

---

# Using the extended innovation attributes framework and consumer personal characteristics as predictors of internet banking adoption

Received (in revised form): 27th February, 2008

## Spiros P. Gounaris

is assistant professor of marketing at the Department of Marketing and Communication (Athens University of Economics & Business, Greece). He holds a PhD from the same university and an MSc from the University of Strathclyde (UK). His research interests pivot around marketing of services, internal marketing, tourism marketing, key account management, retail marketing and logistics, relationship marketing and market orientation development. He has published in various International Journals including *Industrial Marketing Management*, *Journal of Business Research*, *European Journal of Marketing*, *Journal of Business and Industrial Marketing*, *Journal of Services Marketing*, *Journal of Product Innovation Management*, etc.

## Christos D. Koritos\*

is Lecturer and Research Associate, at the Department of Marketing & Communication (Athens University of Economics & Business, Greece). He holds a PhD (2006) from the same university, and an MSc from the University of Stirling (UK). His research interests revolve around the adoption and use of technological innovations by consumers. His work has been accepted for publication by the *International Journal of Bank Marketing*, while it appears at the proceedings of European Marketing Academy Conferences and Strategic Developments in Services Management Conference.

**Abstract** The presumed dominant role of usability attributes (ie usefulness and ease of use) in predicting consumer adoption of a technologically based innovation (eg internet banking — IB) is reexamined, by using an extended framework, which, apart from usability, incorporates the social and psychological aspects of the adoption process. Furthermore, given that IB has been around for almost a decade, it is high time to update the profile of the potential adopters. Results, underscore the role of social factors as predictors of potential IB adopters, whereas the demographic profile of future IB adopters displays important differences compared to that of those already using IB. Possible explanations are discussed, along with implication for practitioners and suggestions for future research.

*Journal of Financial Services Marketing* (2008) **13**, 39–51. doi:10.1057/fsm.2008.4

**Keywords** innovation attributes, consumer behaviour, internet banking, logistic regression

## INTRODUCTION

Among the most challenging strategic decisions that banks have to make every year is the amount of resources to be invested on

the maintenance and development of their distribution channels.<sup>1</sup> This is due to the fact that the nature of new distribution channels, such as the internet, has cast doubt regarding the new channels' ability to serve the banks' strategic goals, such as operational cost reductions, and delivery of products/services that genuinely address consumer needs.<sup>2</sup>

At the same time competitive pressures stemming from the deregulation of domestic

---

\*Correspondence: Athens University of Economics and Business, Department of Marketing and Communication, Laboratory of Research in Marketing, Greece.  
Tel: +30 210 8203852;  
Fax: +30 210 8203851;  
e-mail: ccoritos@aueb.gr

and international financial markets press financial institutions to incorporate into their distribution mix almost every new channel without prior systematic examination of (i) the possibility that the bank customers will adopt the channel and (ii) the characteristics distinguishing channels that customers adopt from channels they do not.

Scholarly research in marketing has just recently started to focus on consumer attitudes and behaviours towards internet banking (IB).<sup>3</sup> The vast majority of the research in this area has concentrated on understanding the impact of customers' perceptions of IB attributes and his/her personal characteristics on the decision to adopt IB.<sup>4</sup>

A thorough examination of this research stream, however, leads to the following conclusions. First, the attributes that have been considered, revolve mainly around the utilitarian aspects of banking activity (ie TAM— *usefulness* and *ease of use*). This focus leads to overlooking the influence of the consumers' perceptions regarding the social and psychological attributes still present on the adoption decision.<sup>5,6</sup>

Secondly, while some studies rely on IB user samples<sup>7</sup> and others on IB nonuser samples,<sup>8</sup> a comparison of the two populations in a single integrated research design, with samples representative of the respective populations, has not been considered yet. Thirdly, as a result of the research designs usually employed, it becomes impossible to use statistical techniques such as logistic regression, that allow for a more accurate, valid and reliable profile of potential IB adopters.<sup>9,10</sup> Finally, extant empirical investigation has failed, with only a few notable exceptions,<sup>11,12</sup> to address the relevance and significance of consumer personal characteristics such as innovativeness and shopping orientation.

Having identified these gaps in existing literature, this study seeks to make a contribution by examining consumers' perceptions not only for utilitarian but for

social and psychological attributes of IB as well. Furthermore, in an effort to provide a richer profile of potential adopters apart from demographics, a number of consumer psychographics is considered. Finally, by drawing two different representative samples, and utilising an efficient and robust statistical technique such as logistic regression, this study provides not only an updated profile of potential IB adopters, but also a more accurate, valid and reliable one.

The remaining text is organised as follows. First we review existing literature in order to substantiate specific research hypotheses. Then, we present the methodology of our study followed by a presentation of the data analyses. The last two sections of this paper cover the discussion of our findings, the limitations as well as some interesting directions for future research.

## RELEVANT LITERATURE AND RESEARCH HYPOTHESES

Understanding the IB adoption process has attracted considerable research effort mainly due to the large diversity of diffusion rates worldwide. For instance, while half of the US population has already adopted IB,<sup>13</sup> only 14 per cent of Chinese consumers have done so.<sup>14</sup> The focus of this research activity has primarily been<sup>4</sup> traditional factors that explain adoption of innovations<sup>5,6</sup> such as innovation attributes and consumer personal (mainly demographic) characteristics.

Within this context, TAM<sup>15</sup> is the dominant research framework, which however, has failed to give strong results, in terms of explanatory power, which is typical of online contexts.<sup>16–18</sup> Consequently, in order to improve predictive power, various researchers attempted to do so by adding variables as antecedents, covariates or outcomes of TAM.

For example, Chan and Lu<sup>19</sup> report that *subjective norms* and computer *self-efficacy* have a significant effect on intentions to adopt IB, whereas, *perceived ease of use* had only an

indirect significant effect on intention to adopt IB, through *perceived usefulness*. Other studies,<sup>20–22</sup> report similar results. Only a recent study by McKechnie *et al.*,<sup>23</sup> reports findings supporting the TAM framework but, even in this case, the authors suggest adding more parameters in order to derive a clearer picture of the IB adoption decision.

Nevertheless, in adding parameters as a way of improving the explanatory power, one has to ensure that by doing so the resulting conceptualisation grounds sufficiently on relevant theory and retains content validity.<sup>24</sup> Along these lines, Moore and Benbasat<sup>25</sup> elaborated on TAM and included specific attributes that ground on relevant research with theoretically grounded relationships that have been empirically validated. More specifically, when the two TAM beliefs and the five innovation attributes (*relative advantage, compatibility, observability, trialability and complexity*), suggested by Rogers<sup>5,6</sup> in his Diffusion of Innovations theory, are examined more closely it becomes clear that *relative advantage* and *complexity* are conceptually tautological with *usefulness* and *ease of use*.<sup>25</sup>

Moreover, Moore and Benbasat<sup>25</sup> suggest that the adoption of an innovation takes place within a certain social context and consequently the adoption decision influences the adopter's image. Furthermore, the authors note that the adoption of innovations, especially in work contexts, may be compulsory. Thus, the degree of *voluntariness* of adoption<sup>5,6</sup> will have a direct effect on innovation adoption and as such it should be incorporated among the *innovation attributes* that influence the adoption process.

The resulted conceptual framework, (Perceived Characteristics of the Innovation — PCI) consists of eight attributes namely: *relative advantage (usefulness), ease of use (complexity), compatibility, trialability, result demonstrability, visibility and image, voluntariness*. PCI has been validated in a number of research studies,<sup>26–30</sup> and according to Rogers<sup>31</sup> it represents a theoretically sound

and operationally useful development in the area of diffusion of innovations.

The PCI model has been among the catalysts that have triggered the research effort towards the investigation of social and psychological aspects of the technological innovations adoption process. For instance, Venkatesh *et al.*<sup>30</sup> suggested the Unified Theory of Acceptance and Use of Technology, while Konana and Balasubramanian<sup>32</sup> incorporated social, economic and psychological factors, as deterministic parameters of the adoption of a technological innovation.

All these research efforts over the last 15 years managed to improve the predictive power of the various models used to explain the adoption of an innovation by incorporating the social (*image, visibility and result demonstrability*) as well as psychological (*voluntariness, trialability*) aspects that influence the adoption process.<sup>25,5,6</sup> More importantly, the improvement of the explanatory power did not come at the expense of the conceptual framework's theoretical relevance and content validity.<sup>24</sup> On these grounds, we suggest the following hypothesis:

**H<sub>1</sub>:** *Social and psychological type of innovation attributes will have a significant contribution in the prediction of IB adoption.*

Another significant research stream investigating IB adoption process incorporates the consumer's demographic profile as part of the explanatory variables.<sup>21,33,34,11,23</sup> The results from these studies are, however, mixed. This may well be the result of the research population definition. More specifically, certain studies profile future adopters of IB based on samples drawn from the population of the IB users,<sup>7</sup> whereas others<sup>8</sup> obtain sample units from the population of the IB nonusers in order to derive the profile of future adopters.

But, as the innovation diffuses beyond the initial adoption groups (ie innovators and

early adopters), the ability to distinguish adopters from nonadopters based on their demographic profile, becomes very difficult.<sup>35,5,6</sup> Furthermore, even though a few studies have included both IB users and nonusers, the composition of the samples departs from the characteristics of the general populations from which the samples were drawn.<sup>3</sup>

Moreover, by incorporating in the analyses the demographic profile of the IB users or nonusers these attempts cannot use appropriate statistical techniques (eg logistic regression analysis) that allow for a more accurate profiling of the potential IB adopters.<sup>9,10,36,37</sup> In other words, although the empirical investigation has failed to demonstrate the importance of the consumer demographic profile in explaining his/her decision to adopt an innovation, the theoretical justification for this investigation (which originally stimulated the empirical examination) remains since the lack of empirical support may well be the result of the research design of these efforts. On these grounds, we consider the following hypothesis:

**H<sub>2</sub>:** *Addition of demographic characteristics (gender, age, education, occupation and income) will improve significantly the predictive accuracy of PCI.*

Another interesting observation stemmed from the review of the literature in the area of consumer adoption of IB is the scant use of psychographic characteristics as predictors of IB adoption. More specifically, with the exception of *innovativeness*<sup>11</sup> and *shopping orientation*<sup>12</sup> no other psychographic characteristic has been considered as explanatory variable of consumer adoption of IB. Lassar *et al.*,<sup>11</sup> however, came up with an unexpected result regarding the effect of *innovativeness* whereas Mäenpää *et al.*<sup>12</sup> based their findings on samples drawn from only one population (IB nonusers). Thus, in order to clarify previous results and provide further

support for the significant role of those two important psychographic variables we suggest that:

**H<sub>3</sub>:** *Addition of innovativeness and shopping orientation will improve significantly the predictive accuracy of PCI.*

## RESEARCH METHODOLOGY

Given the aims of the study, we collected data from both IB users and nonusers. Missing a reliable sampling frame to identify sample units for the sample of IB users we contacted the four leading banks in Greece that jointly represent about 73 per cent (or 165,000 customers) of all Greek IB users and asked them to place a link to a web-based questionnaire at the login page of their IB system. The banks' officials agreed and invited their customers to participate in our study.

With regards to the sample of IB nonusers, we contacted, via e-mail, 1,085 full-/part-time postgraduate students in business and management who use the internet but with no previous experience of IB. The lack of a representative sampling framework of Greek internet users compels towards a more convenient sampling approach.<sup>38</sup> Having informed them of the purpose of the research, we asked them to fill in the same web-based questionnaire that we administered with the IB users sample. After one month, we secured 858 usable questionnaires from IB users and 418 from nonusers. Despite the convenient nature of the sampling process used for the creation of the IB nonusers sample, their demographic profile almost mirrors the demographic composition of the population of Greek internet users during the period of the research study<sup>39</sup> (see Table 1).

To measure perceptions of the eight innovation attributes for both IB users and nonusers we employed the PCI scale developed by Moore and Benbasat,<sup>25</sup>

**Table 1** Composition of consumer personal characteristics and innovation attributes means

	Users (%)	Nonusers (%)	ICT (%)		Users	Nonusers	ICT
<i>Sex</i>				<i>Monthly personal income</i>			
Female	16.1	38.4	35.4	Up to € 500	0.8%	3.3%	4.5%
Male	83.9	61.6	64.6	€ 500–€ 900	10.7%	31.7%	33.6%
				€ 900–€ 1.500	24.9%	38.1%	39.1%
<i>Age</i>				€ 1.500–€ 2.000	19.0%	19.2%	16.3%
18–24 years	7.3	34.9	37.1	More than € 2.000	44.7%	7.6%	6.5%
25–34 years	47.7	30.1	29.2	Innovativeness (means)	6.25	5.51	NA
35–44 years	30.6	20.5	19.1				
45–54 years	11.5	11.2	10.6	<i>Shopping orientation (means)</i>			
55–64 years	2.3	3.3	3.1	Economic	6.09	2.29	NA
More than 65 years	0.6	0.0	0.9	Recreational	4.38	5.12	NA
<i>Education</i>				<i>Innovation attributes (means)</i>			
Elementary	11.6	1.6	1.2	Relative advantage	6.39	4.85	NA
Professional	10.2	27.1	24.6	Ease of use	6.19	4.74	NA
Undergraduate	45.7	21.7	74.2 <sup>a</sup>	Compatibility	5.63	4.68	NA
Graduate	32.5	49.6		Result demonstrability	5.71	4.83	NA
<i>Occupation</i>				Image	3.96	3.56	NA
Self-employed	34.9	12.0	13.1	Visibility	3.75	3.18	NA
Public sector	17.4	10.6	9.2	Voluntariness	6.32	6.03	NA
Private sector	38.3	51.5	49.2	Trialability	4.65	4.06	NA
Unemployed	0.4	1.4	1.1				
Retired	2.8	0.0	0.9				
Housekeeping	0.1	0.6	0.7				
Student	6.0	24.0	25.8				

<sup>a</sup>The Annual National Survey of ICT Usage considers undergraduate and postgraduate education as belonging to the same highest educational level

anchored at a seven-point likert ranging from strongly disagree (1) to strongly agree (7) (see the Appendix). In order to assess the factorial validity as well as other important psychometric properties of PCI<sup>25</sup> since, with the exception of Plouffe *et al.*,<sup>29</sup> there are no other studies systematically assessing the psychometric properties of PCI, we followed a comprehensive three-stage process.

First, we submitted PCI<sup>25</sup> to a confirmatory factor analysis (CFA) using AMOS 7.0.<sup>40</sup> To run this analysis we first split the sample of IB users in two halves randomly, and we used the first subsample of IB users ( $n=429$ ). The purpose of doing so is to explore the optimum factorial validity of the framework. As Plouffe *et al.*<sup>29</sup> also reported, five items had quite low loadings, (see second column of Table 2). After eliminating these items, both factor loadings and the psychometric properties of the

revised framework improved significantly (see third column of Table 2).

The second stage aimed at confirming this modified structure of the PCI framework, that the previous, exploratory in nature,<sup>41</sup> stage derived. To do this we exposed the modified PCI framework on a CFA using the second subsample of IB users ( $n=429$ ). Results confirm both the factorial structure and the psychometric properties of the modified framework (see fourth column in Table 2).

Confirming the modified structure that the first stage derived in different populations (ie IB users and nonusers), provides strong evidence for the validity of the measurement instrument,<sup>42</sup> since the two populations are significantly different (see Table 1). Indeed, performing a third CFA of the purified framework by using the sample of IB nonusers provided additional support for the

**Table 2** Results of framework assessment

Sample	Original framework (based on the 1st subsample of IB users)	Purified framework (based on the 1st subsample of IB users)	1st validation (based on the 2nd subsample of IB users)	2nd validation (based on the nonIB users sample)
<i>Goodness of fit statistics</i>				
$\chi^2$	890.58	478.06	459.61	561.19
DF	296	179	179	179
<i>p</i>	0.000	0.000	0.000	0.000
GFI	0.87	0.91	0.91	0.90
CFI	0.82	0.90	0.90	0.90
RMSEA	0.07	0.06	0.06	0.06
<i>Loadings</i>				
comp1	0.81	0.81	0.98	0.89
comp2	0.83	0.84	0.72	0.78
comp3	0.16			
eu1	0.67	0.67	0.68	0.67
eu2	0.69	0.69	0.70	0.83
eu3	0.93	0.93	0.86	0.90
im1	0.65	0.65	0.64	0.68
im2	0.80	0.79	0.74	0.82
im3	0.69	0.69	0.66	0.71
ra1	0.60	0.57	0.56	0.54
ra2	0.64	0.60	0.60	0.78
ra3	0.76	0.80	0.77	0.85
ra4	0.57	0.48	0.51	0.60
ra5	0.54	0.56	0.52	0.72
rd1	0.70	0.71	0.58	0.81
rd2	0.33			
rd3	0.77	0.76	0.68	0.63
try1	0.52	0.50	0.50	0.75
try2	0.31			
try3	0.64	0.65	0.49	0.64
try4	0.66	0.66	0.71	0.58
vol1	0.36	0.40	0.45	0.36
vol2	0.50	0.72	0.65	0.56
vol3	0.44			
vs1	0.16			
vs2	0.88	0.88	0.90	0.93
vs3	0.84	0.84	0.83	0.82

revised factorial validity (see fifth column in Table 2).

To complete the psychometric assessment of the PCI we calculated<sup>43</sup> composite reliabilities and AVE for the eight dimension of the framework (see Table 3). All dimensions performed above the recommended cutoff values.<sup>44</sup> Finally, tests of convergent and discriminant validity show that the eight PCI dimensions possess sound psychometric properties.

We employed the same three-stage validation process in order to assess the psychometric properties of domain specific innovativeness scale<sup>45</sup> and the two dimensions (economic, recreational) of the online

shopping motivational orientation scale,<sup>46</sup> that we used in order to capture consumer *innovativeness* and *shopping orientation* (Appendix). As can be seen in Table 3 both scales possess acceptable psychometric properties.

## MAIN ANALYSES AND RESULTS

As the major research goals of the present study are (i) to compare the importance of the various factors that play a significant role in predicting adoption of IB, and (ii) to provide with a more accurate profile of the potential adopters of IB, we combined the two samples into a new one ( $n = 1,269$ ) and

**Table 3** Psychometric properties of the constructs measures

<i>Dimension</i>	<i>Crombach's a</i>	<i>Unidimensionality</i>	<i>Composite reliability</i>	<i>AVE</i>	<i>Convergent validity</i>	<i>Discriminant validity</i>
Compatibility	0.81	✓	0.71	0.59	✓	✓
Ease of use	0.80	✓	0.87	0.70	✓	✓
Image	0.76	✓	0.68	0.55	✓	✓
Relative advantage	0.74	✓	0.88	0.60	✓	✓
Result demonstrability	0.70	✓	0.69	0.53	✓	✓
Trialability	0.73	✓	0.69	0.58	✓	✓
Voluntariness	0.71	✓	0.73	0.67	✓	✓
Visibility	0.85	✓	0.72	0.57	✓	✓
Innovativeness	0.92	✓	0.81	0.68	✓	✓
Economic	0.84	✓	0.76	0.59	✓	✓
Recreational	0.89	✓	0.74	0.55	✓	✓

**Table 4** Fit statistics and classification results of the final logit model

<i>Hosmer and Lemeshow Test</i>	<i>-2 Log likelihood</i>	<i>R<sub>L</sub><sup>2</sup></i>	<i>Cox and Snell R<sup>2</sup></i>	<i>Nagelkerke R<sup>2</sup></i>
$\chi^2(8)=11.857$ $p>0.05$	667.332	0.413	0.524	0.730
	Observed	Predicted		Percentage correct
		IB nonusers	IB users	
	IB nonusers	338	80	80.9%
	IB users	56	802	93.5%
Overall Percentage				89.3%

(Maximum Chance Criterion: 67.2%/Proportional Chance Criterion: 55.9%).

used innovation attributes and consumer personal characteristics (demographics and psychographics) as predictor variables of IB (non)usage. To do this we performed a logistic regression analysis with backward likelihood ratio elimination.<sup>47,48,37</sup> All categorical variables were dummy coded, whereas summated rating scales calculated for all continuous multi-item variables.

Table 4 presents model fit statistics and classification results. The goodness of fit test suggested by Hosmer and Lemeshow<sup>49</sup> is not significant, which is an indication that classification is based on samples that do not differ significantly from the populations they were drawn.<sup>47</sup> This represents an additional indication (see also *post hoc* comparison in Table 1), that the sample of IB nonusers, although based on a convenient method, is not departing significantly from the population from which it was drawn.

Furthermore, the three  $R^2$ -like criteria reveal that the variables in the model explain an important part of the variance in IB (non)usage ranging from a moderate 41.3 per cent to a very high 73 per cent. Finally, classification results display that the model would classify correctly nine out of ten consumers as potential IB (non)users. These classification results outperformed those produced by both maximum and proportional chance criteria.

Given the validity of the model, we proceed with a description of its composition (see Table 5). More specifically, of the 30 variables entered the logistic regression analysis 14 remained in the final logit model. Two social-type (*Image*, *Result demonstrability*) and one psychological-type (*Trialability*) innovation attribute have an important contribution in the prediction of IB (non)usage lending full support to  $H_1$ .

**Table 5** Variables remained in the final logit model (1: users/0: non-users)

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>d.f.</i>	<i>Sig.</i>	<i>Exp(B)<sup>a</sup></i>	<i>Odds change<sup>b</sup></i> (%)
<i>Self-employed vs unemployed</i>	3.988	1.351	8.717	1	0.003	53.928	4,392.8
<i>Undergraduate vs elementary education</i>	1.569	0.519	9.150	1	0.002	4.804	380.4
<i>Image</i>	1.528	0.124	12.781	1	0.000	4.639	363.4
<i>Male vs female</i>	1.426	0.216	43.535	1	0.000	4.162	316.2
<i>Trialability</i>	1.391	0.321	18.902	1	0.000	3.914	291.4
<i>Professional vs elementary education</i>	1.167	0.511	5.218	1	0.022	3.213	221.3
<i>Relative advantage</i>	0.963	0.152	40.178	1	0.000	2.619	161.9
<i>Result demonstrability</i>	0.932	0.408	23.480	1	0.000	2.582	158.2
<i>Innovativeness</i>	0.662	0.100	43.550	1	0.000	1.938	93.8
<i>Ease of use</i>	0.474	0.130	13.337	1	0.000	1.606	60.6
<i>Experiential orientation</i>	-0.428	0.092	21.478	1	0.000	0.652	-34.8
<i>45-54 vs 18-24 years old</i>	-4.061	1.173	11.997	1	0.001	0.017	-98.3
<i>35-44 vs 18-24 years old</i>	-4.807	1.190	16.310	1	0.000	0.008	-99.2
<i>25-34 vs 18-24 years old</i>	-5.884	1.268	21.519	1	0.000	0.003	-99.7
<i>(Constant)</i>	50.078						

<sup>a</sup>Because of the required logarithmic transformation, *b* coefficients cannot be interpreted as in OLS regression. Instead, exponential *b* coefficients (*Exp(B)*), which represent the change in odds resulting from a unit change in the predictor variables, can be used to assess the comparative importance of the predictor variables in predicting group membership (Hair *et al.*, 2006). Thus, variables in Table 5 have been ranked according to their *Exp(B)* values

<sup>b</sup>Odds Change=[*Exp(B)*-1]×100

Furthermore, with the exception of income, all demographic variables have a significant effect in the prediction result. In fact, half of the variables remained in the final logit model are demographic (dummy) variables, with two of them (occupation and education) having the strongest effect in the prediction result, providing, thus, support for H<sub>2</sub>. Finally, the psychographic characteristics (*innovativeness* and *shopping orientation*) have also a significant effect on the prediction result, albeit smaller in comparison to demographics and innovation attributes, lending support to H<sub>3</sub>.

In order to offer an interpretation of the logit model we use the *Exp(B)* and its corresponding odds Change (Table 5). More specifically, it appears that the odds of a self-employed consumer becoming an IB user are 54 times higher than those of an unemployed consumer, which is equal to an increase of 4,393 per cent in odds. Similarly, the odds of males, with undergraduate or professional education becoming IB users are three to four times higher than those of housekeeping females, with elementary education.

Interestingly enough, younger consumers have lower odds of becoming IB users compared to older consumers.

Furthermore, the more innovative the consumer, the higher the likelihood of adopting IB, whereas the more experiential the consumer the less the likelihood of adopting IB (Table 5). In addition to this, an increase in consumers' perceptions of gains in social image due to IB adoption and the ability to demonstrate among their peers the benefits of IB usage, increases importantly the odds (158 and 363 per cent, respectively) of IB adoption by such consumers.

Similarly, an increase in consumers' perceptions regarding the opportunity to try and experiment with IB for a certain period of time without any subscription obligations, leads to an increase in the odds (291 per cent) of those consumers becoming IB users. Finally, an increase in consumers' perceptions regarding the relative advantages in banking brought by IB and the ease of using this new distribution channel leads to an increase in the odds (162 and 61 per cent, respectively) of those consumers becoming IB users.



## DISCUSSION AND IMPLICATIONS

The major goals of the present study were (i) to provide a richer framework of innovation attributes that will ultimately offer a more comprehensive understanding of those factors forming consumers' decision to adopt IB, and (ii) to compare the ability of these factors as well as other important ones such as consumer personal characteristics (demographics and psychographics), in predicting future adoption of IB.

As the results of this study show, the use of a richer framework<sup>25</sup> (PCI) clearly indicates that apart from the *usability*<sup>15</sup> (eg *relative advantage* and *ease of use* — TAM), social (eg *image* and *result demonstrability*) as well as psychological<sup>50</sup> (eg *trialability* as a consumer risk relieving strategy) aspects of technology adoption by consumers play a significant role. Within this framework it is worth noting that *relative advantage* and *ease of use*, both reflecting the *usability* aspect in the technology acceptance literature within organisational context<sup>30</sup> are rather low compared to other aspects of the technology acceptance (ie personal characteristics, social and psychological-type of innovation attributes) that this study identified.

The discrepancy between consumer and organisational contexts of innovation adoption may be related with the high diffusion rates of these technological innovations (ie internet and the WWW) that provide the platform for the new distribution channel (IB), among the entire population and not only among innovators and early adopters. Consequently it becomes easier to convince later adoption groups (eg early majority) about both the relative advantages of the new distribution channel and the simplicity of its use.<sup>5,6</sup>

Furthermore, consumption activities and experiences such as banking, even if they are framed by a technology-based interface, as in the case of IB, may still have a strong indirect effect on consumers' social lives, since consumers tend to communicate many of

their consumption experiences and activities to others.<sup>6</sup> As such, social aspects of shopping still have an important role to play. In fact, the results of the present study reveal that this role is more important from the *usability* elements of technology adoption.

Another interesting finding of the present study is that younger consumers do not seem to adopt earlier than other age segments of the population. While this may relate, with their lower income,<sup>12</sup> this may also reflect a change of the significance that certain consumer characteristics have in the adoption decision, as IB penetration level departs from the early phase of introduction. Thus, as the early majority<sup>5,6</sup> of the potential adopters begin to employ IB, the time-starvation due to congested daily professional and family schedules, coupled with a sense of time pressure, appear to drive the adoption of IB. In fact, this is a major driver for the adoption decision for online shopping in general.<sup>51</sup>

Hence, without entirely resolving the issue, our findings would seem to suggest that the motivation system underlying the adoption decision during different phases of the innovation adoption circle varies depending on the phase of the circle. As we explain in the next section, future research towards this direction would be useful. Particularly so, since according to this study and contrary to the findings reported elsewhere<sup>11</sup> the predictive power of the consumer's degree of innovativeness is quite slim compared to other consumer characteristics.

With regard to bank managers an important implication from this study is the need to reconsider their strategic decisions as well as their tactics regarding their online presence at least in two ways. First, although consumer adoption of an innovative distribution channel is affected by perceptions of a useful and easy to use system/process, its diffusion is based on the social mechanisms that pull consumers into markets such as the perceived impact on social image resulting from the adoption of the innovation and the ability to portray the benefits of the

innovation to other members of the social system with whom they relate.

As such the diffusion of IB follows the communication process of new services, that is primarily via word-of-mouth.<sup>52</sup> Thus, creating and diffusing clearly and comprehensively the benefits of IB will aid this communication process. In addition to this, identifying and inviting opinion leaders to become IB users will make IB even more attractive to those perceiving IB adoption, among other things, as adding to their social image.

Moreover, the present study suggests clearly that as diffusion of an innovative distribution channel in financial services moves beyond the initial adopter groups (eg innovators and early adopters), certain consumer personal characteristics may lead to an unnecessary market over-fragmentation. More specifically, according to the results of the present study, it appears that, the next to adopt IB are consumers with higher educational background, but individuals with a professional education will have a growing share in the next to adopt group. Furthermore, unlike the initial IB adopters groups, the next major adopters group, come from older, self-employed segments with marginally innovative personality.

Finally, using income, a typical segmentation criterion used by most banks, will not lead to any actionable segmentation strategy, since, based on the results of the present study, it appears that the next adopters group will come from almost all income categories. This, combined with the main attribute characterising the strongest predictor of the next IB adopters group, self-employed occupation, lead us to consider that time restraints, caused by the pressed professional and personal lives of most citizens in Western societies, is the major driver of IB adoption from the consumers' point a view. As such, bank managers who wish to converse their customers from offline to their online distribution channels should revolve their communication efforts around the time/effort/cost-benefits afforded by IB.

## LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The most important limitation of the present study stems from the sample of IB nonusers. The well articulated difficulties of drawing an *a priori* representative sample of internet users<sup>38,53,54</sup> was a limitation of this study. *Post hoc* comparisons of demographics between the sample of IB nonusers and the general population of Greek internet users, however, displayed a close resemblance, whereas the nonsignificance of H-L goodness of fit test in logistic regression suggests that the sample of IB nonusers is a rather good proxy for the population of Greek internet users.

The present study made a preliminary step towards a better understanding of the interplay between the utilitarian, social and psychological aspects of adoption of a technologically based distribution channel for financial services. Yet, with regards to the social and psychological aspects, the specific set of factors considered (ie *image*, *result demonstrability* and *trialability*) are definitely not exhaustive. For example, a better understanding of the specific mechanisms that support word-of-mouth communications regarding IB would benefit both bank managers and customers by helping them to envision sooner the benefits of IB or any other innovative distribution channel.

Moreover, according to the findings of the present study, the motivational system of consumers seems to change across different stages of innovation diffusion circle. In other words, the usability aspect seems to be more important at initial stages of the innovation diffusion, but given the commercialisation of the technology or other aspects underlying the innovation, social and psychological aspects of the innovation seem to become more important at the subsequent stages of the innovation diffusion circle. Thus, longitudinal research efforts would be very useful in uncovering the true pattern of importance of each category of factors

(usability, social and psychological) across the stages of innovation diffusion circle.

In addition to this, the role of various factors such as trust, risk as well as the prominence of consumer privacy and security concerns, which altogether depict the psychological aspect of technology adoption, except from very few notable exceptions<sup>55–57</sup> have not been extensively examined in order to empirically assess the interplay of these psychological factors within financial services contexts. These research areas guarantee fruitful results for both bank managers and marketing academics.

## REFERENCES

- 1 Nath, R., Schrick, P. and Parzinger, M. (2001) 'Banker's perspectives on internet banking', *e-Service Journal*, Vol. 1, No. 1, pp. 21–36.
- 2 Mols, N. P. (1999) 'The internet and the banks' strategic distribution channel decisions', *International Journal of Bank Marketing*, Vol. 17, No. 6/7, pp. 295–300.
- 3 Akinci, S., Aksoy, S. and Atilgan, E. (2004) 'Adoption of Internet banking among sophisticated consumer segments in an advanced developing country', *International Journal of Bank Marketing*, Vol. 22, No. 3, pp. 212–232.
- 4 Shao, G. (2007) 'The diffusion of online banking: Research trends from 1998 to 2006', *Journal of Internet Banking and Commerce*, Vol. 12, No. 2, pp. 1–13.
- 5 Rogers, E. M. (1962) 'Diffusion of Innovations', The Free Press, New York.
- 6 Rogers, E. M. (2003) 'Diffusion of Innovations', The Free Press, New York.
- 7 Polatoglu, V. and Ekin, S. (2001) 'An empirical investigation of the Turkish consumers' acceptance of Internet banking services', *The International Journal of Bank Marketing*, Vol. 19, No. 4/5, pp. 156–165.
- 8 Howcroft, B., Hamilton, R. and Hewer, P. (2002) 'Consumer attitude and the usage and adoption of home-based banking in the United Kingdom', *International Journal of Bank Marketing*, Vol. 20, No. 3, pp. 111–121.
- 9 Kleinbaum, D. G. (1994) 'Logistic regression: A self-learning text', Springer-Verlag, New York.
- 10 Menard, S. (2002) 'Applied logistic regression analysis', 2nd edn, Thousand Oaks, Sage Publications, CA.
- 11 Lassar, W. M., Manolis, C. and Lassar, S. S. (2005) 'The relationship between consumer innovativeness, personal characteristics, and online banking adoption', *International Journal of Bank Marketing*, Vol. 23, No. 2, pp. 176–199.
- 12 Mäenpää, K., Kanto, A., Kuusela, H. and Paul, P. (2006) 'More hedonic versus less hedonic consumption behaviour in advanced internet bank services', *Journal of Financial Services Marketing*, Vol. 11, No. 1, pp. 4–16.
- 13 Fox, S. and Beier, J. (2006) 'Online banking 2006: Surfing to the bank', *Pew Internet & American Life Project*. (cited 30th June, 2007); Available from: [www.pewinternet.org/PPF/r/185/report\\_display.asp](http://www.pewinternet.org/PPF/r/185/report_display.asp).
- 14 Fang, Y. (2006) 'Forecasting the number of online banking users in China', *China Inforworld*, September.
- 15 Davis, F. D. (1989) 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly*, Vol. 13, No. 3, pp. 319–339.
- 16 King, W. R. and He, J. (2006) 'A meta-analysis of the technology acceptance model', *Information & Management*, Vol. 43, No. 6, pp. 740–755.
- 17 Legris, P., Ingham, J. and Collette, P. (2003) 'Why do people use information technology? A critical review of the technology acceptance model', *Information & Management*, Vol. 40, No. 3, pp. 191–204.
- 18 Ma, Q. and Liu, L. (2004) 'The technology acceptance model: A meta-analysis of empirical findings', *Journal of Organizational and End User Computing*, Vol. 16, No. 1, pp. 59–72.
- 19 Chan, S. -C. and Lu, M. -T. (2004) 'Understanding internet banking adoption and use behaviour: A Hong Kong perspective', *Journal of Global Information Management*, Vol. 12, No. 3, pp. 21–43.
- 20 Chau, P. Y. K. and Lai, V. S. K. (2003) 'An empirical investigation of the determinants of user acceptance of Internet banking', *Journal of Organizational Computing & Electronic Commerce*, Vol. 13, No. 2, pp. 123–145.
- 21 Eriksson, K., Kerem, K. and Nilsson, D. (2005) 'Customer acceptance of internet banking in Estonia', *International Journal of Bank Marketing*, Vol. 23, No. 2, pp. 200–216.
- 22 Suh, B. and Han, I. (2002) 'Effect of trust on customer acceptance of Internet banking', *Electronic Commerce Research & Applications*, Vol. 1, No. 3/4, pp. 247–263.
- 23 McKechnie, S., Winkhofer, H. and Ennew, C. (2006) 'Applying the technology acceptance model to the online retailing of financial services', *International Journal of Retail & Distribution Management*, Vol. 34, No. 4/5, pp. 388–410.
- 24 Shugan, S. (2006) 'Errors in the variables, unobserved Heterogeneity, and other ways of hiding statistical error', *Marketing Science*, Vol. 25, No. 3, pp. 203–216.
- 25 Moore, G. C. and Benbasat, I. (1991) 'Development of an instrument to measure the perceptions of adopting an information technology innovation', *Information Systems Research*, Vol. 2, No. 3, pp. 192–222.
- 26 Agarwal, R. and Prasad, J. (1997) 'The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies', *Decision Sciences*, Vol. 28, pp. 557–582.
- 27 Karahanna, E., Straub, D. W. and Chervany, N. L. (1999) 'Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs', *MIS Quarterly*, Vol. 23, No. 2, pp. 183–213.
- 28 Moore, G. C. and Benbasat, I. (1996) 'Integrating diffusion of innovations and theory of reasoned action models to predict utilization of information technology by end-users', in Kautz, K. and Pries-Heje, J. (eds) 'Diffusion and Adoption of Information Technology', Chapman & Hall, London, pp. 132–146.
- 29 Plouffe, C. R., Hulland, J. S. and Vandenberg, M. (2001) 'Richness versus parsimony in behaviour technology adoption decisions — Understanding merchant adoption of a smart card-based payment system', *Information Systems Research*, Vol. 12, No. 2, pp. 208–222.

- 30 Venkatesh, V., Morris, M. G., Davis, G. B. and Davis, F. D. (2003) 'User acceptance of information technology: Toward a unified view', *MIS Quarterly*, Vol. 27, No. 3, pp. 425–478.
- 31 Rogers, E. M. (1995) 'Diffusion of Innovations', The Free Press, New York.
- 32 Konana, P. and Balasubramanian, S. (2005) 'The Social — Economic — Psychological model of technology adoption and usage: An application to online investing', *Decision Support Systems*, Vol. 39, No. 3, pp. 505–524.
- 33 Guriting, P. and Ndubisi, N. O. (2006) 'Borneo online banking: Evaluating customer perceptions and behavioural intention', *Management Research News*, Vol. 29, No. 1/2, pp. 6–15.
- 34 Lai, V. S. and Li, H. (2005) 'Technology acceptance model for internet banking: An invariance analysis', *Information & Management*, Vol. 42, No. 2, pp. 373–386.
- 35 Assael, H. (2005) 'A demographic and psychographic profile of heavy internet users and users by type of internet usage', *Journal of Advertising Research*, Vol. 45, No. 1, pp. 93–123.
- 36 Pampel, F. C. (2000) 'Logistic regression: A primer', Thousand Oaks, Sage Publications, CA.
- 37 Tabachnick, B. G. and Fidell, L. S. (2001) 'Using Multivariate Statistics', Harper Collins, New York.
- 38 Van Selm, M. and Jankowski, N. W. (2006) 'Conducting online surveys', *Quality & Quantity*, Vol. 40, pp. 435–456.
- 39 Annual National Survey of ICT Usage. (2006). *Greek Ministry of Development*, Press Release. (cited 30th June, 2007); Available from: [http://www.ebusinessforum.gr/information/statistics/grnet\\_statistics/index.php?downid=1519&parent=1272&language=el#1272](http://www.ebusinessforum.gr/information/statistics/grnet_statistics/index.php?downid=1519&parent=1272&language=el#1272).
- 40 Arbuckle, J. (2006) 'Amos 7.0 User's Guide', Amos Development Corporation, Spring House, PA.
- 41 Schumacker, R. E. and Lomax, R. G. (2004) 'A Beginner's Guide to Structural Equation Modeling', Lawrence Erlbaum Publishers, London.
- 42 DeVellis, R. F. (2003) 'Scale Development: Theory and Applications', Sage, London.
- 43 Calculations based on the first subsample of IB users ( $n=429$ ), however similar results were obtained when the second subsample of IB users ( $n=429$ ), and the IB nonusers sample ( $n=418$ ) were employed.
- 44 Fornell, C. and Larcker, D. F. (1981) 'Structural equation models with unobservable variables and measurement error: Algebra and statistics', *Journal of Marketing Research*, Vol. 18, pp. 382–388.
- 45 Goldsmith, R. E. and Hofacker, C. F. (1991) 'Measuring consumer innovativeness', *Journal of the Academy of Marketing Science*, Vol. 19, pp. 209–221.
- 46 Vijaysarathy, L. R. (2003) 'Shopping orientations, product types and internet shopping intentions', *Electronic Markets*, Vol. 13, No. 1, pp. 67–79.
- 47 Field, A. P. (2006) 'Discovering statistics using SPSS', Sage Publications, London.
- 48 Hair, J. F., Black, B., Babin, B. and Anderson, R. E. (2006) 'Multivariate Data Analysis', Prentice-Hall, Englewood Cliffs, NJ.
- 49 Hosmer, D. and Lemeshow, S. (1989) 'Applied Logistic Regression', Wiley & Sons, New York.
- 50 Roselius, R. (1971) 'Consumer rankings of risk reduction methods', *Journal of Marketing*, Vol. 35, No. 1, pp. 56–61.
- 51 Burke, R. R. (2002) 'Technology and the customer interface: What consumers want in the physical and virtual store', *Journal of the Academy of Marketing Science*, Vol. 30, No. 4, pp. 411–432.
- 52 Murray, K. B. (1991) 'A test of services marketing theory: Consumer information acquisition activities', *Journal of Marketing*, Vol. 55, No. 1, pp. 10–25.
- 53 Couper, M. P. (2000) 'Web surveys: A review of issues and approaches', *Public Opinion Quarterly*, Vol. 64, pp. 464–494.
- 54 Couper, M. P., Traugott, M. W. and Lamias, M. J. (2001) 'Web survey design and administration', *Public Opinion Quarterly*, Vol. 65, No. 2, pp. 230–253.
- 55 Cunningham, L. F., Gerlach, J. and Harper, M. D. (2005) 'Perceived risk and e-banking services: An analysis from the perspective of the consumer', *Journal of Financial Services Marketing*, Vol. 10, No. 2, pp. 165–178.
- 56 Heaney, J. -G. (2007) 'Generations X and Y's internet banking usage in Australia', *Journal of Financial Services Marketing*, Vol. 11, No. 3, pp. 196–210.
- 57 Littler, D. and Melanthiou, D. (2006) 'Consumer perceptions of risk and uncertainty and the implications for behaviour towards innovative retail services: The case of Internet Banking', *Journal of Retailing & Consumer Services*, Vol. 13, No. 6, pp. 431–443.

## APPENDIX

### Perceived Characteristics of Innovation (Moore and Benbasat<sup>39</sup>)

#### Relative Advantage

- Using IB speeds up banking (ra1)
- Using IB improves the quality of banking (ra2)
- Using IB makes banking easier (ra3)
- Using IB gives me greater control in banking (ra4)
- Using IB enhances banking (ra5)

#### Ease of Use

- Overall, I believe that IB is easy to use (eu1)
- Learning to operate IB is easy for me (eu2)
- I believe that it is easy to get IB to do what I want it to do (eu3)

#### Compatibility

- Using IB is compatible with all aspects of banking (comp1)
- Using IB is completely compatible with my current ways of banking (comp2)
- I think that using IB fits well with the way I like to do banking (comp3)

*Image*

People who use IB have a high profile (im1)  
 People who use a IB have more prestige than those who do not (im2)  
 Using IB is a status symbol (im3)

*Result Demonstrability*

I would have no difficulty telling others about the results of using IB (rd1)  
 I would have difficulty explaining why using IB may or may not be beneficial (rd2)  
 The results of using IB are apparent to me (rd3)

*Visibility*

I have not seen many others using IB (vs1)  
 I have seen what others do using IB (vs2)  
 It is easy for me to observe others using IB (vs3)

*Trialability*

Before deciding whether to use IB. I can properly try it out (try1)  
 IB is available to me to adequately try it (try2)  
 It is permitted to use IB on a trial basis long enough to see what it can do (try3)  
 I do not really have adequate opportunities to try out different things on IB (try4)  
 Voluntariness  
 My bank does not require me to use IB (vol1)  
 Although it was suggested by my bank. using IB is certainly not compulsory (vol2)  
 My use of IB is voluntary (vol3)

**Domain Specific Innovativeness (Goldsmith and Hofacker<sup>20</sup>)**

In general, I am among the last in my circle of friends to visit my bank's new website when it appears on the WWW.

If I heard that my bank's new web was available on the web, I would not be interested enough to visit it.  
 Compared to my friends, I seek out relatively little information over my bank's new website.  
 In general, I am the last in my circle of friends to know of any new bank websites.  
 I will visit a new bank's website even if I have not heard of it before.  
 I know about new bank websites before most other people in my circle do.

**Shopping Orientation (Vijayasathy<sup>57</sup>)**

*Economic*

I make it a rule to shop at a number of stores before I buy.  
 I can save a lot of money by shopping around.  
 I like to have a great deal of information before I buy.

*Recreational*

I like to go shopping with a friend.  
 I often combine shopping with lunch or dinner at a restaurant.  
 Shopping gives me a chance to get out and do something.

Copyright of *Journal of Financial Services Marketing* is the property of Palgrave Macmillan Ltd. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.

Copyright of *Journal of Financial Services Marketing* is the property of Palgrave Macmillan Ltd. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.