An examination of the critical factors affecting consumer acceptance of online banking

A focus on the dimensions of risk

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Abstract

Purpose – The recent advances in the technology of electronic banking have helped develop new ways of handling banking affairs, especially through online banking. Moreover, the rapid development of the internet has stimulated the banking sector towards encouraging customers to make their transactions online. The purpose of this paper is to introduce an extended technology acceptance model (TAM) model as a tool for examining the factors that have a significant impact on customers’ online banking acceptance.

Design/methodology/approach – The typical TAM constructs were enhanced with the variables of perceived risk and quality of the internet connection. The proposed conceptual framework of the study (extended TAM), was tested on a sample of Greek internet users. Data were analysed using the “structural equation modelling” technique.

Findings – Results provide overall support for the extended TAM model and confirm its robustness in predicting customers’ intention of adoption of internet banking. More specifically, results underlined the important impact of perceived usefulness, security risk and performance risk on the intention to use internet banking. On the contrary, the impact of perceived ease of use and quality of the internet connection seemed to have only an indirect effect on internet banking adoption.

Practical implications – The paper makes an analytical effort in order to point out areas that banking organisations should emphasize in order to successfully implement online banking and, therefore, harvest its potential benefits.

Originality/value – The paper proposes an enhanced conceptual framework (extended TAM) that examines vital issues concerning online banking acceptance, thus providing valuable outcomes for decision makers and academics. To the best of the researchers’ knowledge, such an extension of the TAM model has never been examined in the relevant literature. Moreover, the results of the study may be generalised in other developed countries whose financial sector faces significant challenges (e.g. Spain, Italy, Portugal, Ireland, etc.).

Keywords Consumer behaviour, Internet, Banking, Online banking, Perceived risk, Technology acceptance model, Structural equation modelling, Greece

Paper type Research paper
1. Introduction

Nowadays, the internet technology is rapidly changing the design and delivery of financial services. Online services offer consumers a number of information-related benefits that favour adoption. These benefits include the opportunity to control bank accounts at any time and place, the access to personalised information for taking investment decisions and the comparison between alternate services (Howcroft et al., 2002).

Internet banking, defined as the delivery of banking services through the internet, offers numerous potential benefits to implementing financial organisations (Howcroft and Durkin, 2000; O’Reilly and Finnegan, 2003), especially through the utilisation of user friendly technologies and the lack of restriction to physical locations or geographical areas. It is considered to enhance customer satisfaction by providing faster, easier and more reliable services through an online platform (Al-Somali et al., 2009; Pikkarainen et al., 2004).

Nevertheless, despite the advantages of online banking, there is still a large customer group refusing to adopt such services, mainly, due to security reasons (Kuisma et al., 2007; Littler and Melanthiou, 2006). Therefore, the understanding of these reasons is expected to be proven useful for bank managers when formulating strategies that aim at increasing the use of online banking (Jarvenpaa et al., 1999; Lee, 2009; Yiu et al., 2007). Despite the risk related inefficiencies, online banking is clearly a potentially rich research context (AbuShanab and Pearson, 2007; Ndubisi and Sinti, 2006; Shanmugam and Guru, 2000).

Several empirical studies have focused on the factors that have an impact on the adoption of information or internet technology (Chan and Lu, 2004; Ndubisi and Sinti, 2006; Sachan and Ali, 2006; Wan et al., 2005), but there is limited empirical research considering the nature of internet adoption in the banking sector of Greece, nor analyse the success factors that may help in forming a strategic internet banking agenda in the whole country.

Until the end of the 1980s, the Greek banking system was characterised by selective credit controls and regulations that gradually led to unprecedented distortions and inefficiencies. Since then, the landscape of the Greek banking system has altered significantly. It underwent substantial developments that increased its potential (integration to the Economic and Monetary Union and introduction of the Euro currency).

Online banking has the potential to play an important role in the financial success of Greek Banks. Especially during the current global financial crisis, Greek banks have extra reasons to encourage their customers to increase the use of online banking, since through its implementation banks will be able to cut extra costs, reduce the number of branch employees and trim transportation expenditures. Furthermore, given the low percentages of online banking penetration in Greece, there is a significant gap for online banking development.

Given the above considerations, the present empirical study develops and tests a theoretical extension of the technology acceptance model (TAM) (Davis, 1989), and examines the factors that influence the adoption and acceptance of online banking in Greece.

To empirically test the validity of the proposed conceptual framework (extended TAM), a newly developed structured questionnaire was distributed to a sample of Greek internet users. The questionnaire of the study was extensively tested for its construct validity. In order to test the proposed conceptual framework, the “structural equation modelling” technique was used. Such an analysis provides the highest level of statistical verification.
Results indicated that perceived usefulness had a statistically significant positive influence on intention to use internet banking. On the contrary, perceived ease of use did not seem to have an effect on intention directly. Moreover, the statistical analysis highlighted the dominant role of perceived enjoyment on the adoption of online banking, since the hypotheses associating perceived enjoyment with intention, ease of use and usefulness were all confirmed by the statistical analysis.

Finally, regarding the risk factors examined, only security and performance risk seem to affect intention. Usage decisions did seem to be affected by possible negative criticism from important others, as no statistically significant relationship between sociotechnical risk and intention to use online banking has been indicated by the statistical analysis.

Section 2 includes the presentation of the proposed hypotheses of the study, while in Section 3 the research methodology is being presented. Results follow in Section 5, Section 6 includes a thorough discussion of the main empirical findings, while summary and conclusions are presented in Section 7. Finally, the limitations and the suggestions for future research are being presented in Section 8.

2. The conceptual framework of the study

2.1 Introduction

The present study focuses on exploring the determinants of online banking acceptance, adopting the TAM as the most widespread, appropriate and useful path of examination (Cheng et al., 2006). According to various academics (Abbasi et al., 2011; Chong et al., 2010; Pikkarainen et al., 2004), TAM performs incredibly in exploring user perceptions, a concept that appears to be extremely significant in the context of the present study.

The proposed conceptual framework (extended TAM) examines the causal relationship between six research constructs:

1. Perceived usefulness.
2. Perceived ease of use.
3. Perceived enjoyment.
4. Quality of internet connection.
5. Perceived risk:
   - performance risk;
   - social risk;
   - time risk;
   - financial risk; and
   - security risk.
6. Intention to use (online banking).

The proposed conceptual framework is based on the synthesis of various previous studies (Aldas-Manzano et al., 2009; Cheng et al., 2006; Eriksson and Nilsson, 2007; Guriting and Ndubisi, 2006; Pikkarainen et al., 2004). To the best of the researchers' knowledge, such a framework has never been previously examined.

2.2 Research hypotheses

2.2.1 Perceived usefulness. According to Guriting and Ndubisi (2006), perceived usefulness is one of the most popular factors utilised in the existing internet banking literature.
Pikkarainen et al. (2004) found that perceived usefulness has the most powerful impact on intention to use, among various other variables. Gounaris and Koritos (2008) compared drivers of internet banking adoption and concluded that, similar to the findings of Pikkarainen et al. (2004), perceived usefulness was one of the most important factors of online banking adoption. Jaruwachirathanakul and Fink (2005) conducted a study on Thailand (a rapidly developing economy) and, moreover, supported the argument that perceived usefulness is able to encourage the adoption of online banking. Therefore, we hypothesise that:

H1. Perceived usefulness has a positive impact on intention to use.

2.2.2 Perceived ease of use. Successful internet banking sites should be both easy to learn and use, since the perception about these characteristics is likely to lead in higher adoption behaviour (Jahangir and Begum, 2008). Hence, the prevention of the “under-used” useful system effect passed through the development of systems that are both easy to use and easy to learn. According to Moon and Kim (2001), easy to use information systems will be less threatening to most users. Thus, we hypothesise:

H2. Perceived ease of use has a positive impact on perceived usefulness.

The relationship between ease of use and intention to use online banking has provided mixed results in the relative literature. Gounaris and Koritos (2008) concluded that perceived ease of use satisfactory predicts the intention to use online banking, while Pikkarainen et al. (2004) and Eriksson et al. (2005) failed to establish such a relationship. As different studies present various results considering the impact of perceived ease of use, it is hypothesised:

H3. Perceived ease of use has a positive impact on intention to use.

2.2.3 Perceived enjoyment. Information technology manufacturers are attempting to provide fun interfaces, aiming to create enjoyment and enhance the perceived ease of use and usefulness of the developing systems (Venkatesh, 2000). Manufacturers believe that as the use of a system becomes routinised and, thus, less challenging, the lack of enjoyment may cause the system to be perceived more effortful to use and less useful. Moreover, according to Venkatesh (1999), with the manipulation of system-specific enjoyment through training, perceived ease of use could be enhanced and, at the same time, the impact of perceived ease of use on intention to use online banking be increased.

Thus, it is suggested that perceived usefulness and ease of use could certainly be influenced by system-specific perceived enjoyment (Agarwal and Karahanna, 2000; Moon and Kim, 2001; Venkatesh, 1999, 2000; Yi and Hwang, 2003):

H4. Perceived enjoyment has a positive impact on perceived usefulness.

H5. Perceived enjoyment has a positive impact on ease of use.

Igbaria et al. (1995a, b) empirically proved that perceived enjoyment has a positive correlation with time of use, but not with frequency of use. On the contrary, Teo et al. (1999) argued that perceived enjoyment has a positive impact on frequency of internet use and daily internet use. According to Igbaria et al. (1994), perceived fun can be defined as the realisation of a certain activity for no apparent reason other than performing the
activity itself. Igbaria et al. (1994) found that perceived fun and system usage were positively intercorrelated. Furthermore, Moon and Kim (2001) discovered that perceived playfulness had a significant effect on actual internet usage. On this basis, it is expected that perceived enjoyment is positively correlated with online banking acceptance:

**H6.** Perceived enjoyment has a positive impact on intention to use.

2.2.4 Quality of internet connection. Al-Somali et al. (2009) confirmed that a significant relationship between internet speed and use of online banking services exists. Hence it is hypothesised:

**H7.** Quality of internet connection has a positive impact on intention to use.

2.2.5 Perceived risk. Despite the relatively extensive empirical focus that has been given to risk perceptions of online banking adoption (Tan and Teo, 2000; Yousafzai et al., 2003), the perceived risk construct has been poorly operationalised (measured, most of the times, as a single item construct), thus, failing to capture its real characteristics and extensively explain the resistance towards adopting online banking services. In order to provide an enhanced understanding of this complex meaning, the present study adopts a deeper definition and operationalisation. At that direction, five types of risk are being investigated:

1. performance risk;
2. social risk;
3. time risk;
4. financial risk; and
5. security risk.

According to Yiu et al. (2007), a sudden breakdown in the function of the bank servers may lead to unexpected data losses and have an impact on executing money transfers. Littler and Melanthiou (2006) argued that web site malfunctions would certainly reduce users’ willingness to utilise online services, while Featherman and Pavlou (2003) empirically discovered that frequent web site breakdowns and connection disruptions inhibits the overall evaluation of e-banking services. Therefore, it is supported that:

**H8a.** Performance risk has a negative impact on intention to use.

According to Forsythe and Shi (2003), the unfavourable perceptions of the immediate social structure may affect the views of possible online banking users. Over the last decades, several empirical evidence regarding retail transactions have highlighted that social risk has a negative influence on customer attitude (Yang et al., 2007). Based on these studies, it is reasonable to expect that social risk would yield a negative influence on the intention to use online banking:

**H8b.** Social risk has a negative impact on intention to use.

The present study supports that online banking customers are time oriented and, therefore, this characteristic strongly motivates them to participate in online banking activities. These customers are highly concerned with the time spent for implementing, learning to use and troubleshooting a banking service. They are strongly against
possible loss of time and are less likely to adopt online banking if they consider that is has significant switching, setup and maintenance costs (Featherman and Pavlou, 2003). Thus, it is hypothesised:

\[ H8c. \] Time risk has a negative impact on intention to use.

Kuisma et al. (2007) supported that most bank customers have a negative disposition towards the use of online banking, because they fear economic losses and other similar misfortunes. The typical safeguards of conventional banking (clerical support and paper assurance about specific procedures) are not present in the online banking environment and, thus, feelings of insecurity and uncertainty may be generated. Therefore, the following hypothesis is examined:

\[ H8d. \] Financial risk has a negative impact on intention to use.

Security risks against online banking can be attempted via:
- network and data transaction attacks; and
- unauthorised account access (through false identification).

According to Milind (1999) and Bestavros (2000) security risk plays a prominent role to online banking adoption. It is, therefore, hypothesised that:

\[ H8e. \] Security risk has a negative impact on intention to use.

Figure 1 summarises all the above hypotheses, thus, presenting the proposed conceptual framework of the study.
3. Research methodology

3.1 Sample of the study
The conceptual framework of the present study (extended TAM) was tested with the use of a newly developed questionnaire on a sample of Greek internet users. As it is evident, internet users residing in Greece constitute the population of the study. According to Internetworkstats.com (2010), internet users in Greece have reached 4,971,182 in 2010 (46.2 percent of the population). Almost the same data have been announced by the Observatory for Digital Greece (2010), an official state organisation.

Since the main dependent variable (construct) of the study is “intention to use”, the respondents of the questionnaire could be inexperienced online banking users (non-users), one-time online banking users (not continual users), or continual users. These users were contacted with the use of various research techniques, so as to achieve a quite satisfactory representation and gather reliable information (data).

3.2 Measures
The measurement of each of the six variables (constructs) of the present study was conducted with the use of multiple items (questions) that were adopted from the international literature. The five point Likert scale was used for the measurement of all variables. The complete form of the questionnaire used in the survey consisted of seven units. The first six were used for the measurement of the six study variables, while the seventh unit included demographic questions about the person filling the questionnaire.

The measurement of the five study variables included 27 items (questions):

1. Perceived usefulness (four items): Cheng et al. (2006), Davis (1989) and Suh and Han (2002).
3. Perceived enjoymt (three items): Davis et al. (1992), Igbaria et al. (1995a, b) and Teo et al. (1999).

3.3 Data collection
Primary data were collected from a random sample of internet users. The only criterion for participating in the survey was the use of the internet. Given that fact, the members of the research team found that the use of the internet itself for collecting the primary data would be as a suitable and appropriate method (Celik, 2008).

Therefore, an online questionnaire was created and the participants of the survey completed the questionnaire online. The link containing the questionnaire of the survey was published in various Greek sites and forums, so as to achieve a random and representative sample. Since the questionnaire was accessible to a significant number of internet users (it was published in quite few highly popular sites and forums), it can be assumed that the target of a representative sample was attained. The research period lasted two months (May-July 2011). Totally, 220 questionnaires were returned and after conducting all necessary controls 213 were used for data analysis.
Regarding the profile of the participants, 54 percent of the respondents were male and 46 percent female, while the average age was 36 years. Furthermore, the majority of the respondents held a post-graduate degree (54.9 percent), whilst 62 (29.1 percent) were high school graduates, 57 held a Master’s degree and five participants held a PhD. Of the 213 respondents, the vast majority (75.6 percent) had actually performed a transaction using internet banking services. Regarding internet banking experience, users were almost equally divided among four groups: experience of less than six months, one to two years, two to four years and over five years. This indicates that the sample of the study includes individuals from all online banking experience level categories. It would also be safe to say that the majority of the respondents are fairly experienced users. Moreover, respondents reported using internet banking almost nine times a month and performed an almost an equal number of transactions. This result indicates that most of the times a user logs on his internet banking account performs a transaction.

4. Data analysis and results

4.1 The measurement model

4.1.1 Content validity. For the current research, content validity was established through questionnaire pre-testing. In more detail, four academics were asked to comment on the wording and appropriateness of the items (questions), as well as on other aspects of the questionnaire, including format and length. Based on the comments of the pre-testing participants, slight changes to the final draft of the questionnaire were made. It should also be noted that the wording of questions was finalised after performing a back translation, i.e. questions were translated from Greek back to their original language, i.e. English. This method ensures that translated questions of validated scales are accurately reflected in the targeted language.

4.1.2 Construct validity. For this study, construct validity was assessed by performing both an exploratory factor, through principal component analysis (PCA) with Varimax rotation, and a confirmatory factor analysis (CFA).

The results of the exploratory factor analysis (EFA), performed using the SPSS statistical package, are presented in Table I. All items intended to measure perceived enjoyment, perceived ease of use, perceived usefulness, quality of internet connection and intention to use loaded into their corresponding constructs, as indicated by the source of the scales. In all cases loadings were well above the cut-off values suggested by the literature, specifically 0.5 by Straub (1989) and 0.6 by Hair et al. (1995).

On the other hand, the items used to measure perceived risk loaded into three distinct factors, instead of the five factors proposed by Lee (2009). Factor loadings for these items ranged from 0.652 to 0.888, all exceeding the recommended threshold, while two items (F3 and F8) were removed from the analysis because of low factor loadings (Table I).

The new factors that were produced by the EFA were named security risk and sociotechnical risk. The “security” construct comprises of the three items proposed by Lee (2009), i.e. F9-F11 and an additional item (F4: When transaction errors occur, I worry that I cannot get compensation from banks), from the financial risk scale. This may be because respondents focused more on the possibility of an error occurring during the transaction rather than on possibility of not being compensated by the bank in case that happened.
Finally, the last factor labelled “sociotechnical risk” also comprises of an additional item from Lee’s (2009) time risk scale. Hence, this new construct denotes a general distress caused to the individual by the possibility of an erroneous transaction or fraud. This distress, however, is enhanced because fear of losing face with one’s social group, such as family, friends and/or colleagues, or because of the time required by the individual to spend on fixing the error.

To further assess the appropriateness of the factor models produced by the factor analysis, the Kaiser-Meyer-Olkin (KMO) and total variance explained (TVE) values, as well as the significance of Bartlett’s test were examined. Finally, construct reliability was tested using Cronbach’s α measure, which according to Nunnally (1978) should be over 0.7, whilst Bagozzi et al. (1991) argue that it should exceed 0.6. All indexes are ranged into the acceptable criteria.

As previously mentioned, the validity of the research instrument was further examined by performing a CFA using AMOS statistical package. In this case, each of the eight factors, produced by the EFA, was treated as an independent model with latent variable and as such was subjected to CFA. Four commonly used fit measures were mostly used to assess the fit of each model: chi-square/degrees of freedom ($\chi^2$/df), root mean square residual (RMR), general fit index (GFI) and comparative fit index (CFI). Results of the CFAs, per construct, are presented in Table II.
4.2 The structural model

Once the validity of the measurement model was confirmed, the structural model was tested using structural equation modelling, performed with AMOS 16.0. The results of the analysis are presented in Figure 2 and Tables III.

As it can be seen on Table II, three of the originally hypothesised paths are insignificant, while three new paths (shown on Figure 2 with dashed lines) were added to the model, based on modification indexes function of AMOS. This resulted in a modified structural model with improved fit. In more detail, the modified structural model fitted the data well, while the factors that were included can explain 53 percent of the variance in the dependent variable, i.e. intention to use online banking.

![Figure 2. The modified conceptual framework of the study](image-url)
Specifically, $\chi^2$/df is 3.723, slightly exceeding the cut-off value of 3, proposed by Straub (1989), while it indicates a satisfactory fit, based on the minimum acceptable value proposed by Wheaton et al. (1977), i.e. 5 or less than 5. Both CFI and GFI scores, on the other hand, exceed the 0.9 threshold (CFI = 0.903, GFI = 0.942). Finally, RMR (0.109) is slightly over the proposed cut-off value; the model, however, can still be considered acceptable as other fit criteria are met.

With respect to the hypotheses testing, eight of the originally proposed associations are accepted, while four ($H3$, $H7$, $H8b$ and $H8c$) are rejected. In more detail, of the TAM constructs, perceived usefulness has a statistically significant positive influence on intention to use internet banking. Perceived ease of use, on the other hand, does not affect intention directly, as initially hypothesised. It does however influence intention indirectly through its effect on perceived usefulness, confirming $H2$. All hypotheses associating perceived enjoyment with intention ($H6$), ease of use ($H5$) and usefulness ($H4$) were confirmed by the analysis.

Hypotheses concerning perceived risk factors produced mixed results. In more detail, the two hypotheses linking performance risk and security risk to intention to use online banking were confirmed by the analysis. However, the composition of the security risk factor has changed as the result of the EFA, as also previously noted. Security risk contains an additional item (F4) from the financial risk scale, adopted from Lee (2009). Hence, it could be argued that the hypothesis concerning financial risk is only partially rejected.

Moreover, the negative relationship between time risk and intention has not been confirmed. Note that one of the scale’s items, namely F7, loaded in the social risk scale, producing a new factor, labelled sociotechnical risk. The latter, however, had no statistically significant effect on intention to use online banking, although the resultant coefficient was negative. Hence, the hypothesis linking social risk and Intention is also rejected.

Finally, three new causal paths were added to the model as a result of the modification indexes provided by AMOS, as previously mentioned. These new associations indicate a fairly strong positive effect of quality of internet connection on perceived enjoyment.

<table>
<thead>
<tr>
<th>Causal path</th>
<th>Estimate</th>
<th>$p$</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H1$ Perceived usefulness</td>
<td>Intention to use</td>
<td>0.39</td>
<td>* Accepted</td>
</tr>
<tr>
<td>$H2$ Perceived ease of use</td>
<td>Perceived usefulness</td>
<td>0.50</td>
<td>* Accepted</td>
</tr>
<tr>
<td>$H3$ Perceived ease of use</td>
<td>Intention to use</td>
<td>0.04</td>
<td>* Rejected</td>
</tr>
<tr>
<td>$H4$ Perceived enjoyment</td>
<td>Perceived usefulness</td>
<td>0.24</td>
<td>* Accepted</td>
</tr>
<tr>
<td>$H5$ Perceived enjoyment</td>
<td>Perceived ease of use</td>
<td>0.35</td>
<td>* Accepted</td>
</tr>
<tr>
<td>$H6$ Perceived enjoyment</td>
<td>Intention to use</td>
<td>0.28</td>
<td>* Accepted</td>
</tr>
<tr>
<td>$H7$ Quality of internet connection</td>
<td>Intention to use</td>
<td>-0.02</td>
<td>0.652 Rejected</td>
</tr>
<tr>
<td>$H8a$ Performance risk</td>
<td>Intention to use</td>
<td>-0.11</td>
<td>* Accepted</td>
</tr>
<tr>
<td>$H8b,c$ Sociotechnical risk</td>
<td>Intention to use</td>
<td>-0.05</td>
<td>0.300 Rejected</td>
</tr>
<tr>
<td>$H8e$ Security risk</td>
<td>Intention to use</td>
<td>-0.37</td>
<td>* Accepted</td>
</tr>
</tbody>
</table>

New causal paths

| Quality of internet connection | Perceived enjoyment | 0.37 | * New path |
| Quality of internet connection | Perceived ease of use | 0.22 | * New path |
| Security risk | Perceived usefulness | -0.10 | * New path |

Note: Significant at: *$p < 0.001$
and perceived ease of use and a small negative effect of security risk on perceived ease of use.

Overall, the analysis resulted in a model that can explain over half the variance in intention to use internet banking, as well as 42 percent of the variance in usefulness, 23 percent in ease of use and 14 percent in perceived enjoyment stemming from internet banking usage.

5. Discussion

Regarding the core TAM constructs, perceived usefulness has been found to have a rather strong effect on intention while ease of use only affects it indirectly, through usefulness. Usefulness has been found to be a stronger influencing factor, compared to ease of use, in a noteworthy amount of studies examining online banking applying TAM and/or extended-TAM models in various contexts (Abbasi et al., 2011; Amin, 2007; Celik, 2008; Chatzoglou et al., 2010; Cheng et al., 2006; Chong et al., 2010; Eriksson et al., 2005; Guriting and Ndubisi, 2006; Jahangir and Begum, 2008; Pikkarainen et al., 2004; Ramayah et al., 2003; Suh and Han, 2002; Yousafzai et al., 2010).

With respect to the current research, this result can be attributed to respondent characteristics, as the sample consists of fairly experience internet banking users. Venkatesh et al. (2003) analysis indicated that effort expectancy, i.e. the effort required by an individual to learn how to operate a system and how easy he/she considers it to be, is a more important factor among less experienced users, while its effect decreased with experience.

Hence, it can be argued that individuals’ decisions on whether to use the service mainly depend on the perceived benefit accruing from its usage, as for example saving time and making transactions easier, compared to visiting a bank branch. Usability, however, is not a factor to be overlooked, as it has a rather strong effect on user perceptions of online banking usefulness, as initially hypothesised. In other words, if a platform is not easy to operate it cannot be considered as a useful means to perform transactions.

Perceived enjoyment, on the other hand, was found to be one of the most significant factors affecting internet banking adoption. This factor has been associated with technology usage from early on (Dabholkar, 1996). As indicated from the analysis, enjoyment has noteworthy positive effects on all TAM constructs, namely perceived usefulness ($r = 0.39^{*}$), ease of use ($r = 0.24^{*}$) and intention ($r = 0.28^{*}$). Poustchi and Goeke’s (2011) research also designated the central role of enjoyment, which they found to be the key determinant factor of usefulness perceptions. Hence, these results suggest that if users believe that using the system is enjoyable, playful or fun to use (Igbaria et al., 1994; Moon and Kim, 2001; Pikkarainen et al., 2004) the more useful they consider it to be. Similarly, enjoyment and usability are positively related, consistent with theory propositions (Venkatesh, 2000). Enjoyment has also been found to affect intention directly, as initially hypothesised. Similar findings are reported in other studies examining the effect of the construct on usage intentions and acceptance of various systems (Davis et al., 1992; Igbaria et al., 1995a, b; Pikkarainen et al., 2004; Teo et al., 1999).

It is worth noting at this point, that while enjoyment poses significant effects on intention, that is not the case with ease of use, as previously mentioned. In the context on online banking, ease of use has also been found to be insignificant by Abbasi et al. (2011), Chong et al. (2010), Eriksson et al. (2005) and Yousafzai et al. (2010).
Overall, the findings concerning enjoyment point to the importance of providing customers with systems they can consider fun and enjoyable to use; even more so for experienced users. Hence, the provision of a non-enjoyable system may negatively affect ease of use perceptions.

Quality of internet connection, on the other hand, was not found to have a direct effect on usage intention. Similarly, Polasik and Wisniewski’s (2009) indicated that internet banking adoption is not affected by the type of connection. Conversely, internet connection quality has been found to pose noteworthy effects on perceived ease of use and enjoyment. In that sense, quality of internet connection facilitates the access to online banking, enhancing user perceptions of its usability. As regarding the relationship between internet connection quality and enjoyment, it is logical to assume that no online activity can be considered as enjoyable unless access to the internet connection meets the demands of the particular application (Aptivate, 2007).

Finally, of the risk factors examined, only security and performance risk seem to affect usage intention \( (r = -0.10^* \text{ and } r = -0.37^*,\) respectively). Similar strong influences have been found in the studies of Alda’s-Manzano et al. (2009) and Lee (2009). In general, privacy, security and risk issues have been widely identified as factors inhibiting the acceptance and use of internet banking (Eriksson et al., 2008; Howcroft et al., 2002; Jahangir and Begum, 2008; Liao and Cheung, 2002; Polasik and Wisniewski, 2009; Wang et al., 2003; Yiu et al., 2007; Yousafzai et al., 2003).

This finding suggests that even more experienced users (as the ones included in the current sample), are not fully convinced of the safety of their online transactions. Moreover, they may not find online banking to be fully dependable, as errors during the performance of a transaction may occur, due to system malfunction. The centrality of security concerns is further corroborated by the fact that is has also been found to pose statistically significant negative effects on perceived usefulness. In fact, risk factors have been indicated by past research to influence usage intentions not only directly but also indirectly. For example, in the Lee’s (2009) study, performance risk has been found to affect intention through usefulness.

Conversely, usage decisions seem not to be affected by possible negative criticism from important others, as no statistically significant relationship between sociotechnical risk and intention to use online banking has been indicated by the analysis. This finding can be partially explained considering the usage experience of the current study’s participants. As previously mentioned, social risk, partially comprising the sociotechnical risk factor, is associated with “threats [that] can be generated due to the unfavourable perceptions of online banking of consumers’ family, acquaintances, or peers that in turn affect their views of its adopters” (Lee, 2009, p. 314). In this respect, sociotechnical risk captures in part the effect of social influence on usage decisions. Social influence, however, has not been indicated to exert statistically significant effects on internet usage intention in several studies (Jaruwachirathanakul and Fink, 2005; Shih and Fang, 2004, 2006). Past research findings have also shown that social influence is a factor of greater importance among inexperienced users (Venkatesh et al., 2003).

In summary, the results of the hypotheses testing indicated that the current sample’s intentions to use online banking are primarily affected by perceived usefulness and enjoyment. Security risk concerns also pose a noteworthy negative effect on the intention to use, while performance risk has a small but statistically significant effect on the construct. Perceptions of online banking usefulness, on the other hand, are primarily
ease of use and enjoyment perceptions; the latter factor also affects usefulness perceptions, through its influence on usability. Finally, contrary to initial expectations, the quality of internet connection does not influence usage intentions directly. The construct, however, has been found to affect enjoyment and ease of use. Overall, the results of the current study point to the importance of system characteristics, i.e. usefulness, ease of use and enjoyment, as well as to security and performance risk exposure associated with internet banking usage. All of the aforementioned factors should be of concern when wanting to increase internet banking penetration.

6. Summary and conclusions
The present study developed and tested an extension of the TAM, examining the factors that influence the adoption of online banking in Greece. The aim of the research was to analyse the impact of the typical TAM constructs on the intention to use internet banking in Greece and, at the same time, incorporate “perceived risk” and “quality of the internet connection” to the TAM.

A newly developed questionnaire was electronically answered by the sample population (internet users). The final sample was 213 questionnaires. The questionnaire of the study was extensively tested for its content and construct validity. Data were analysed using the “structural equation modelling” technique.

Considering the TAM constructs, perceived usefulness was found to have a statistically significant positive influence on intention to use internet banking, while perceived ease of use, contrariwise, did not seem to have an effect on intention directly. This result is explained based on the special respondents’ characteristics, as the sample of the study consisted of fairly experienced internet banking users.

Moreover, the hypotheses associating perceived enjoyment with intention, ease of use and usefulness were confirmed by the empirical analysis, setting perceived enjoyment as one of the most significant factors affecting internet banking adoption.

Additionally, quality of internet connection has not been found to affect usage intention directly, but it seems to simplify the access to internet banking, enhance user perceived usability and strengthen the enjoyment parameter of internet banking.

Regarding the risk factors examined in the present study, only security and performance risk seem to affect usage intention, bringing out the fact that the experienced users of this research, are not fully convinced of the safety of their online transactions. However, mainly because of the high level of experience of the current study’s participants, usage decisions seem not to be affected by possible negative criticism from important others, as no statistically significant relationship between sociotechnical risk and intention to use online banking has been indicated by the statistical analysis.

7. Practical implications
Based on the current study’s findings the following can be proposed to financial institutions wishing to retain and expand their customer base, with respect to internet banking. Respondents seem to be primarily concerned with online banking usefulness, as this factor has been found to have the strongest direct effect on usage intentions. This finding indicates that when banks market their system they should emphasise on the potential benefits that result from internet banking usage. Hence, customers should
be informed of online banking advantages, including convenience, time saving, low cost services and information availability (Jaruwachirathanakul and Fink, 2005).

This would include emphasising the ability to manage one’s accounts and portfolios around the clock and from every location, simply requiring an internet access. Similarly, stress on the fact that one could pay all kinds of bills without having to visit a bank branch or any other services organization, either private or public. Additionally, underlining the benefits of online banking for the environment, as for example saving trees from paperless transactions and reducing carbon dioxide emissions, would be appealing to environmentally concerned customers. In other words, consumer benefits, either personal or social/environmental should be on the focal attention of banks marketing strategy.

Perceived usefulness may be also associated with system characteristics, in terms of the variety of services that are provided, as well as system usability. Therefore, an advertising strategy should highlight the range of services that are offered to online banking users. Care should also be taken in constantly expanding the range of services offered. Attention must also be paid in developing a system that is easy to use. Although, internet banking usability has been found to affect usage intentions directly, it poses strong effects on perceived system usefulness. This finding clearly suggests that a significant portion of e-banking usefulness evaluations is based on how easy to use the system is considered to be.

Perceived enjoyment emerged as a crucial factor affecting online banking adoption, as it has been found to influence intentions, both directly and indirectly. Based on this result, it can be suggested that special care should be taken during the online banking system development, especially with respect to user interface. For this reason, the system should be designed in such a way that users find it fun and enjoyable to use.

Moreover, as quality of the internet connection has been found to also influence enjoyment and ease of use perceptions web sites should be designed for low bandwidth connections: “it is possible to produce attractive, easily maintainable websites which are responsive and easy to navigate [...] and work over low bandwidth connections” (Aptivate, 2007).

Risk factors have also been found to largely affect usage decisions. Past studies examining the influence of risk and security factors have drawn dissimilar and even conflicting conclusions, especially regarding the relative effect of these factors on online banking usage (Aldea’s-Manzano et al., 2009; Lee, 2009; Pikkarainen et al., 2004).

The results of the current study indicated that participants are mainly concerned with security and performance risk. As Lee (2009) also suggests, banks should focus their efforts on coming up with “[...] risk-reducing strategies that might assist in inspiring high confidence in potential customers” (p. 139). This would include building high security systems, focusing on firewalls, encryption systems and so forth (Lee, 2009). All these steps are necessary to protect personal information and secure transactions, that is sheltered costumers against such threats as intrusion, fraud and identity theft (Lee, 2009). Additional measures would be to provide consumers with receipts of their transactions that can be used as a means to get compensation in case of an error (Lee, 2009).

8. Limitations and suggestions for further research
As is the case with the majority of researches, this study has some limitations. First, the sample of future studies should expand to include all user categories, from
inexperienced to very experienced users, as well as non-users. This would help identify the potentially different factors that affect usage or non-usage decisions among the various groups, as also indicated by past studies on internet banking adoption (Lai and Li, 2005).

A limitation stemming from the methodology employed is the use of self-report scales to measure the constructs of the theoretical model. This may have resulted in errors due to common method and social desirability bias (Zikmund, 2003). Moreover, usage intentions were examined rather than actual system usage. Hence, future research should attempt to assess actual internet banking usage, employing both subjective (self-report) and objective measures to increase the reliability of the findings.

Finally, future research models should incorporate additional factors that have been found to play a significant role in internet banking adoption and/or IT usage, in general. These could include, for example, the variety of services offered, perceptions of support and service quality, trust in the financial institutions, corporate image or bank reputation (Chong et al., 2010; Suh and Han, 2002; Wong et al., 2008; Tan and Teo, 2000).

References


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Further reading
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