

FACTORS AFFECTING INTERNET BANKING USAGE BEHAVIOR: AN EMPIRICAL INVESTIGATION OF GREEK CUSTOMERS

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Abstract

This study deals with the factors affecting customers to continue to be users of internet banking. The context of the research framework is based on the extension of the Technology Acceptance Model with concepts from Innovation Diffusion Theory. Theory was developed to identify factors that influence customers' behavioral intentions and actual usage. The conceptual framework includes latent variables formulating customers' perception on service's usefulness, easy of use, risk and compatibility, which are operating as predictors of customers' behavioral intentions to continue to use internet banking services. Survey was conducted to internet banking customers of a major Greek banking institution to gather data. Partial least square was used to examine pattern of inter-correlations among the six proposed constructs and to test related propositions empirically. Results show that service compatibility is the most important factor shaping customers' behavioral intentions, followed by TAM constructs and perceive risk. Moreover, TAM and perceived risk constructs are operating as mediators between compatibility and customers' behavioral intentions, while perceived usefulness mediating the relationship between perceived easy of use and customers behavioral intentions. Finally, theoretical contributions and practical implications of the findings are discussed and suggestions for future research are presented.

Keywords: Internet banking, extended TAM, compatibility, risk, partial least squares

1. Introduction

Internet banking (IB) becomes a major trend in the financial marketplace and the number of users of the internet banking has been increased significantly. Internet banking is a new type of information system that uses the Internet's innovative resources to enable customers to perform their financial activities in virtual space (Shih and Fang, 2004). Internet banking is extremely beneficial to customers because of the savings in costs, time and space it offers, its quick response to complaints, and its delivery of improved services, all of which benefits make for easier banking (Turban et al. 2000). Bank customers, now, perform their banking transactions at the place and time of their choice because of internet banking. The benefits of Internet banking from the banks' side are that they can lower their operational costs, be more responsive to customers' requests and provide value-added services (Tan and Teo, 2000). In addition, internet banking may enhance customer loyalty, drive customers to carry higher balances, and be willing to refer their banks to others (Market Research, 2006).

The internet banking situation in EU-15 is illustrated in Figure 1 (Eurostat, 2008). The figure shows that internet banking is well established in Europe since more than 30% of internet users are using internet for their financial activities.

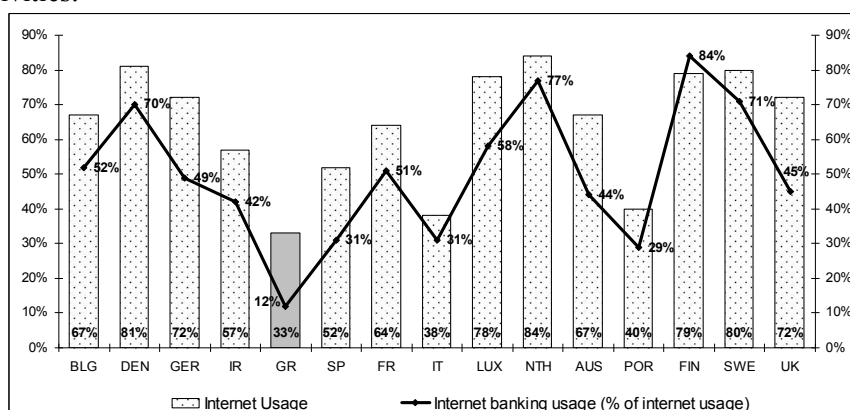


Figure 1: Internet and Internet Banking Usage in EU-15 (2007Q2) (Eurostat 2008)

The penetration of internet banking in Greece is not as high as in other European countries since 12% of internet users are using internet banking services. One of the main reasons of low penetration levels is that Greeks are not familiar with the usage of new technologies since only 33% are internet users resulting in low levels of trust in doing financial transactions through internet. However, online banking transactions continue to increase because Greek customers are seeking for convenience. According to the Hellenic Bank Association, the daily turnover is about 100 million Euros and the number of transactions was about 7 million. Moreover, there are 20 credit institutions and 10 branches of foreign banks in Greece with presence on the Internet. Although the numbers are constantly changing, in the Greek market the Internet offers an alternative distribution channel. However, soon more Greek banks are expected to follow, which shows that Internet banking is poised for rapid growth in the country.

Although the adoption of internet banking has been extensively studied, relevant studies concentrate on initial adoption and neglects continuity. Continuous use is very important, particularly in the web-based industry, because companies make their profits mainly from customers continuously using their services. Service continuance in the internet environment is not entirely novel concept (Aladwani, 2001), but until now few studies investigated what encourage adopters to continuously using internet banking. Research on the determinants of internet banking usage may enhance the understanding of a customer's intention to use internet banking, and show how this intention affect internet banking usage behavior. Understanding of Internet Banking usage behavior can help banks to formulate appropriate marketing strategies for internet banking in Greece. These considerations are also very vital to the practitioners who plan and promote internet banking in the current competitive market.

This paper is a comprehensive research in terms of using a theoretical model to understand internet banking usage behavior in Greece. The purpose of this research is to test the ability of an extended theoretical model to predict and explain user acceptance and usage continuance of internet banking services.

2. Theoretic Basis

A review of prior studies provides the theoretical foundations of the hypotheses formulations. This section elaborates on the related theory for deriving the research model and hypotheses. Significant body of the literature investigating the adoption of internet banking employed the theory of reasoned action (TRA), technology acceptance model (TAM), or innovation diffusion theory (IDT), or mixtures of two/three theories as their theoretical basis. Motivated by prior literature, this work takes TAM and IDT as a theoretical basis for designing a research framework to exploring what influences adopters to continue bank online.

TAM proposed by Davis in 1986 (Davis, 1989; Davis et al., 1989) originates from the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) to forecast individual computer acceptance. According to TAM, behavioral intention of individuals in adopting a technology-based product/service can be explained by their perceived usefulness (PU) and perceived ease-of-use (PEOU). For perceived usefulness and for perceived ease of use antecedents have been suggested including personal characteristics (Teo et al., 1999), and risk (Lee et al., 2001). Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance, while perceived ease of use is defined as the degree to which a person believes that using a particular system would be free of effort.

Among the beliefs, perceived ease of use is hypothesized to be a predictor of perceived usefulness. (Venkatesh and Davis, 2000).

IDT was introduced by Rogers in 1962 (Rogers, 2003), and applies a process-oriented viewpoint to explain how an innovation is accepted and diffused within a social system (Rogers, 2003). According to IDT innovation adoption or rejection begins with consumer awareness of the innovation, and diffusion is a process through which an innovation is communicated via certain channels over time among members of a social system. IDT has been widely applied in predicting IT adoption behavior (e.g., Chen et al., 2002). It posits a set of innovation attributes to explain the rates of adoption by users: relative advantage, compatibility, complexity, trialability, and observability. However, previous studies found that only relative advantage, compatibility and complexity were consistently related to innovation adoption (Tornatzky and Klein, 1982; Wang and Liao, 2008). Since internet banking is an innovation, these three attributes can be used in predicting and explaining the customers' behavioral intentions.

3. Research Model and Hypotheses

The research model used to guide the study is shown in Figure 2, which suggests that perceived usefulness, perceived ease of use, perceived compatibility and perceived risk are potential determinants of behavioral intention to use internet banking services.

Perceived Usefulness: There is extensive research in the IS community that provides evidence of the significant effect of perceived usefulness on usage intention (Agarwal & Prasad, 1999; Venkatesh, 1999, 2000; Venkatesh & Davis, 1996, 2000). The ultimate reason that people exploit internet banking service systems is that they find the systems useful to their transactions. Thus, the following hypothesis is tested:

H1: Higher perceived usefulness of internet banking users will lead to higher behavioral intention for service usage continuance.

Perceived Compatibility: As mentioned earlier, among the innovation diffusion factors, only relative advantage, compatibility and complexity are potential determinants of innovation adoption (Tornatzky and Klein, 1982). However, relative advantage and complexity are conceptually overlapped with TAM's perceived usefulness and perceived ease of use, respectively (Moore and Benbasat, 1991). Thus, the two innovation attributes were excluded from the current research model. Perceived compatibility in this study is defined as the extent to which service under investigation is perceived to be consistent with the users' existing values, previous experiences, and needs. Previous empirical research also indicate that perceived compatibility has a significant positive influence on perceived usefulness, easy of use (Wu and Wang, 2005; Agarwal and Karahanna, 2000), and behavioral intention to use electronic/mobile commerce systems (Chen et al., 2002; Wu and Wang, 2005). Moreover, Sohail and Shanmugham (2003) assert that the lower requirement to change existing customers habits, such as current method of banking, the higher likelihood that customers will continue to use internet banking services. Thus, the following hypotheses are tested:

H2: Higher perceived compatibility will lead to higher perceived usefulness of internet banking services.

H3: Higher perceived compatibility will lead to higher perceived easy of use of internet banking services.

H4: Higher perceived compatibility will lead to lower perceived risk regarding internet banking usage.

H5: Higher perceived compatibility will lead to higher behavioral intention for service usage continuance.

Perceived Ease of Use: Extensive research over the past decade provides evidence of the significant effect of perceived ease of use on usage intention, either directly or indirectly through its effect on perceived usefulness (Agarwal & Prasad, 1999; Venkatesh, 1999, 2000; Venkatesh & Davis, 1996, 2000). In order to prevent the "under-used" useful system problem, internet banking service systems need to be both easy to learn and easy to use. Thus, the following hypotheses are tested:

H6: Higher perceived ease of use will lead to higher perceived usefulness of internet banking services.

H7: Higher perceived ease of use will lead to higher behavioral intention for service usage continuance.

Perceived Risk of Usage: Perceived risk, another subjective concept in social relations, is critical for e-commerce acceptance (Gefen, 2002; Pavlou and Gefen, 2004). Perceived risk refers to individual's subjective belief about the likelihood of a loss in pursuit of a desired outcome (Pavlou, 2003). It is expected that perceived risk negatively affects customers' intentions to continue internet banking usage. Additionally, easy of use has a negative impact on perceived usage risks for service continuance (Featherman and Pavlou, 2002). Thus, the following hypotheses are tested:

H8: Higher perceived risk will lead to lower perceived usefulness of internet banking.

H9: Perceptions of internet banking services' ease of use ascertained from hands-on trial significantly reduces perceived risk of usage.

H10: Higher perceived risk will lead to lower behavioral intention for service usage continuance.

Actual Use: In prior studies intention to use is found to be a predictor of actual usage. Therefore it is presumed that a person with a positive intention for service use continuance will actually use internet banking more frequently. In other words, positive intentions will increase the number of time the service is being used within a period of time. Thus, the following hypothesis is tested:

H11: Perceived behavioral intention for service usage continuance will have a positive effect on the frequency of internet banking usage.

4. Research Methodology

Measures of the Constructs: Items for perceived ease of use, perceived usefulness and behavioral intentions were measured using items adopted from the original TAM instrument (Davis, 1989; Davis et al., 1989) and subsequent applications of TAM to internet banking and other technology acceptance studies (Agarwal & Prasad, 2000; Tan and Teo, 2000). Measures of perceived risk were adapted from studies on internet banking (Tan and Teo, 2000), e-services (Featherman and Pavlou, 2002) and e-shopping. Items for the construct compatibility were adopted from studies of Moore and Benbasat (2001) and Tan and Teo (2000). Items for demographic variables such as gender, age, education, computer, internet and internet banking experience, were adopted from Tan and Teo (2000). Table 1 indicates the list of items used for developing each construct in the internet banking users' questionnaire. Likert scales (1–7), with anchors ranging from “strongly disagree” to “strongly agree” were used for all items to ensure statistical variability among survey responses for all items measured.

PU1	Using IB site improves my performance of banking activities
PU2	IB site makes it easier for me to do my banking
PU3	Using IB enables me to accomplish banking activities more quickly
PEOU1	It was easy to become skilful at using IB
PEOU2	I find IB easy to use
PEOU3	My interaction with IB site is clear and understandable
COMP1	IB is compatible with my lifestyle
COMP2	Using IB fits well with the way I like to manage my finance
COMP3	Using IB suits my current situation
RISK1	Using IB may expose me to fraud or monetary loss
RISK2	Using IB may jeopardise my privacy
RISK3	IB is insecure
BI1	I intend to continue to use IB within the near future
BI2	I plan to continue to use IB
BI3	I expect to continue use IB in the near future
AU1	In the last 30 days, approximately how often have you used IB?
AU2	In the last 30 days, approximately how many times have you used IB?

Table 1: List of Items by Construct

Data Collection: To determine user's intention to continue to use internet banking, a survey was conducted during the second quarter of 2008. Questionnaires were distributed to 500 randomly selected personal

internet banking customers of a Greek banking institution. Participation in the study was voluntary. A total 137 usable, complete responses were obtained resulting in a response rate of 27,4%. Detailed descriptive statistics related to the respondents' characteristics are shown in Table 2

		Frequency (N=137)	Percent (%)
Gender	Male	91	56
	Female	46	44
Age	15-24	10	7
	25-39	63	46
	40-54	46	34
	55-69	16	12
	> 70	2	1
PC experience	< 1	3	2
	1-2	1	1
	3-5	16	12
	6-10	28	20
	> 10	89	65
Internet experience	< 1	3	2
	1-2	6	4
	3-5	51	37
	6-10	56	41
	> 10	21	15
Internet banking experience	< 6	7	5
	6-12	8	6
	1-2	38	28
	3-5	66	48
	>5	18	13

Table 2: Demographic Information of the Respondents

5. Data Analysis and Results

Measurement Model: The loadings of the total set of all items were estimated using Partial Least Squares (PLS) (Gefen, Straub and Boudreau 2000). PLS is suitable for this kind of a project because it fits both exploratory and confirmatory research, places less restriction on the data, and requires smaller sample sizes. Table 3 presents the measurement model. The results demonstrate that the loadings of all items exceeded the required threshold of 0.7, and, therefore, explain over 50% of the variance in an observed item. At the same time, the instrument showed high internal reliability since the Cronbach's Alphas were above 0.7 for all scales. In order to test for discriminant validity, a matrix of loadings and cross-loadings was constructed (see Table 4). By using this matrix, the loadings of an item with its associated factor (or construct) to its cross-loadings were compared. All items had higher loadings with their corresponding factors in comparison to their cross-loadings. Therefore, it was concluded that there is enough confidence in the discriminant validity of the measures and their corresponding constructs. Table 5 presents construct statistics. First, tests for reliability of the measurement items relating to four constructs were conducted by estimating the Cronbach's Alpha. Based on the results, it was concluded that all scales behaved consistently. Secondly, internal consistency and convergent validity measures were calculated. The analysis demonstrated high internal consistency and convergent validity since the scores exceeded 0.7 and 0.5 threshold respectively (Fornell and Larcker 1981).

Construct	Indicator	Mean	Stdev	Loading	Residual	Weight
PU	PU1	6,481	0,932	0,896	0,196	0,338
	PU2	6,379	1,022	0,922	0,149	0,363

Construct	Indicator	Mean	Stdev	Loading	Residual	Weight
	PU3	6,445	0,938	0,933	0,127	0,387
PEOU	PEOU1	6,240	0,989	0,931	0,131	0,393
	PEOU2	6,270	0,943	0,923	0,147	0,420
	PEOU3	5,941	0,937	0,839	0,294	0,293
Compatibility	COMP1	5,532	1,388	0,964	0,070	0,346
	COMP2	5,613	1,486	0,964	0,069	0,347
	COMP3	5,489	1,500	0,971	0,056	0,341
Risk	RISK1	2,788	1,203	0,919	0,154	0,364
	RISK2	2,693	1,074	0,946	0,103	0,450
	RISK3	3,021	0,966	0,844	0,286	0,282
BI	BI1	6,416	0,944	0,944	0,108	0,449
	BI2	5,956	1,076	0,862	0,255	0,322
	BI3	5,912	1,107	0,883	0,219	0,338
AU	AU1	5,474	1,367	0,900	0,188	0,653
	AU2	4,583	0,967	0,823	0,322	0,500

Table 3: Estimated Loadings for the Total Set of Measurement Items

	PU	Compatibility	Risk	BI	PEOU	AU
PU1	0,9028	0,4310	-0,3207	0,6208	0,6922	0,4440
PU2	0,9289	0,4526	-0,2792	0,6153	0,8005	0,3390
PU3	0,9408	0,5213	-0,3989	0,6732	0,8144	0,3755
COMP1	0,5135	0,9714	-0,2450	0,5736	0,4428	0,4818
COMP2	0,4963	0,9719	-0,2785	0,5761	0,4435	0,4644
COMP3	0,4755	0,9785	-0,2676	0,5991	0,4137	0,5207
RISK1	-0,3336	-0,2175	0,9263	-0,3739	-0,2359	-0,2868
RISK2	-0,3890	-0,3094	0,9537	-0,4575	-0,2897	-0,3903
RISK3	-0,2401	-0,1918	0,8510	-0,2763	-0,2073	-0,1550
BI1	0,7529	0,6855	-0,4105	0,9510	0,6955	0,6120
BI2	0,5008	0,3668	-0,3542	0,8690	0,5087	0,5032
BI3	0,5774	0,5239	-0,3609	0,8898	0,5067	0,4439
PEOU1	0,7848	0,4292	-0,2677	0,6160	0,9387	0,3608
PEOU2	0,816	0,4823	-0,2651	0,6381	0,9302	0,4011
PEOU3	0,6041	0,2632	-0,1995	0,4683	0,8460	0,3057
AU1	0,4529	0,4711	-0,3349	0,5663	0,3797	0,9073
AU2	0,2462	0,3959	-0,2105	0,4337	0,3035	0,8296

Table 4: Matrix of Loadings and Cross-loadings

Thirdly, measures of discriminant validity were calculated as the square root of the average variance extracted compared to the construct correlations. All values were greater than those in corresponding rows and columns. Table 6 offers the correlation matrix and discriminant validity assessment.

	PU	Compatibility	Risk	BI	PEOU	AU
Composite Reliability	0,941	0,977	0,931	0,925	0,927	0,853
Avg. Variance Extracted	0,842	0,935	0,818	0,805	0,809	0,744
Cronbach Alpha	0,905	0,965	0,888	0,875	0,883	0,636

Table 5: Construct Statistics,

	PU	Compatibility	Risk	BI	PEOU	AU
PU	0,918					
Compatibility	0,508	0,967				
Risk	-0,362	-0,271	0,905			
BI	0,689	0,598	-0,417	0,897		
PEOU	0,834	0,445	-0,273	0,642	0,899	
AU	0,416	0,502	-0,322	0,582	0,397	0,863

Table 6: Correlation Matrix of the Constructs and Discriminant Validity Assessment

Structural Model: Bootstrapping was performed, using Visual-PLS software, with 2000 replications to derive t-statistics, assess the significance level of the model's coefficients and test the hypotheses. Table 7 and Figure 2 present the structural model paths as well as their significance measures. As such, ten out of eleven hypotheses were supported (H1, H2, H3, H4, H5, H6, H8, H9, H10, H11) and one hypothesis were rejected (H7). In order to further confirm the insignificance of the rejected hypothesis, the linkages corresponding to that hypothesis was dropped, and the PLS model was re-estimated. The analysis revealed that the beta coefficients and t-values of the remaining model were strong and significant. In addition, none of the R-squared values changed that manifests the statistical validity of the remaining linkages.

Path	Entire Sample Estimate	Mean of Subsamples	Standard Error	t-statistic
PEOU->PU	0,735	0,737	0,044	16,629
COMP->PU	0,148	0,146	0,048	3,064
COMP->PEOU	0,445	0,445	0,084	5,323
COMP->RISK	-0,186	-0,184	0,084	-2,220
PEOU->BI	0,217	0,223	0,114	1,899
PU->BI	0,290	0,297	0,128	2,267
RISK->BI	-0,170	-0,164	0,070	-2,439
BI->AU	0,582	0,584	0,067	8,635
COMP->BI	0,309	0,306	0,085	3,623
RISK->PU	-0,121	-0,123	0,059	-2,040
PEOU->RISK	-0,190	-0,196	0,092	-2,074

Table 7: Structural Model Path Coefficients and Bootstrap Results

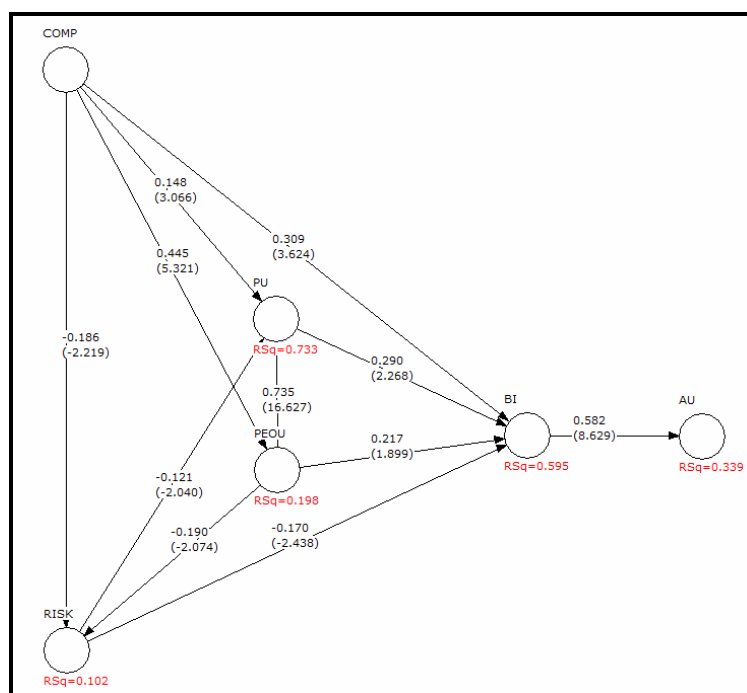


Figure 2: Proposed Model and Hypotheses Testing Results

Altogether, the proposed model accounted for 59,5% of the variance in behavioral intentions, 33,9% of the variance in the actual usage, 73,3% of the variance in perceived usefulness, 19,8% of the variance in perceived easy of use and 10,2% of the variance in perceived risk. Perceived compatibility exhibit the stronger direct effect on behavioral intentions followed by TAM constructs and perceived risk.

5. Implications and Discussion

Summarizing, the results of the proposed model indicate that Compatibility, PU and Risk are significantly directly associated with behavioral intentions.

Consistent with the work of Wu and Wang (2005), perceived compatibility had the strongest direct effect on behavioral intention among the determinants of internet banking retention. Making internet banking environment more compatible with potential users' lifestyle and needs is critical for banking institutions in ensuring users' retention rate of the service. Moreover, the enhancement of perceived compatibility reduces the fears that customer may have about their security and privacy in doing financial transactions through internet.

Perceived usefulness had the second strongest direct impact on behavioral intention. Therefore, in addition to providing users with rich platforms and useful functions to transact online, it is crucial for service providers to promote constantly users' perception of usefulness of internet banking service.

Perceived easy of use was observed to have no direct effect on behavioral intention but have an indirect effect influence on behavioral intention through its effect on perceived usefulness and perceived risk. This result probably is caused by the fact that a big portion of our sample consists of mature internet banking users who are not facing problems in using the system given the usefulness of the system properties. The impact of perceived easy of use on perceived risk is appeared to be significant meaning that the system friendliness lowers customers' fears about the problems that may have about their transactions security and personal privacy.

Finally, perceived risk was observed to negatively affect usage continuance. Despite the fact that our sample consists of mature internet banking users, they always have in mind the problems that may arise in terms of their transaction security and personal privacy. Therefore, constantly enhancement in the quality of security and privacy mechanisms should take place in order to avoid trust loss towards internet banking credibility.

6. Conclusions

Based on the available technology acceptance literature, this study presented and validated an extended model for predicting users' intention to continue to use internet banking services in Greece. The results indicated that perceived usefulness, perceived ease of use, perceived compatibility, and perceived internal

risk had direct or indirect influences on behavioral intention of service retention. The findings of this study provided several crucial implications for banking institutions and researchers.

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