Usefulness	PU1	I think that using the Internet banking would enable me to accomplish my tasks more quickly.
	PU2	I think that using the Internet banking would make it easier for me to carry out my tasks.
	PU3	I think the Internet banking is useful.
	PU4	Overall, I think that using the Internet banking is advantageous.
Perceived ease of use	PEOU1	I think that learning to use Internet banking would be easy.
	PEOU2	I think that interaction with Internet banking does not require a lot of mental effort.
	PEOU3	I think that it is easy to use Internet banking to accomplish my banking tasks.
Intention	INT1	I would use the Internet banking for my banking needs.
		Continue

	INT2	Using the Internet banking for handling my banking transactions is something I would do.
	INT3	I would see myself using the Internet banking for handling my banking transactions.
Attitude	ATT1	I think that using Internet banking is a good idea.
	ATT2	I think that using Internet banking for financial transactions would be a wise idea.
	ATT3	I think that using Internet banking is pleasant.
	ATT4	In my opinion, it is desirable to use Internet banking.
Security and privacy	SP1	I trust in the technology an Internet bank is using
	SP2	I trust in the ability of an Internet bank to protect my privacy
	SP3	I trust in an Internet bank as a bank
	SP4	Using an Internet bank is financially secure
	SP5	I am not worried about the security of an Internet banking
	SP6	Metters of security have no influence on using an Internet banking
Self efficacy	SE1	I could complete my bank transaction using the internet banking, if there was no one around to tell me what to do.
	SE2	I could complete my bank transaction using the Internet banking, if I had never used a package like it before
	SE3	I could complete my bank transaction using the Internet banking, if I had only the manuals or online help for reference
	SE4	I could complete my bank transaction using the Internet banking, if I had seen someone else using it before trying it myself.
	SE5	I could complete my bank transaction using the Internet banking, if I could call someone for help if I got stuck
	SE6	I could complete my bank transaction using the Internet banking, if someone had helped me get started
	SE7	I could complete my bank transaction using the Internet banking, if I had a lot of time to complete the job.
	SE8	I could complete my bank transaction using the Internet banking, if I had built-in help facility for assistance.
	SE9	I could complete my bank transaction using the Internet banking, if someone showed me low to do it first
	SE10	I could complete my bank transaction using the Internet banking, if I had used similar system before to do the same job.
Social norm	SN1	People who are important to me would think that I should use Internet banking.
	SN2	People who influence me would think that I should use Internet banking.
	SN3	People whose opinions are valued to me would prefer that I should use Internet banking.
Awareness (AW)	AW1	I receive enough information about Internet banking services
	AW2	I receive enough information about the benefits of Internet banking
	AW3	I receive enough information of using Internet banking
	AW4	I never received information about Internet banking from the bank