Consumer acceptance of online banking: an extension of the technology acceptance model

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Keywords

Virtual banking, Consumer behaviour, User studies

Abstract

Advances in electronic banking technology have created novel ways of handling daily banking affairs, especially via the online banking channel. The acceptance of online banking services has been rapid in many parts of the world, and in the leading e-banking countries the number of e-banking contracts has exceeded 50 percent. Investigates online banking acceptance in the light of the traditional technology acceptance model (TAM), which is leveraged into the online environment. On the basis of a focus group interview with banking professionals, TAM literature and e-banking studies, we develop a model indicating online-banking acceptance among private banking customers in Finland. The model was tested with a survey sample (n = 268). The findings of the study indicate that perceived usefulness and information on online banking on the Web site were the main factors influencing online-banking acceptance.

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Introduction

Since the mid-1990s, there has been a fundamental shift in banking delivery channels toward using self-service channels such as online banking services. During the past years online banking acceptance has been rapid and currently 55 percent of the private banking customers in Finland have an online banking contract with their bank (The Finnish Banker's Association, 2003; cf. Nordea Oyj, 2003). In general, Europe has been and still is the leader in online banking technology and usage (Schneider, 2001). By comparison, at the end of 2000 only roughly 20 percent of the US banks offered online banking services and only 20 percent of US private banking customers equipped with an internet connection used online banking services (Sheshunoff, 2000; Orr, 2001). By the end of 2002 about 120 largest US banks offered online banking services (Pyun *et al.*, 2002). Although in recent years this number has grown rapidly, there is some evidence supporting the opposite fact that online banking acceptance is faced with problems. Robinson (2000) for instance found that half of the people that have tried online banking services will not become active users.

An interesting and notable difference between US and European banks is that US banks are not allowed to have a vast bank branch network covering the whole country (Pyun *et al.*, 2002). Thus online banking services as well as ATMs have fostered competition between banks in the USA.

Online banking in this study is defined as an Internet portal, through which customers can use different kinds of banking services ranging from bill payment to making investments. Therefore banks' Web sites that offer only information on their pages without possibility to do any transactions are not qualified as online banking services.

The goal of this article is to increase our current understanding of the factors that influence online banking acceptance in the light of the technology acceptance model (TAM) (Davis *et al.*, 1989; Mathieson, 1991; Davis and Venkatesh, 1996). More precisely, online banking acceptance will be studied from the information systems acceptance point of view referring to the idea that consumers are using banks information system (online banking service) directly and hence more knowledge on the factors that affect information

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systems adoption is needed in order to better understand and facilitate the acceptance.

This article is divided into four parts: the first part contains a literature review on online banking and information systems acceptance. The second part presents the research methodology used in this work. The third part comprises of the results and analysis. In this part the data is analysed using a factor, regression and correlation analyses. The final part consists of the conclusions and practical implications of the research.

Literature review

Online banking acceptance studies

Online banking acceptance has gained special attention in academic studies during the past five years as, for instance, banking journals have devoted special issues on the topic (e.g. Karjaluoto *et al.*, 2002; Waite and Harrison, 2002; Bradley and Stewart, 2003; Gerrard and Cunningham, 2003; Mukherjee and Nath, 2003). We can find two fundamental reasons underlying online banking development and diffusion. First, banks get notable cost savings by offering online banking services. It has been proved that online banking channel is the cheapest delivery channel for banking products once established (Sathye, 1999; Robinson, 2000; Giglio, 2002). Second, banks have reduced their branch networks and downsized the number of service staff, which have paved the way to self-service channels as quite many customers felt that branch banking took too much time and effort (Karjaluoto *et al.*, 2003). Therefore, time and cost savings and freedom from place have been found the main reasons underlying online banking acceptance (Polatoglu and Ekin, 2001; Black *et al.*, 2002; Howcroft *et al.*, 2002).

Several studies indicate that online bankers are the most profitable and wealthiest segment to banks (Mols, 1998; Robinson, 2000; Sheshunoff, 2000). On this basis, no bank today can underestimate the power of the online channel. Luxman (1999) for instance estimates that in the near future the online channel reinforces its importance especially in the countryside, where banks have closed many branches. However, there is no supporting evidence on this regional issue. Without the possibility of managing banking affairs directly from home or office, customers easily perceive troubles in managing their financial affairs such as paying bills.

As noted, online banking offers many benefits to banks as well as to customers. However, in global terms the majority of private bankers are still not using online banking channel. There exist multiple reasons for this. To start with, customers need to have an access to the Internet in order to utilize the service. Furthermore, new online users need first to learn how to use the service (Mols *et al.*, 1999). Second, nonusers often complain that online banking has no social dimension, i.e. you are not served in the way you are in a face-to-face situation at branch (Mattila *et al.*, 2003). Third, customers have been afraid of security issues (Sathye, 1999; Hamlet and Strube, 2000; Howcroft *et al.*, 2002). However, this situation is changing as the online banking channel has proven to be safe to use and no misuse has been reported by the media in Finland.

Traditional banks have been the vanguard of online banking channel development and control lion's share of the total market. However, the online banking channel works without having an extensive branch network, at least in theory. In recent years we have witnessed the rise of pure online banks, but their impact on the whole banking sector has been remote. Pure online banks often use other channels as well, such as contact centers (both outbound and inbound), and some have even established physical presences by establishing branch services. Quite many pure online players have suffered from achieving sufficient customer base and thus have had to close their business down (Orr, 2001; Schneider, 2001). In this regard, Sievewright (2002) forecasts that in the USA many pure online banks will close down their business in the next five years.

TAM and related studies

Organizations invest in information systems for many reasons, for example cutting costs, producing more without increasing costs, improving the quality of services or products (Lederer *et al.*, 1998). It has been noted that users' attitudes towards and acceptance of a new information system have a critical impact on successful information system adoption (Davis, 1989; Venkatesh and Davis, 1996; Succi and Walter, 1999). If users are not willing to accept the information system, it will not bring full benefits to the organisation (Davis, 1993; Davis and Venkatesh, 1996). The more accepting of a new information system the users are, the more willing they are to make changes in their practices and use their time and effort to actually start using the new information system (Succi and Walter, 1999).

A system that satisfies user's needs reinforces satisfaction with the system and is a perceptual or subjective measure of system success. Similarly, usage of a system can be an indicator of information system success and computer acceptance in some cases. Whether the system is regarded as good or bad depends on how the user

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feels about the system. Especially if the users do not rely on the system and its information their behaviour toward the system could be negative. Success is not necessarily dependent of the technical quality of the system (Ives *et al.*, 1983). Using the system is connected with the effectiveness of the system – systems that users regard as useless cannot be effective. Therefore it is important to find out the reasons why people decide to use or not to use information system (IS). This knowledge will help both systems designers and developers in their work (Mathieson, 1991)

One of the most utilized model in studying information system acceptance is the technology acceptance model (TAM) (Davis *et al.*, 1989; Mathieson, 1991; Davis and Venkatesh, 1996; Gefen and Straub, 2000; Al-Gahtani, 2001) in which system use (actual behaviour) is determined by perceived usefulness (PU) and perceived ease of use (PEOU) relating to the attitude toward use that relates to intention and finally to behaviour. According to the TAM these two beliefs are of primary significance for computer acceptance. PU refers to the prospective user's subjective likelihood that the use of a certain application will increase his or her performance. PEOU is defined as the degree to which the prospective user expects the potential system to be free of effort (Davis *et al.*, 1989). According to DeLone and McLean (1992) system use as the dependent variable is acceptable, if system usage is not compulsory. Although the TAM has been tested widely with different samples in different situations and proved to be valid and reliable model explaining information system acceptance and use (Mathieson, 1991; Davis and Venkatesh, 1996,), many extensions to the original TAM have been proposed (e.g. Venkatesh and Speier, 1999; Venkatesh and Davis, 2000; Venkatesh *et al.*, 2002; Henderson and Divett, 2003; Lu *et al.*, 2003). Recently, Venkatesh and Davis (2000) extended the original TAM by introducing the second generation of the model labelled TAM2 to explain how subjective norms and cognitive instrumental processes affect perceived usefulness and intentions.

TAM is based on the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980), which is concerned with the determinants of consciously intended behaviours (Ajzen and Fishbein, 1980; Davis *et al.*, 1989). Development of TRA started in 1950s and the first research concerning TRA was published in 1967 (Ajzen and Fishbein, 1980). Since 1967 TRA has been developed, tested and used extensively and its extension, the theory of planned behaviour (TPB) (Ajzen, 1991) utilized widely. TRA has proven successful in predicting and explaining behaviour across a wide variety of domains. TRA is based on the assumption that consumers' behave rationally and that they collect and evaluate systematically all of the available information. Additionally, TRA assumes that people also take into account the effects of their possible actions and based on this reasoning make decision whether or not to take action (Ajzen and Fishbein, 1980). Individuals would use computers if they have a feeling that there could be positive benefits (outcomes) associated with using them (Compeau and Higgins, 1995). From the information systems perspective one relevant element of TRA is its assertion that any other factor that influences behaviour for example systems design variables, user characteristics, task characteristics, political influences and organizational structure do so only indirectly by influencing attitude toward behaviour, subjective norm or their relative weights (Davis *et al.*, 1989).

Although the TAM and the TRA share many issues they have some considerable differences. The first difference is that according to TRA beliefs are bound to context and hence they can not be generalised. Contrary to that, TAM states that PEOU and PU are issues that have an effect on acceptance of all information systems. The other significant difference is that in TRA all beliefs are summed together, but in the TAM both beliefs are seen as distinct constructs. Modelling each belief separately allows researchers to better trace influences of all of the affecting factors on information systems acceptance (Davis *et al.*, 1989).

TAM has been tested in many studies (see, for example, Davis, 1989; Davis *et al.*, 1989; Mathieson, 1991; Adams *et al.*, 1992; Davis, 1993; Segars and Grover, 1993; Taylor and Todd, 1995), and it has been found that TAM's ability to explain attitude toward using an information system is better than other model's (TRA and TPB) (Mathieson, 1991). These studies have found that TAM consistently explains a significant amount of the variance (typically around 40 percent) in usage intentions and behaviour. The use of an information system has been understood in many studies as the user acceptance of the information system in question (Davis *et al.*, 1989; Davis, 1993; Al-Gahtani, 2001). In other words the use of information system acts as an indicator for information system's acceptance.

The model

Based on the literature review and a focus group interview with four business professionals from the banking sector, a model indicating the acceptance

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of online banking was developed (Figure 1). The model consists of six factors that we posit to have an effect on acceptance of online banking.

Perceived usefulness PU and perceived ease of use PEOU

TAM posits that PU is a significant factor affecting acceptance of an information system (Davis *et al.*, 1989). Davis defined PU as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). According to TAM PEOU is a major factor that effects acceptance of information system (Davis *et al.*, 1989). PEOU is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). Hence an application perceived to be easier to use than another is more likely to be accepted by users. By applying these into online banking context we hypothesize:

H1. Perceived usefulness (PU) has a positive effect on consumer acceptance of online banking

H2. Perceived ease of use (PEOU) has a positive effect on consumer acceptance of online banking

Perceived enjoyment

Enjoyment refers to the extent to which the activity of using a computer is perceived to be enjoyable in its own right (Davis *et al.*, 1992). This is contrasting to the PU, which can be seen as an extrinsic motivation whereas perceived enjoyment (PE) as an intrinsic motivation to use information systems. A number of studies on PE (Davis *et al.*, 1992; Igbaria *et al.*, 1995; Teo *et al.*, 1999) have noticed that PE significantly affects intentions to use computers. Igbaria *et al.* (1995) found that PE correlates positively with time of use but not with frequency of use or number of tasks. In contrast, Teo *et al.* (1999) noted that PE correlates positively with frequency of Internet usage and daily Internet usage. Definitions of perceived fun and perceived playfulness are quite similar to the concept of PE. In this research they are all handled as the same.

Some studies have focused on perceived fun and perceived playfulness (Igbaria *et al.*, 1994; Moon and Kim, 2001). According to Igbaria *et al.* (1994) perceived fun refers to the performance of an activity for no apparent reinforcement other than the process of performing the activity per se. They found that system usage and the perceived fun were positively correlated with each other. Moon and Kim (2001) define perceived playfulness as consisting of three parts: concentration, curiosity and enjoyment. They discovered that the perceived playfulness had a significant impact on the intention to use the Internet. On this basis, we expect that PE affects the acceptance of online banking:

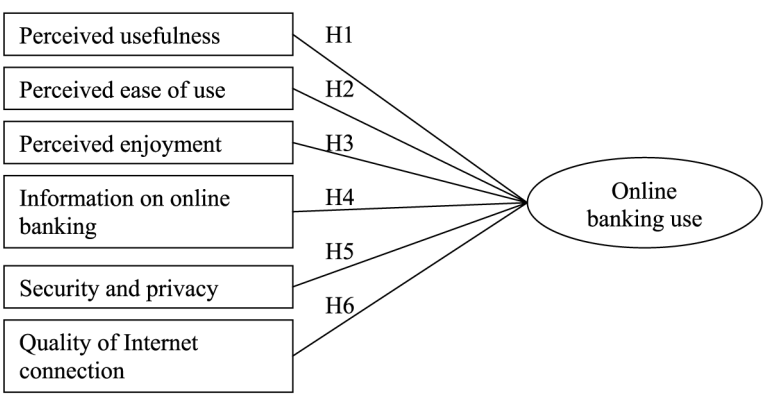
H3. Perceived enjoyment (PE) has a positive effect on consumer acceptance of online banking

Amount of information on online banking

The amount of information consumers have about online banking has been identified as a major factor impacting the adoption. According to Sathye (1999) while the use of online banking services is fairly new experience to many people, low awareness of online banking is a major factor in causing people not to adopt online banking. In an empirical study of Australian consumers Sathye (1999) found that consumers were unaware about the possibilities, advantages/disadvantages involved with online banking. Hence, we posit that:

H4. The amount of information a consumer has about online banking has a positive effect on consumer acceptance of online banking

Figure 1 The research model



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Security and privacy

The importance of security and privacy to the acceptance of online banking has been noted in many banking studies (Roboff and Charles, 1998; Sathye, 1999; Hamlet and Strube, 2000; Tan and Teo, 2000; Polatoglu and Ekin, 2001; Black *et al.*, 2002; Giglio, 2002; Howcroft *et al.*, 2002). To be more precise, privacy and security were found to be significant obstacles to the adoption of online banking in Australia (Sathye, 1999). Roboff and Charles (1998) found that people have a weak understanding of online banking security risks although they are aware of the risks. Furthermore, they found that consumers often rely that their bank is more concerned about privacy issues and protect them. Finally they argue that although consumers' confidence in their bank was strong, their confidence in technology was weak (see also Howcroft *et al.*, 2002).

As the amount of products and services offered via the Internet grows rapidly, consumers are more and more concerned about security and privacy issues. Generally speaking, many consumers are unwilling to give private information over the telephone or the Internet, for example credit card information (Hoffman and Novak, 1998).- According to many studies (e.g. Westin and Maurici, 1998; Cranor *et al.*, 1999) privacy issues have proven important barriers to the use of online services. Basically, consumers are not willing to accept that they do not have full control over their own behaviours. They want to master their own acts and to know the causes and consequences of their own and others' acts (Baronas and Louis, 1988). Users want to control what kind of data is collected, for what purposes, how long data is recorded for, how and for what purposes their data is processed (Kobsa, 2001; Kobsa, 2002). Gathering and recording user data without consumers' awareness concerns them (DePallo, 2000).

As trust, security, and privacy are multidimensional constructs and need further explanation, in this article we concentrate only on the aspects consumers are most concerned about. We are interested in the level of confidence in the technology and online banking service provider. Thereby we propose that:

H5. Security and privacy have a positive effect on consumer acceptance of online banking

Quality of Internet connection

The importance of a decent Internet connection and its quality was raised in our focus group interview. Also Sathye (1999) used Internet access as one of the factors affecting the adoption of online banking in her research. Without a proper Internet connection the use of online banking is not possible. Hence we posit:

H6. The quality of the Internet connection has a positive effect on consumer acceptance of online banking

Next we will continue to presenting our methodological standpoints and the results.

Research methodology

Data for this study was collected by the means of a survey conducted in Finland in 2002. A total of 427 questionnaire forms were delivered to respondents of which 268 were returned giving a response rate of 63 percent. Questionnaires were filled in three different places, at university classes, at two barber shops, and at a medium sized retail company. This resulted in a sample that was well distributed in terms of demographic information (e.g. age, income, and education). The questionnaire (shown in Appendix) consisted of questions that were related to background, possible factors affecting acceptance of online banking and use of online banking services. Likert five point scales ranging from "strongly agree" to strongly disagree" were used as a basis of questions. This scale has been used in previous TAM related research (e.g. Igbaria *et al.*, 1995; Teo *et al.*, 1999). Additionally, the "not sure" option was allowed in almost all questions. The questionnaire was developed and tested with a focus group consisting of professionals from the banking sector. The focus group finally verified that the hypotheses we developed might be affective factors explaining online banking acceptance. Based on this information the questionnaire was modified and finalized.

On the basis of previous studies on computer and information systems acceptance, the use of the information system was chosen to be the indicator for success (see Davis *et al.*, 1989; Davis, 1993; Al-Gahtani, 2001). The use of online banking services was chosen as the dependent variable in the model. This is in line with other studies, in which actual usage has been selected as the measure of use (Legris *et al.*, 2003).

Results

The average age of respondents was 29 years (SD 12). Close to 55 percent of the respondents were male. Approximately half of the respondents belonged to the lowest income level (under €500 per month). About third of the respondents fell into middle income level (€500-2,000 per month).

The rest fit into the highest income level (over €2,000 per month).

Factor analysis

A confirmatory factor analysis was conducted on the items comprising PU, PEOU, PE, Information on online banking, security and privacy and the quality of online connection. The factor analysis was conducted using principal axis factoring with varimax rotation as an extraction method (see for details, e.g. Nummenmaa *et al.*, 1996, p. 244; Aczel, 1999, pp. 814-18; Hair *et al.*, 1998, pp. 87-120). Five variables from the original variable list did not fit into the factor model. Two of the excluded variables were associated with quality of Internet-connection and three with enjoyment. The five factors identified were chosen in terms of eigenvalue larger than 1.0. The Bartlett's test of sphericity confirmed that the variables within factors are correlated. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicated a practical level of common variance (KMO = 0.824). Thereby, the factor analysis was appropriate.

The identified factors (Table I) represent 60.4 percent of the variance of the variables.

The first factor, PEOU, consists of six variables (alpha = 0.86). Peterson (1994) points that acceptable value of Cronbach's alpha can vary between 0.5 and 0.95 depending on the type of research. For basic research Cronbach's alpha should be higher than 0.7-0.8. The second factor, security and privacy, was loaded with five variables (alpha = 0.90). The third factor, PU, contained six variables (alpha = 0.86). The fourth factor exhibits loadings for two variables referring to amount of information on online banking (alpha = 0.80). The fifth factor refers to PE and was loaded with two variables (alpha = 0.78). The overall reliability of the factor analysis was 0.89. The first factor, PEOU explained most of the total variance (17.3 per cent).

This factor model was then used to analyse the use of online banking. The dependent variable was formed by summing up the use of basic and other banking services. This was done, because it gives better view of the use of online banking with the data used. The regression analysis was conducted to reveal how different factors affect the use of online banking. A multi-correlation problem was identified and minimized using the statistical choice methods (Nummenmaa *et al.*, 1996). Although of the explanatory variables and their coefficients only PU ($t = 3.15$, $p < 0.01$) and amount of information ($t = 2.28$, $p < 0.05$) are statistically significant, the overall model was statistically significant ($R^2 = 0.12$, $p < 0.01$). PE is almost significant with the five percent level ($t = 1.716$, $p = 0.09$). The results of the regression analysis are presented in Table II.

We finally run a correlation analysis to further test our hypotheses. The results indicate that PU and amount of information are also positively correlated with use ($p < 0.05$). From background variables only income was positively correlated with use. Correlations of all factors and background variables with use of online banking are displayed in Table III.

In sum, PU and amount of information clearly have a positive effect on the use of online banking. Also the income level has an effect. Based on our data analysis, it seems that PEOU, security and privacy and PE do not statistically significantly affect the use. Background variables age and gender are also statistically non-significant. This means that only *H1* and *H4* were supported. The rest of the hypotheses were not supported by the data.

Summary and conclusions

The primary objective of the study was to study consumer acceptance of online banking in Finland in the light of the technology acceptance model (TAM) added with new variables derived from online banking acceptance literature on one hand and from a focus group interview with bank managers on the other. The model we developed proposed that online banking acceptance can be modelled with the variables derived from the TAM (PU and PEOU) and four other variables referring to perceived enjoyment (PE), information on online banking, security and privacy, and the quality of the Internet connection. In the results section the model was tested with 268 Finnish consumers and revised. With the use of a factor analysis, five factors were identified suggesting that PU, PEOU, PE, information on online banking, and security and privacy have an impact on the acceptance of online banking. Thus, from the hypothesized model the factor referring to quality of Internet connection did not suite in the model. This might hint that speed and reliability of the Internet connection are not regarded as important owing to the fact that reliable Internet connections have become so common place among the respondents.

The results of the regression analysis conducted on the five factors indicate that PU and the amount of information on online banking were found to be the most influential factors explaining the use of online banking services. This finding refers to the fact that consumers use online banking for the benefits it provides in comparison to other banking delivery channels. This finding is in line with other

Table I The factor analysis

Variable	Factors				
	Perceived ease of use	Security and privacy	Perceived usefulness	Amount of information	Perceived enjoyment
I find it easy to do what I want to do in online bank	0.837				
Overall, I find an online bank easy to use	0.821				
My interaction with an online bank is clear and understandable	0.761				
Learning to use an online bank is easy for me	0.759				
It is easy for me to become skillful at using an online bank	0.622				
I find an online bank to be flexible to interact with	0.577				
I trust in the technology an online bank is using		0.928			
I trust in the ability of an online bank to protect my privacy		0.870			
I trust in an online bank as a bank		0.739			
Using an online bank is financially secure		0.726			
I am not worried about the security of an online bank		0.664			
Using an online bank enhances my effectiveness of utilizing banking services			0.736		
Using an online bank makes it easier for me to utilize banking services			0.687		
Using an online bank enables me to utilize banking services more quickly			0.676		
Using an online bank for my banking services increases my productivity			0.672		
Using an online bank improves my performance of utilizing banking services			0.655		
Overall, an online bank is useful for me to utilize banking services			0.582		
I have generally received enough information about online banks				0.818	
I have received enough information about the benefits of using an online bank				0.689	
Using an online bank is pleasant					0.774
Using an online bank is positive					0.614
Eigenvalue	3.628	3.467	3.058	1.412	1.209
Percentage of total variance explained	17.274	16.507	14.563	6.276	5.757

TAM studies (e.g. Davis, 1989; Davis *et al.*, 1989), which found that PEOU has less impact on technology acceptance than PU. This is explained with the fact that as users learn about PEOU, its impact becomes instrumental. In other words, PEOU impinges on acceptance through PU. The second influential factor indicates that while consumers get more information about online banking the more informative they become about the benefits it offers.

Perceived enjoyment (PE) was almost statistically significant variable in the model. Other studies have found controversial findings on the role of enjoyment on acceptance. Teo *et al.* (1999) for instance argue that enjoyment is related to the use of the Internet whereas Igbaria *et al.* (1995) found that enjoyment has no statistically significant effect on the acceptance of data processing systems.

Theoretical contributions

From a theoretical standpoint, the results presented contributed to the existing literature in a number of ways. First, the article makes a contribution to electronic banking literature by providing insights on the factors that seem to affect online banking acceptance. The results hint that information about online banking services and its benefits is a critical factor influencing the acceptance. Moreover, security and privacy were found to have a relatively weak relationship with the acceptance. This is in contrary to many banking studies conducted during the past years

Table II Regression analysis

Model summary					
	R	R^2	Adjusted R^2	Std error of the estimate	
Model	0.352[a]	0.124	0.093	0.867	
ANOVA model [b]					
	Sum of squares	df	Mean square	F	Sig.
Regression	15.273	5.000	3.055	4.064	0.002[a]
Residual	108.244	144.000	0.752		
Total	123.518	149.000			
Coefficients[a]					
	Unstandardized coefficients		Standardized coefficients		
	B	Std. error	Beta	t	Sig.
(Constant)	6.108	0.071		86.225	0.000
Perceived ease of use	0.070	0.075	0.074	0.940	0.349
Security and privacy	0.006	0.072	0.007	0.084	0.933
Perceived usefulness	0.239	0.076	0.247	3.151	0.002
Amount of information	0.181	0.079	0.178	2.283	0.024
Perceived enjoyment	0.136	0.079	0.134	1.716	0.088

Notes: [a]Predictors: (constant), perceived ease of use, security and privacy, perceived usefulness, amount of information, perceived enjoyment. [b]Dependent variable: online banking usage

Table III Correlation analysis

		Use	Perceived ease of use	Security and privacy	Perceived usefulness	Amount of information	Perceived enjoyment	Age	Gender	Income (brutto/month)
Use	Pearson correlation	1	0.092	0.018	0.258**	0.183*	0.152	0.078	−0.066	0.166*
	Sig. (two-tailed)		0.263	0.824	0.001	0.025	0.063	0.238	0.319	0.013
	n	232	150	150	150	150	150	229	232	223

Notes: *Correlation is significant at the 0.05 level (two-tailed); **correlation is significant at the 0.01 level (two-tailed)

(Roboff and Charles, 1998; Sathye, 1999; Hamlet and Strube, 2000; Polatoglu and Ekin, 2001; Black *et al.*, 2002; Giglio, 2002; Howcroft *et al.*, 2002). Secondly, the article contributes to the technology acceptance literature by suggesting that PU as well as perceived enjoyment (PE) were found to have some effect on technology acceptance (cf. Davis, 1989; Davis *et al.*, 1989; Teo *et al.*, 1999). Furthermore, we found that PU was more influential than PEOU in explaining technology acceptance.

Managerial contributions

The results of the study provide managers information about the planning of online banking Web sites and service selection. In the planning and development of online banking services, software developers should pay attention to informative content that is above all perceived useful and with relevant information and services. In the marketing process of online banking services marketing experts should accentuate the benefits its adoption provides. Banks should now concentrate in their advertising more to informative issues rather than in building only brands with less informative advertisements.

Limitations and further research

Although the results can be considered statistically significant in most parts, the study has several limitations that affect the reliability and validity of the findings. First of all, the regression model developed had relatively low coefficient. The second limitation concerns the sample. Although the sample size was quite large compared to sample sizes of other TAM studies, and representative, it consisted of Finnish consumers only. This has an effect on the generalization of the findings. The other limitation of this work concerns the measures for user acceptance. TAM studies have found that PU and PEOU are not the only predictors of technology acceptance. Legris *et al.* (2003) found that many TAM studies are not

consistent or clear and lack many significant factors that influence adoption. Partly on this basis, the original TAM has been extended for example by Venkatesh and Davis (2000) who introduced the second version of TAM, labelled TAM2 to explain how subjective norms and cognitive instrumental processes affect perceived usefulness and intentions (see also Venkatesh and Morris, 2000). On this basis, our model might also suffer from the fact that for example subjective norms and other possible factors influencing the acceptance of online banking were not included in the model.

These limitations pave the way to future studies. Furthermore, another interesting avenue for further research could be a detailed study on online banking usage in firms. We should also measure online banking acceptance with other possible factors derived from different sources of literature. An important area is to look more deeply on marketing literature and test acceptance with for instance innovation theory and the TPB.

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Appendix

Figure A1 Questionnaire

Questionnaire: Online banking

Use

I use online bank mainly

I do not use	at home	at work	at school	in a bank	in a library	in a friend's place	in another place	I do not know

On average I use online bank _____ times in a month

On average I do _____ transactions at a time

How often you use the following online bank services?

	Almost never 1	2	3	4	Almost always 5	I do not know
a) Primary current accounts						
b) Credit-based services						
c) Investment-based services						
d) Insurance-based services						

	Totally disagree 1	2	3	4	Totally agree 5	I do not know
Internet connection						
My internet connection is fast						
My internet connection is reliable						
Amount of information						
I have generally received enough information about online banks						
I have received enough information about the benefits of using an online bank						

I have received information about using an online bank from

a bank	a phone bank	the internet	a friend	an advertisement	another source	I do not know

	Totally disagree 1	2	3	4	Totally agree 5	I do not know
Perceived Usefulness						
Using an online bank enables me to utilize banking services more quickly						
Using an online bank improves my performance of utilizing banking services						
Using an online bank for my banking services increases my productivity						
Using an online bank enhances my effectiveness of utilizing banking services						
Using an online bank makes it easier for me to utilize banking services						
Overall, an online bank is useful for me to utilize banking services						
Perceived Ease of Use						
Learning to use an online bank is easy for me						
I find it easy to do what I want to do in online bank						

(*continued*)

Figure A1

	Totally disagree 1	2	3	4	Totally agree 5	I do not know
My interaction with an online bank is clear and understandable	☐	☐	☐	☐	☐	☐
I find an online bank to be flexible to interact with	☐	☐	☐	☐	☐	☐
It is easy for me to become skillful at using an online bank	☐	☐	☐	☐	☐	☐
Overall, I find an online bank easy to use	☐	☐	☐	☐	☐	☐
Perceived Enjoyment						
Using an online bank is fun	☐	☐	☐	☐	☐	☐
Using an online bank is pleasant	☐	☐	☐	☐	☐	☐
Using an online bank is positive	☐	☐	☐	☐	☐	☐
Using an online bank is exciting	☐	☐	☐	☐	☐	☐
Using an online bank is wise	☐	☐	☐	☐	☐	☐
Security and Privacy						
Using an online bank is financially secure	☐	☐	☐	☐	☐	☐
I trust in the ability of an online bank to protect my privacy	☐	☐	☐	☐	☐	☐
I trust in the technology an online bank is using	☐	☐	☐	☐	☐	☐
I trust in an online bank as a bank	☐	☐	☐	☐	☐	☐
I am not worried about the security of an online bank	☐	☐	☐	☐	☐	☐
Matters of security have no influence on using an online bank	☐	☐	☐	☐	☐	☐

	Nordea	Sampo	Osuus-pankki	Säästö-pankki	Han-dels-banken	Aktia	Paikallis-osuus-pankki	Other
My Bank	☐	☐	☐	☐	☐	☐	☐	☐

Age _____ years

Gender **MALE** ☐ **FEMALE** ☐

Income (before tax/month) below 500€ ☐ 501-2000€ ☐ above 2000€ ☐

Thank You!