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CUSTOMERS' PERSONALITY, THEIR PERCEPTIONS, AND GREEN CONCERN ON INTERNET BANKING USE

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ABSTRACT

In this paper, we developed a theoretical model that posits factors influencing Internet banking use and validated it with a sample of more than 300 respondents using Partial Least Squares (PLS). The results indicated that three factors, openness to experience from the Five-Factor Model, perceived usefulness, and green concern from peer pressure, were positively associated with Internet banking use. Consistent with previous research, security concern was negatively associated with Internet banking use while perceived ease of use was found to influence perceived usefulness. The results offer valuable insights for bank managers.

Keywords: Internet banking, personality traits, security, perceived ease of use, perceived usefulness, and green concern

INTRODUCTION

Advanced developments in information technology and the Internet have changed how banks operate their business and how consumers conduct their banking activities [43]. Today, most banks offer their banking services over the Internet in addition to traditional services in the brick-and-mortar environment. As a result, consumers can access their accounts, transfer funds between accounts, view their online bank statements, pay their bills, and conduct other banking transactions electronically through the bank's website 24/7. Although there are many benefits of Internet banking for banks and their customers,

the major benefits are cost savings for banks, and convenience and efficiency for customers [27]. Using Internet banking also promotes going-green and protecting the environment. Instead of printing and mailing paper statements, electronic statements can conserve resources and reduce paper waste.

Despite the rapid increase in the number of Internet users and the cited benefits using Internet banking, the number of Internet banking users has not risen as strongly as expected. Among 3,988 adults surveyed in the U.S. in December 2008 and January 2009, only 47% reported that they use Internet banking [17]. Another survey by eMarketer [14] revealed that 76% of US bank customers still prefer to visit a branch than using online for major transactions, such as applying for a loan.

Although bank customers who prefer Internet banking to other banking methods are increasing in number [2], nearly half of US bank customers are concerned about security of their banking transactions and/or personal information when carrying out financial transactions over the Internet [14]. This negative perception toward Internet banking is a major reason reported by non-adopters [18]. Therefore, identifying individual characteristics of bank customers who use Internet banking and other factors promoting or hindering Internet banking use is crucial for developing successful strategies to boost up its usage. This is a primary motivation for our study. This paper investigates factors that influence Internet banking use. For that purpose, we categorized factors into four dimensions: individual, usage, security, and social.

The rest of the study is organized as follows. In the next section, we propose an integrative model of Internet banking use. We describe each construct in the model and formulate the associated research hypotheses. We then discuss the research method and present the results from the analysis of the empirical data. The paper discusses the theoretical and practical implications of the model in the discussion section and concludes with limitations and directions for future studies.

RESEARCH MODEL AND HYPOTHESES

The theoretical research model that includes four key dimensions is shown in Figure 1. Each construct is described in detail as follows.

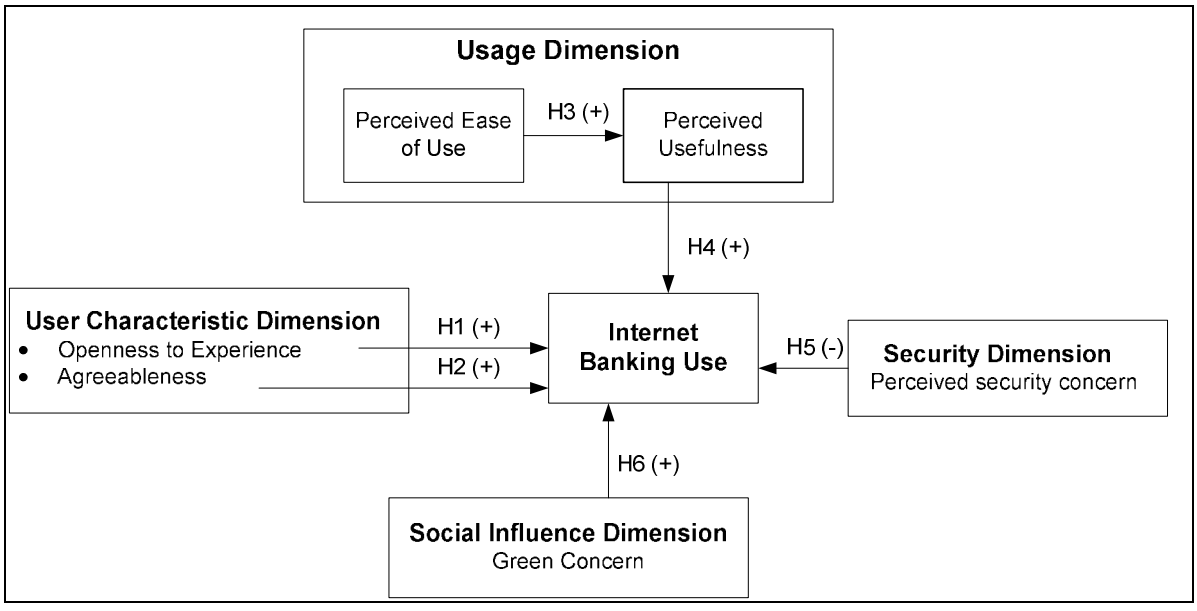


Figure 1: Proposed Research Model of Internet Banking Use

User Characteristic Dimension

Previous studies have found that individual personality is an important construct affecting individual attitude and behavior toward technology [4, 5, 12]. In the information systems domain, a relationship between individual differences and IT adoptions has been theoretically posited and empirically demonstrated in a large body of prior research [24]. These previous studies indicated that personality traits are significant predictors influencing the adoption of IT [1, 32, 38]. Accordingly, we believe incorporating personality traits advances our understanding on the types of bank customers who use Internet banking.

Personality is unique to an individual, and an individual's perceptions, intentions, attitudes, motivations, and behaviors are influenced by the individual's personality [42]. The Five Factor Model (FFM, or "Big-Five model") includes five key personality traits: *neuroticism, extraversion, conscientiousness, openness to experience,* and *agreeableness* [35, 36]. These are typically described as follows:

- Neuroticism: anxious, depressed, and unstable
- Extraversion: energetic, outgoing, and talkative
- Conscientiousness: efficient, responsible, and organized
- Openness to Experience: curious, receptive to new ideas, and wide range of interests
- Agreeableness: kind, generous, and trustful

Voluntary adoption of Internet banking technology requires some degree of innovativeness on the part of the adopter. However, previous studies did not find any significant relationship between extraversion and perceived task technology fit [20], between conscientiousness and innovative use of IT [31], and between neuroticism and Internet use [21]. Therefore, we decided to include two personality traits, *openness to experience,* and *agreeableness* from the FFM in this study.

Previous studies suggest that *openness to experience* positively influences personal innovation in IT [38], perceived task technology fit [20], and mindfulness in IT innovation [13]. Individuals who score high on *openness to experience* tend to have a broad range of interests, receptivity to new ideas, and inventiveness [28]. These individuals are more likely to have a positive attitude or behavior toward accepting technology [12]. Li et al. [31] also found that the CIO with high *openness to experience* has a positive impact on organizational innovative use of IT. Accordingly, bank customers with high *openness to experience* are likely to try out Internet banking. Therefore, we propose the following hypothesis.

H1: *A customer's openness to experience is positively associated with Internet banking use.*

On the surface, the other factors may appear less central to the explanation of Internet banking use. However, recent research suggests that agreeableness is an important trait that can predict computer anxiety, and individuals with high *agreeableness* are associated with low computer anxiety [25]. Gu and Wang [20] also found that *agreeableness* has a significant positive impact on perceived task technology fit. We therefore posit that bank customers with high *agreeableness* will be more inclined to use Internet banking, because they experience less computer anxiety and have a higher perceived task technology fit with the Internet banking medium. Accordingly, we propose the following hypothesis.

H2: *A customer's agreeableness is positively associated with Internet banking use.*

Usage Dimension

Compared to traditional offline banking, Internet Banking is viewed as one of the most effective ways to operate bank transactions because it offers many benefits, such as faster transaction speed, the lower or no transaction handling fees, and increased information transparency [28]. These benefits can influence the customer's attitude toward Internet banking use.

The Technology Acceptance Model (TAM), originally developed by Davis [11], attempts to explain technology use and technology acceptance behaviors using two primary factors, *perceived usefulness* (PU) and *perceived ease of use* (PEU). Several previous studies that have investigated the relationship between these two factors and Internet banking use found significance between them [7, 48]. These studies suggest that both factors, PU and PEU, have positive effects on Internet banking use. However, other studies indicated that while PU has a positive impact on Internet banking use, PEU has a significant effect on PU [6, 8]. Accordingly, the following hypotheses are proposed.

H3: *A customer's perceived ease of use is positively associated with perceived usefulness of Internet banking use.*

H4: *A customer's perceived usefulness is positively associated with Internet banking use.*

Security Dimension

Perceived security has been widely studied in the contexts of using an IT device and e-commerce [22, 19, 28, 24]. Many consumers are vulnerable to identity theft when using Internet banking services [13]. They fear that their financial information can be in jeopardy and they might incur considerable financial losses. Accordingly, many consumers prefer not to use Internet banking due to this negative perception about security risk [28, 43]. Therefore, we propose the following hypothesis.

H5: *A customer's perceived security concern is negatively associated with Internet banking use.*

Social Influence Dimension

Social influences may occur when an individual's opinions, feelings or actions are affected by other people. Social influence, also known as subjective norm, is defined as perceived pressures from most people to make or not to make a certain behavioral decision [32]. The previous research has shown that subjective norm has a significant impact on intention, attitude, and behavior for certain IT use [12, 28, 34, 46].

Green Concern

In this study, green concern is viewed as a construct related to social influence. While environmental sustainability or green IT has become an important issue for organizations, its impact on individual behavior cannot be ignored to ensure a sustainable world [40, 49]. People are continually experiencing social pressure to "go green"—to engage in behavior that decreases one's negative impact on the environment. Electronic documentation in lieu of paper is increasingly common and encouraged by banks [15, 44]. Banks are informing users that receiving statements online instead of paper statements by mail is one way to preserve the environment. When 10% of Americans (about 11 million U.S. homes) switch from paper statements to online bills, it saves about 75.5 million pounds of paper and eliminates production of 1.96 million pounds of greenhouse gases [39]. Banks are also motivated to encourage their users to "go green" due to significant cost savings.

Not only are banks encouraging customers to "go green," customers also appear to be encouraging their banks to "go green." Previous studies found that companies' green efforts play an important role in improving customer satisfaction, loyalty, trust, and attitude [31, 33, 37, 45]. Consumers tend to associate "environmentally friendly" with product quality [10], and with a company's concern for their consumers and society [23].

As more people become concerned about protecting the environment, people's green concern is influenced by how other people around them such as friends, family, and coworkers will view them. In this study, we expect that customers use Internet banking because they believe it is one way to save the environment, following people around them who promote "going green". Therefore, we propose the following hypothesis.

H6: *A customer's green concern is positively associated with Internet banking use.*

RESEARCH METHOD

Measurement Instrument and Sample

A survey instrument was developed based on the review of the Internet banking literature and other related studies (see Appendix A). Except for the *Internet Banking Use,* which was measured by a single item, each construct was measured by four items using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). All constructs were measured using existing measurement items which were adapted to the context under study. Green Concern measurement items were adapted from Social Influence Construct measurement items. A summary including the items for each construct, and sources and loading for individual item is included in the Appendix A.

The survey was pretested by a few of business school graduate students since sources of measurement items are from previous studies. Measurement items for green concern construct are adapted from social influence studies. The survey was administered in the fall 2011 to groups of undergraduate students at a large public university in the south central United States. A total of 302 surveys were collected (the return rate was 100% since the survey was distributed in a classroom setting). One was omitted due to missing data and 301 were used in this analysis. While using student subjects is often considered as a weakness of the study, these students reported themselves as the users of Internet banking, and, thus, we believe that they are suitable for our study. Of the 301 respondents, over 60% were male. Approximately 83% of the respondents were between 20 and 30 years old and over 60% of them have used computers for more than 10 years. Demographic characteristics of the respondents collected are presented in Table 1.

Table 1: Demographic Profile of Respondents

Variable		Frequency	Percent (%)
Gender	Female	119	39.5
	Male	182	60.5
Age	under 20	19	6.3
	20-30	251	83.4
	31-40	19	6.3
	Over 40	12	4.0
Student Status	Freshmen	0	0
	Sophomore	54	17.9
	Junior	188	62.5
	Senior	56	18.6
	Did not reply/ missing	3	1
Computer Experience	Less than 1 year	6	2
	1 to less than 5 years	23	7.6
	5 to less than 10 years	82	27.3
	10 or more years	186	61.8
	Other (missing)	4	1.3

DATA ANALYSIS AND RESULTS

The model was evaluated using Partial Least Squares (PLS), a Structural Equation Modeling (SEM) technique. The statistical package, SmartPLS 2.0 was used [41]. In PLS, the underlying data is not assumed to be multivariate normal, and therefore, a nonparametric resampling procedure, bootstrapping, was used to calculate t-values of the path parameters [29].

Validity and Reliability

The validity and reliability of the measurement model were assessed using the individual items loadings, composite reliability (CR) and Cronbach's alpha scores, and the average variance extracted (AVE).

As shown in Table 2, the internal consistency of the constructs was confirmed by both Cronbach's alpha and the composite reliability scores, which were well above the recommended threshold value of 0.7, suggesting that they explained more than 50% of the variance in the construct [21]. Convergent validity was confirmed by average variance extracted (AVE) scores, which were greater than the criterion score of 0.50, suggesting that the amount of variance in the items attributable to errors was less than the amount attributable to the construct [16].

Table 2: Factor Loading, Validity and Reliability Scores

Construct	Cronbach's alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Openness to Experience (Open)	0.814	0.878	0.642
Agreeableness (Agree)	0.860	0.905	0.704
Perceived Ease of Use (PEOU)	0.964	0.974	0.904
Perceived Usefulness (PU)	0.968	0.977	0.913
Perceived Security Concern (PS)	0.919	0.943	0.806
Green Concern (Green)	0.932	0.952	0.831

Discriminant validity was confirmed by verifying that the square root of AVE for a construct is larger than its correlation with other constructs, and also by verifying item loadings [16]. Individual item loadings in the PLS model were larger than 0.75 [16]. All the constructs in our study fulfilled this criterion and thus, all the constructs demonstrated adequate Discriminant validity. Table 3

presents the calculated AVE and their square root (in parentheses) and the correlation with other construct.

The proposed research model was reasonably supported by the empirical data. The Result of each hypothesis is summarized in Table 4. Except hypothesis 2, all other hypotheses (1 and 3-6) were supported.

Table 3: Discriminant Validity

	Open	Agree	PEOU	PU	PS	Green	IB Use
Open	0.642 (0.801)						
Agree	0.403	0.704 (0.839)					
PEOU	0.429	0.379	0.904 (0.951)				
PU	0.406	0.384	0.908	0.913(0.956)			
PS	-0.046	-0.053	-0.126	-0.139	0.806 (0.898)		
Green	0.141	0.087	0.148	0.135	0.119	0.831 (0.912)	
IB Use(1)	0.314	0.226	0.527	0.533	-0.231	0.210	1.0

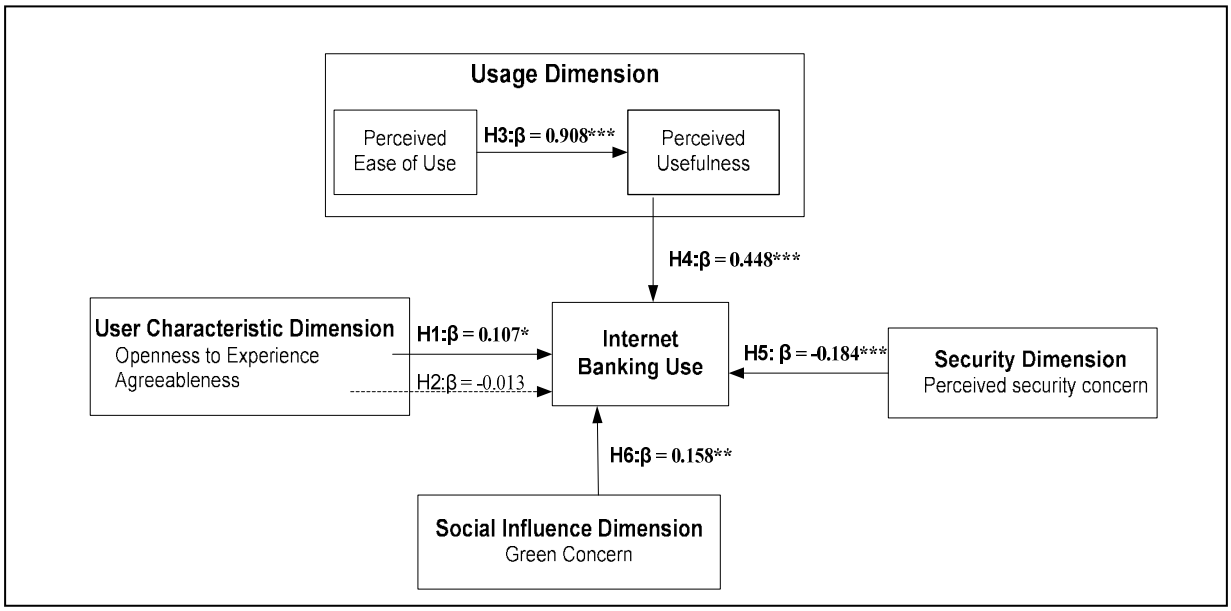
Open: Openness to Experience; Agree: Agreeableness; PEOU: perceived ease of use; PU: Perceived usefulness
PS: Perceived Security Concern; Green: Green concern; IB Use: Internet Banking Use
Note: Shaded numbers on the diagonal (AVE followed by the square root of AVE in parentheses) indicated that the square roots of AVE are greater than the correlations of each pair of constructs
(1) A single item was used to measure this latent variable

Table 4: Hypothesis Testing Results

Hypothesis	Relationship	B	p-value (t-value)	Hypothesis Outcome
H1	Openness to experience → Internet Banking Use	0.107	0.0157 (2.162)	Supported
H2	Agreeableness → Internet Banking Use	-0.013	0.4056 (0.239)	Not Supported
H3	Perceived Ease of Use → Perceived Usefulness	0.908	<.0001 (35.253)	Supported
H4	Perceived Usefulness → Internet Banking Use	0.448	<.0001 (6.071)	Supported
H5	Perceived Security Concern → Internet Banking Use	-0.184	<.0001 (4.127)	Supported
H6	Green Concern → Internet Banking Use	0.158	0.0003 (3.471)	Supported
Internet Banking Use (R^2 0.345)				

DISCUSSIONS AND IMPLICATIONS

This study investigates factors that influence Internet banking use by focusing on some of personality traits of bank customers and their perceptions affecting Internet banking use. The final research model is presented in Figure 2. A customer's *openness to experience* has a significant positive effect on *Internet banking use* and thus, H1 was supported. This finding is in line with previous research, Nov and Ye [38], which found a positive link between *openness to experience* and *personal IT innovativeness,* and Thatcher and Perrewĕ [47], which found that innovative individuals tend to have high confidence in using a new technology. On the contrary, the hypothesized relationship between a customer's *agreeableness* and Internet Banking Use (H2) was not found significant. Previous research has indicated that the individual with high in agreeableness is likely to be associated with less computer anxiety [25] and thus, those individuals are more likely to use a new technology. However, our study indicated that coefficient (**β**) of the path between *agreeableness* and *Internet banking use* was negative although it was not significant. Although this is different than what we expected, this is somewhat in line with findings of Korzaan and Boswell [26]. Their study reported that *agreeableness* was found to have a significant positive influence on concern for information privacy. Accordingly, bank customers with highly *agreeableness* would demonstrate privacy concerns for their own and others, and thus, they are not likely to use Internet banking. However, further investigation is needed to validate this claim in the near future.



*p<0.05 **p<0.001 ***p<0.0001: Note: Dotted line represents no significance

Figure 2: Internet Banking Use – Final Model

With regard to usage dimension, testing the positive relationship between *Perceived Ease of Use* and *Perceived Usefulness* (H3) was found highly significant. Also as expected, *Perceived Usefulness* has significant positive relationship with *Internet Banking Use* (H4), confirming previous findings in the literature [6, 28, 32]. Overall, *Perceived Ease of Use* and *Perceived Usefulness* seem to be relevant constructs for understanding Internet banking use [7, 48].

As hypothesized, *Perceived Security Concern* was found to have a significant negative relationship with *Internet Banking Use*. As previously reported, Internet banking security is a concern for most bank consumers [28, 43]. Only 20.5% of the people surveyed perform their financial transactions online without fear of security and the rest of people surveyed are either not using Internet banking because of security concerns (31%) or use it but still are concerned about security (48.5%) [3].

With regard to the social influence dimension, we found a significant positive relationship between *Green Concern* and *Internet Banking Use* (H6). Our finding may suggest that bank customers are more concerned about environmental problems and they are willing to go green, following other people who are making green efforts.

There are several theoretical and practical implications of this study. On the theoretical aspect, this study introduces individual's green concern as a construct of the social influence dimension, which has a statistically significant influence on Internet banking use. Our study indicates that word-of- mouth communication from family, friends, and others is an important source influencing Internet banking usage. Recently, many organizations as well as individuals are "going green" to preserve the environment. However, there is little research focusing on green issue, especially in the area of Internet banking. We believe that the results of this study enhance our understanding of current status on green concern.

This study also includes two personality trait constructs that were borrowed from the Five-Factor Model of personality. Although these factors are well used in the field of personality trait research, they are not widely used in the IS field. This study introduces the personality trait in the field of IS, especially in the area of Internet banking. The study indicated that *openness to experience* has a significant influence on Internet banking use. However, a negative sign of *agreeableness* indicates contrary to what we have expected and this needs to be investigated further in the future.

The current study provides some practical implications for bank managers. An important implication de-

rived from the study is a role of green concern as the social influence. In order to encourage bank customers' Internet banking use, a strong "green awareness program" is needed to educate bank customers that Internet banking is one way to preserve and protect the environment. Training programs can be also offered to target potential bank customers who are not easily motivated to try Internet banking. Another implication is about security concerns. This study along with previous research indicated that security concern has been shown to be a frequently cited factor affecting users' technology adoption or use. When designing Internet banking, additional attention should be given to assure bank customers' security concerns are properly addressed. Features such as chat rooms and discussion forums can be incorporated for real-time communication with business representative to encourage bank customers' Internet banking usage. Both of these findings provide support for perception management investment activities, such as marketing campaigns specifically designed to influence customer belief that the bank's Internet banking services are carefully secured, and that many of their peers are "going green." In addition, our study suggests that personality traits of individual bank customer can be a significant contributor influencing Internet banking usage and thus these individual characteristics should also be considered for successful Internet banking design and implementation.

CONCLUSIONS, LIMITATIONS, AND DIRECTIONS FOR FUTURE STUDIES

This study is not without limitations. While the participants in our sample are active users of Internet banking, sampling was limited to students enrolled in business classes at a large south central university. Therefore, the generalizability of the findings from our study may be limited. Further research is needed using samples with different characteristics of bank customers (e.g., different age groups, various income levels, and education levels), which would help ascertain the generalizability of our findings. Like any survey method study, another limitation of our study is using self reported measures, which may suffer from common method variance that could show spurious correlation since both independent and dependent variables were from the same respondents [9]. However, the corroborating evidence of the moderate to low levels of correlation coefficients among the variables suggests that it is not likely a major threat in this study. Future studies could test the model with mobile banking to enhance our knowledge in different types of online banking. Investigating the differences in personality between Internet banking users and non-users might be an interesting study in the future and also could be beneficial to bank managers and designers in designing the system.

Conducting banking transactions electronically via the bank's website can provide customers convenience and also help lower transaction fees, compared to using traditional banking. However, not every banking customer is willing to use Internet banking. This study proposed a research model that investigates factors influencing Internet banking use and empirically validated it. The results indicated that *openness to experience* was found to have a significant positive association with *Internet banking use*. In line with previous research, security concern was negatively associated with Internet banking use while *perceived usefulness* was positively associated with *Internet banking use*. Moreover, the results indicated that *green concern* has a strong positive association with *Internet banking use*, indicating that bank customers use Internet banking because they are influenced by people around them who practice "going green." The final model includes bank customers' personality traits and their perceptions toward Internet banking use in four dimensions. We believe that our findings provide additional insight on this research topic.

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APPENDIX A: MEASUREMENT SCALES

The measurement items for each construct are described as follows. Each item is using a 7-point Likert scale (1= strongly disagree to 7= strongly agree). Except for Internet banking use, which has only one item, all other constructs have 4 items each.

Construct / Measurement Items	Sources	Loading
Openness to Experience (OPEN)		
OPEN1: I am curious about many different things.	(Gu & Wang, 2009)	0.7973
OPEN2: I like to think up new ways of doing things.	(Li et al., 2006)	0.8236
OPEN3: I like to challenge the norms.	(Li et al., 2006)	0.8278
OPEN4: I like to read challenging materials.	(Li et al., 2006)	0.7541
Agreeableness (AGREE)		
AGREE1: I am considerate and kind to almost everyone	(Gu & Wang, 2009)	0.8330
AGREE2: I like to cooperate with others	(Gu & Wang, 2009)	0.8629
AGREE3: I sympathize with others' feeling	(Korzaan & Boswell, 2008)	0.8509
AGREE4: I take time out for others.	(Korzaan & Boswell, 2008)	0.8086
Perceived Ease of Use (PEOU)		
PEOU1: It is easy to use Internet banking to accomplish my banking tasks.	Lee (2009)	0.9592
PEOU2: Internet banking is easy to use.	Lee (2009)	0.9587
PEOU3: Learning to operate Internet banking would be easy for me.	Lee (2009)	0.9585
PEOU4: It is easy for me to remember how to perform tasks with Internet banking.	Chan & Lu (2001)	0.9260

Perceived Usefulness (PU)			
PU1:	Internet banking enables me to accomplish my tasks more quickly.	Lee (2009)	0.9456
PU2:	The Internet banking is useful	Lee (2009)	0.9730
PU3:	Internet banking is a convenient way to manage my finances.	Chan & Lu (2001)	0.9576
PU4:	Internet banking eliminates geographic limitation and increases flexible in mobility.	Chan & Lu (2001)	0.9460
Perceived Security Concern (PS)			
PS1:	I would not feel safe in making transactions over the Internet banking.	Kim et al. (2008)	0.8740
PS2:	I would not feel totally safe providing personal privacy information over the Internet Banking.	Chang (2009)	0.9091
PS3:	I do not perceive the information relating to user and Internet banking transactions as secure.	Kim et al. (2009)	0.9181
PS4:	I'm worried to use Internet banking because other people may be able to access my account.	Chang (2009)	0.8885
Social Influence –Green Concern (Green)			
GREEN1:	People around me have encouraged me to use Internet banking to promote 'green'.	Adapted from Lopez-Nicolas et al. (2008)	0.8873
GREEN2:	My decision to adopt Internet banking to promote 'green' is influenced by my friends.	Adapted from Chan and Lu (2001)	0.9319
GREEN3:	My decision to adopt Internet banking to promote 'green' is influenced by my family or relatives.	Adapted from Chan and Lu (2001)	0.9123
GREEN4:	My decision to adopt Internet banking to promote 'green' is influenced by my colleagues or peers.	Adapted from Chan and Lu (2001)	0.9152
Internet Banking Use			
IB USE:	I am using Internet banking more often than others	Kim et al. (2009)	1.0