The influence of external variables on intentions to adopt mobile banking: A comparison between Portugal and Finland

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Abstract

This paper explores the influence of external variables such as demographics, past user experience, consumer traits, system characteristics, facilitating conditions, and country effect, on online bank customers' intentions to use mobile banking services. The authors develop hypotheses based on the earlier literature and test them on a large data with 2.482 effective responses collected from Portugal and Finland. The results show that past user experience is the most significant determinant of the phenomenon in the overall data, while significant country differences exist.

Keywords: *mobile banking, adoption, intention to use, Finland, Portugal*

Track: New Technologies and E-Marketing

1. Introduction

Online banking applications are gaining ground in Europe. On average in EU27 countries, already 36 percent of the population use internet for their banking transactions (Eurostat 2011). Indeed, internet banking innovation has diffused well in many countries and studies indicate high user satisfaction (Pikkarainen et al. 2006). The success of internet banking and wide penetration of mobile phones have encouraged banks to develop banking application also for mobile devices. Besides fund transfer between accounts these services today enable bank customers to make buy and sell orders on the stock exchange and to receive portfolio and price information over the internet. The true value of mobile banking for bank customers is in its immediate location-free access to banking services enabling time savings, real-time information, and enhanced feelings of control (Laukkanen and Lauronen 2005; Laukkanen 2007). However, it appears that mobile banking is yet to receive the attention of the masses. This is challenging for the banks as a great number of customers should use these services in order to produce a return on investment (Lee and Chung 2009).

This paper deals with the characteristics that determine mobile banking non-users' intentions to adopt the innovation. In the literature, behavioral intention to use refers to an individual's subjective probability of performing a specified behavior, and is argued to determine actual usage behavior (e.g. Ajzen & Fishbein 1980). The concept is traditionally related to the Theory of Reasoned Action (Fishbein & Ajzen 1975) and its extensions Theory of Planned Behavior (Ajzen 1985; 1991) and Technology Acceptance Model (Davis 1989; Davis et al. 1989). The TAM model has received remarkable attention in the information technology adoption literature, and has been further developed and expanded, probably the most notable extensions being the TAM2 (Vankatesh and Davis 2000; Venkatesh 2000) and the Unified Theory of Acceptance and Use of Technology UTAUT (Venkatesh et al. 2003). The most recent notable upgrade called TAM3 has been presented by Venkatesh and Bala (2008).

The basic idea of these models is that the behavioral intention to act in a certain way derives from personal attitudes, subjective norm, and perceived behavioral control. In the context of technological innovations the key direct antecedents of intentions are suggested to be perceived usefulness of the technology and perceived ease of use. All of these models identify a number of 'external variables' that they claim to have indirect, mediation or moderator effect on intentions and actual behavior. These external variables include items such as individual differences (demographics and/or personality variables), characteristics of the actual technology system, social influence, facilitating conditions, and previous experience (Venkatesh et al. 2003; Venkatesh & Bala 2008). Support exists for the indirect effects of external variables on behavioral intention, but direct effects have also been frequently found (Bagozzi et al. 2002). In this paper we test the direct influence of various external variables on mobile banking non-users' intentions to adopt the service in Portugal and Finland.

2. Earlier literature and hypotheses development

The influence of demographics on electronic banking adoption (e.g. Cruz et al. 2010; Karjaluoto et al. 2002; Laukkanen et al. 2007; Laukkanen & Pasanen 2008) and intentions to use mobile services (e.g. Meuter et al. 2003; Nysveen et al. 2005ab) has been widely studied in the earlier literature. Gender is one of the most studied demographic characteristics and studies evince a male predominance among users of mobile banking services (Laforet & Li 2005; Laukkanen & Pasanen 2005; Suoranta & Mattila 2004). Thus we hypothesize:
H1: Gender has a significant effect on behavioral intention (BI) to use mobile banking (MB)

The earlier literature evince that older individuals have lower interest in technology-based services (Gilly & Zeithaml 1985; Oumlil & Williams 2000) and have more resistance to internet and mobile banking services (Laukkanen et al. 2007; Mattila et al. 2003) than other bank customers. Laukkanen and Pasanen (2008) argue that a typical mobile banking user is more likely to be middle-aged (30-49 years old) and same pattern is found in China (Laforet & Li 2005), and in Brazil (Cruz et al. 2010). Thus we hypothesize:

H2: Age has a significant effect on BI to use MB

Household income and education have been pointed to have significant impacts on the adoption of internet banking services (Karjaluoto et al. 2002; Mattila et al. 2003). For example, the earlier literature argues that higher earnings (Al-Ashban & Burney 2001; Lockett & Littler 1997; Polatoglu & Ekin 2001) explain the use of electronic banking. Moreover, a greater level of education may lead to a greater understanding and ability regarding self-service technologies (Meuter et al. 2003) and lower perceptions on complexity of innovations. Accordingly we hypothesize:

H3: Household income has a significant effect on BI to use MB
H4: Level of education has a significant effect on BI to use MB

The influence of past user experience have been highlighted in the latest behavioral intention models (Venkatesh et al. 2003; Venkatesh & Bala 2008). For example Venkatesh and Bala (2008) suggest that a user will have more information on how easy or difficult the system is to use with increasing hands-on experience with the a system. Indeed, consumers are likely to adopt a technology offering similar functions to those already adopted (Bigne et al. 2005). On the other hand, consumers exposed to technology are more likely to have a positive attitude towards new electronic channels (Dholakia & Uusitalo 2002; Lohse et al. 2000). Bigne et al. (2005) found that the longer the experience as an internet purchaser the greater the probability of turning into a mobile services adopter. The same pattern was found in internet and mobile banking usage (Teo & Pok 2003). Hence we hypothesize:

H5: Previous experience on mobile services has a significant effect on BI to use MB

Consumer traits have evinced to have a direct influence on intention to use new technology (e.g. Lee et al. 2010). In mobile services context consumer mobility can be seen as one of such trait. Teo and Pok (2003) argue that individuals who have a busy life and who are always on the move may be more likely to adopt a mobile phone with internet access compared to those having more sedentary lifestyle. We draw two hypotheses:

H6: Mobility at work (H7: free time) has a significant effect on BI to use MB
H7: Mobility in free time has a significant effect on BI to use MB

System characteristics such as menus, icons and touch screens are argued to influence in the technology acceptance (Davis et al. 1989). In case of mobile devices, input and output mechanisms are argued to impede the development of user-friendly interfaces for mobile services (Siau & Shen 2003). Handheld devices are typically small, making text and graphics more difficult to work out and the data input more laborious compared to personal computers (Bruner & Kumar 2005). These handheld devices include traditional cell phones and other more advanced handheld devices such as Personal Digital Assistants (PDAs) and enhanced alphanumeric communicators which supplement mobile telephones, thus expanding the devices available for m-commerce transactions (Dholakia & Dholakia 2004). These advanced devices have enhanced data input and output mechanisms deriving from larger keypads, color screens and touch screens better supporting the use of mobile services. Thus we hypothesize:

H8: Type of device has a significant effect on BI to use MB

Facilitating conditions is suggested to have an effect on technology acceptance (e.g. Venkatesh et al. 2003). One such condition is the financial resources necessary to use the system. In mobile services context there is research evidence suggesting that depending on who pays consumer's mobile phone bill the mobile service usage may be different. For example, it is argued that those people whose phone bill is paid by their employer use mobile services the most (Aarnio et al. 2002). Thus we hypothesize that:
H9: The fact that who pays the phone bills has a significant effect on BI to use MB

The effect of culture or country has been rarely studied in technology acceptance. Given the fact that a large differences in the diffusion of internet banking exist among the EU27 countries, the share in Portugal and Finland being 19 and 76 percent respectively (Eurostat 2011), we hypothesize that intention to use mobile banking is significantly higher among the Finns compared to Portuguese bank customers.
H10: Intention to use MB is significantly higher in Finland than in Portugal

3. Data, methods and results

The questionnaires both in Finland and Portugal were placed in a log-out page of large banks' online service. A total number of 2.482 effective responses from mobile banking non-users were received of which 1258 (50.7%) were from Portugal and 1224 (49.3%) from Finland. The dependent variable is a binary/dichotomous variable in which 0 represents bank customers with no intentions to adopt mobile banking and 1 corresponds to those customers who claim to have adoption intentions.

In the analysis phase stepwise logistic regression with forward conditional method was used. This means that the choice of predictive items is carried out by an automatic procedure, which starts with no items in the model and continues by trying the items one at a time and including statistically significant items in the order of statistical significance. Following the SPSS default settings the entry limit was set to a significance level of 0.05 and the removal from the model was set to 0.10 level. The results of the overall model show that seven out of the ten hypothesized variables have a significant effect, the most significant predictor of the phenomenon being the previous usage experience of mobile services like e.g. purchase of ring tones or ticket booking, supporting H5. This is followed by country as the second most significant determinant. We hypothesized that Finns, as one of the leading nations in terms of online banking adoption rates, would outdo Portuguese in their intentions to adopt mobile banking. However, the results show the opposite as the Finns have likelihood of 0.684 to adopt mobile banking when compared to Portuguese. This means that Portuguese have 1.462 times higher likelihood (1/Expβ) to adopt mobile banking than Finns. Thus, H10 is rejected.

Gender appears to be the third most important determinant indicating that males have nearly 1.3 times higher likelihood to adopt mobile banking compared to females. Similarly, the results show that those bank customers having an advanced mobile phone (e.g. multimedia phone or a PDA), and those whose phone bill is paid by someone else than the respondent oneself, have nearly 1.3 times higher likelihood to adopt mobile banking services compared to (respectively) those having a basic phone or who pay their bills by themselves. Finally, consumer mobility seems to have a significant effect, the results showing that those travelling a lot in work and in a free time have greater intention in mobile banking adoption. Therefore hypotheses 1, 6, 7, 8, and 9 are supported (Table 1).

Table 1: Logistic regression analysis – overall sample

	β	S.E.	Wald	Sig.	Exp(β)
Gender (Female)*					
Male	0.257	0.086	8.900	p=0.003	1.293
Type of device (Basic)*					
Advanced (e.g. multimedia phone or PDA)	0.249	0.092	7.300	p=0.007	1.282
Who pays the bill? (Myself)*					
Company, institution, other	0.255	0.106	5.791	p=0.016	1.290
Previous mobile service usage experience (No)*			19.252	p<0.001	
Yes, tried once	0.264	0.118	5.001	p=0.025	1.302
Yes, used more than once	0.435	0.102	18.079	p<0.001	1.545
I travel and move about a lot in my work	0.043	0.025	2.826	p=0.093	1.043
I travel and move about a lot in my free time	0.057	0.026	4.758	p=0.029	1.059
Country (Portugal)*					
Finland	-0.380	0.090	17.917	p<0.001	0.684

Note: -2 Log likelihood=3342.030; Cox & Snell R²=0.038; Nagelkerke R²=0.051; CI (%) = 51.3 → 58.2

As the country appeared to be highly significant determinant in the overall model, we explore both of the subsamples in separate models. Among the Portuguese bank customers age seem to be the most significant predictor for mobile banking adoption intentions, giving partial support to H2. The youngest age group being the reference, all the other age groups show negative β in relative to the reference group. This means that the age group of 18-25 years has the highest likelihood for mobile banking adoption. However, it should be noted that the difference is statistically significant only when compared the oldest age group (> 56 years old) to the youngest so that the oldest age group has a likelihood of 0.438 to adopt mobile banking compared to the 18-25 year-olds. As in the overall sample, gender appears to be a significant determinant also in the Portuguese subsample; the males having 1.364 times higher likelihood for mobile banking adoption compared to females. Finally, among Portuguese, travelling a lot in free time determines intentions for mobile banking adoption but work travelling does not have an effect (Table 2).

Table 2: Logistic regression analysis – Portugal subsample

	β	S.E.	Wald	Sig.	Exp(β)
Gender (Female)*					
Male	0.311	0.118	6.909	p=0.009	1.364
Age (18 – 25 years)*			11.022	p=0.026	
26 – 35 years	-0.051	0.209	0.060	p=0.807	0.950
36 – 45 years	-0.072	0.222	0.105	p=0.746	0.931
46 – 55 years	-0.092	0.262	0.122	p=0.727	0.912
> 56 years	-0.826	0.296	7.793	p=0.005	0.438
I travel and move about a lot in my free time	0.096	0.034	7.949	p=0.005	1.101

Note: -2 Log likelihood=1713.039; Cox & Snell R²=0.019; Nagelkerke R²=0.026; CI (%) = 53.5 → 55.6

In case of the Finnish subsample, previous mobile service usage experience appears to be the most significant determinant followed by the type of device. The results show that those bank customers who have once tried some kind of mobile services and those who have used some mobile services more than once, have 1.472 and 1.609 times higher likelihood respectively for mobile banking adoption than those who have never tried any mobile services. Moreover, those bank customers having an advanced mobile phone compared to those having a basic mobile phone, have 1.659 times greater likelihood to adopt mobile banking services. Finally,

as in the two previous models, gender is a significant determinant of mobile banking adoption intentions. The results evince that in Finland males have 1.333 times higher likelihood for mobile banking adoption compared to females (Table 3).

Table 3: Logistic regression analysis – Finland subsample

	β	S.E.	Wald	Sig.	$Exp(\beta)$
Gender (Female)*					
Male	0.287	0.125	5.297	p=0.021	1.333
Type of device (Basic)*					
Advanced (e.g. multimedia phone or PDA)	0.506	0.146	12.023	p=0.001	1.659
Previous mobile service usage experience (No)*			13.677	p=0.001	
Yes, tried once	0.387	0.154	6.329	p=0.012	1.472
Yes, used more than once	0.475	0.138	11.833	p=0.001	1.609
I travel and move about a lot in my work	0.078	0.032	6.026	p=0.014	1.081

Note: -2 Log likelihood=1627.896; Cox & Snell R²=0.040; Nagelkerke R²=0.054; CI (%) = 56.2 → 59.5

5. Discussion

This paper explored the influence of external variables on online bank customers' intention to adopt mobile banking services. Data from two European countries, namely Portugal and Finland were collected. The overall data and country-specific subsamples were tested. The results evince that gender is a significant determinant of mobile banking adoption intention in all the models. In addition, age is highly significant predictor in Portugal while in Finland past usage experience and system characteristics, like the type of device, have a significant role. Whereas in Portugal leisure time traveling determines adoption intentions, in Finland the traveling is related to work. Contradictory to some earlier findings, household income and level of education appear to have no influence in mobile banking adoption intentions.

References

Aarnio, A., Enkenberg, A. Heikkilä, J. & Hirvola, S. (2002). Adoption and use of mobile services: Empirical evidence from a Finnish survey. Proceedings of the 35th Hawaii International Conference on System Sciences, Big Island, Hawaii, USA.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl, & J. Beckmann (Eds.), Springer series in social psychology (pp. 11-39). Berlin: Springer.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50 (2), 179-211.

Ajzen, I. & Fishbein, M. (1980). Understanding attitudes and predicting social behavior, Englewood Cliffs, NJ: Prentice-Hall

Al-Ashban, A.A. & Burney, M.A. (2001). Customer adoption of tele-banking technology: The case of Saudi Arabia. International Journal of Bank Marketing, 19 (5), 191-200.

Bagozzi, R.P., Gürhan-Canli, Z. & Priester, J.R. (2002). The social psychology of consumer behavior. Philadelphia: Open University Press.

Bigne, E., Ruiz, C. & Sanz, S. (2005). The impact of internet user shopping patterns and demographics on consumer mobile buying behaviour. Journal of Electronic Commerce Research, 6 (3), 193-209.

Bruner II, G.C. & Kumar, A. (2005). Explaining consumer acceptance of handheld internet devices. Journal of Business Research, 58 (5), 553-558.

Cruz, P., Filgueiras, L., Muñoz-Gallego, P. & Laukkanen, T. (2010). Mobile banking rollout in emerging markets: Evidence from Brazil. International Journal of Bank Marketing, 28(5), 342-371.

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology, MIS Quarterly, 13 (3), 319–340.

Davis, F.D., Bagozzi, R.P. & Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. Management Science. 35, 982–1003

Dholakia, R.R. & Dholakia, N. (2004). Mobility and markets: emerging outlines of m-commerce. Journal of Business Research, 57 (12), 1391-1396.

Dholakia, R. & Uusitalo, O. (2002). Switching to electronic stores: Consumer characteristics and the perception of shopping benefits. International Journal of Retail and Distribution Management, 30 (10), 459-469.

Eurostat (2011). "Individuals using the Internet for internet banking". Available at url: http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/dataset?p_product_code=TIN00099

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.

Gilly, M., & Zeithaml, V. (1985). The Elderly Consumer and Adoption of Technologies. Journal of Consumer Research, 12, 353-357.

Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E. (2010). Multivariate Data Analysis, 7th edition, Upper Saddle River, New Jersey: Prentice Hall.

Karjaluoto, H., Mattila, M. & Pento, T. (2002). Factors underlying attitude formation towards online banking in Finland. International Journal of Bank Marketing, 20 (6), 261–272.

Laforet, S. & Li, X. (2005). Consumers' attitudes towards online and mobile banking in China. International Journal of Bank Marketing, 23 (5), 362-380.

Laukkanen, T. (2007), Internet vs mobile banking: comparing customer value perceptions. Business Process Management Journal, 13 (16), 788-797.

Laukkanen, T. & Lauronen, J. (2005). Consumer value creation in mobile banking services. International Journal Mobile Communications, 3 (4), 325-338.

Laukkanen, T. & Pasanen, M. (2008). Mobile banking innovators and early adopters: How they differ from other online users? Journal of Financial Services Marketing, 13 (2), 86-94.

Laukkanen, T., Sinkkonen, S., Kivijärvi, M. and Laukkanen, P. (2007). Innovation resistance among mature consumers. Journal of Consumer Marketing, 24 (7), 419-427.

Lee, H.-J., Cho, H.J., Xu, W. & Fairhurst, A. (2010). The influence of consumer traits and demographics on intention to use retail self-service checkouts. Marketing Intelligence & Planning, 28 (1), 46-58.

Lee, K.C. & Chung, N. (2009). Understanding factors affecting trust in and satisfaction with mobile banking in Korea: a modified DeLone and McLean's model perspective. Interacting with Computers, 21, 385-392.

Lockett, A. & Littler, D. (1997). The adoption of direct banking services. Journal of Marketing Management, 13 (8), 791-811.

Lohse, G., Bellman, S. & Johnson, E. (2000). Consumer buying behaviour on the Internet: Findings from panel data. Journal of Interactive Marketing, 14 (1), 15-29.

Mattila, M., Karjaluoto, H. & Pento, T. (2003). Internet banking adoption among mature customers: early majority or laggards? Journal of Services Marketing, 17 (5), 514-28.

Meuter, M.L., Ostrom, A.L. Bitner, M.J. & Roundtree, R. (2003). The influence of technology anxiety on consumer use and experiences with self-service technologies. Journal of Business Research, 56(11), 899-906.

Nysveen, H., Pedersen, P.E. & Thorbjornsen, H. (2005a). Intentions to use mobile services: Antecendents and cross-service comparisons. Journal of the Academy of Marketing Science, 33 (3), 330-343.

Nysveen, H., Pedersen, P.E. & Thorbjørnsen, H. (2005b). Explaining intention to use mobile chat services: Moderating effects of gender. Journal of Consumer Marketing, 22 (5), 247-256.

Oumlil, A., & Williams, A. (2000). Consumer education programs for mature consumers. Journal of Services Marketing, 14 (3), 232-243.

Pikkarainen, K., Pikkarainen, T., Karjaluoto, H. & Pahnila, S. (2006). The measurement of end-user computer satisfaction of online banking services: empirical evidence from Finland. International Journal of Bank Marketing, 24 (3), 158-172.

Polatoglu, V.N. & Ekin, S. (2001). An empirical investigation of the Turkish consumers' acceptance of Internet banking services. International Journal of Bank Marketing, 19 (4), 156-165.

Siau, K. & Shen, Z. (2003). Mobile communications and mobile services. International Journal of Mobile Communications, 1 (1/2), 3-14.

Suoranta, M & Mattila, M. (2004). Mobile banking and consumer behaviour: New insights into the diffusion pattern. Journal of Financial Services Marketing, 8 (4), 354-366.

Teo, T. & Pok, S. (2003). Adoption of WAP-enabled mobile phones among Internet users. Omega, 31, 483–498.

Venkatesh, V. & Davis, F.D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46 (2), 186–204.

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. Information systems research, 11, 342–365.

Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27 (3), 425–478.

Venkatesh, V. & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. Decision Sciences, 39 (2), 273–315.