

What determines mobile banking non-adoption?

*Tommi Laukkanen, University of Eastern Finland, tommi.laukkanen@uef.fi
Pedro Cruz, ISG- Business School, pedrocruz@isg.pt*

Abstract

This study examines those variables that determine mobile banking non-adoption among retail banking customer. Two large data sets were collected from Finland and Portugal. By leaning on the earlier literature on online banking in general and mobile banking in particular, we included a set of independent variables to a logistic regression model to predict mobile banking usage and non-usage. The results suggest that innovation resistance has a significant role in mobile banking non-adoption. In addition the type of device and earlier mobile service usage experience have a highly significant effect on the mobile banking non-usage behavior. The results show that among demographics only gender has a significant effect on differentiating between mobile banking users and non-users, while age, household income, and level of education have a non-significant effect.

Keywords: Mobile banking, consumer resistance, non-adoption

What determines mobile banking non-adoption?

Introduction

Concerning the nature of its functions and services, the banking sector is relatively open to innovative technologies. This may be due to the fact that competition has increased and banks have recognized the importance to differentiate themselves from other financial institutions by offering services online via different distribution channels (Gan *et al.*, 2006). On the other hand online banking services provide cost saving opportunities for banks and value added for customers (Laukkanen *et al.*, 2007). The wide penetration and rapid diffusion of mobile phones has opened mobile service opportunities for the banks. Indeed, value-adding mobile services are becoming increasingly important in gaining a competitive edge in the marketplace (Wang *et al.*, 2006). Currently mobile banking offers financial transactions and information services such as viewing account balances, making transfers between accounts, or paying bills by using a mobile device like cell phone, PDA, or a smartphone. Previous studies have shown that mobile banking users perceive that it increases efficiency and convenience in bill paying, for example, as the service can be used wherever wanted enabling time savings and immediate reactions to unexpected service need (Laukkanen, 2007). Despite the rapid rollout of mobile services over the past decade, mobile transactions, including mobile banking and payments, have not been used as much as expected (Kleijnen *et al.*, 2007). Despite certain prognoses claiming a resounding success, it has become clear that the real usage of financial mobile applications lags way behind the projected scenarios (Walden *et al.*, 2007). Basic mobile services (SMS, MMS, music downloads, games and news services) are popular in Europe (Mylonopoulos and Doukidis, 2003; Carlsson *et al.*, 2006); however, more advanced services, such as mobile banking, have yet to find their way into the everyday lives of consumers (Walden, 2007). Thus more research is needed in order to better understand what determines non-adoption behaviour in this context.

The diffusion perspective, including the motivating factors of adoption and characteristics of innovation adopters has up until now represented the mainstream of the literature on innovations (Gatignin and Robertson, 1985; 1991; Ram, 1987), while at the same time, the reasons that hamper or postpone the diffusion of an innovation appear to have been somewhat neglected in the academic literature (Bradley and Stewart, 2002). It is argued that resistance may occur even in the case of successful innovations (Ram, 1987; 1989). In addition, even though adoption and resistance may also coexist, before adoption may begin the initial resistance must first be overcome (Ram, 1987). Thus, in order to reduce the possibility of product failures, it is of essence for managers and firms in general to identify the sources of resistance to innovations (Ram, 1989). Besides practical interests, resistance as a phenomenon also raises academic significance to understand those individuals who resist innovations and the reasons that slow down the adoption process. Thus the objective of this study is to identify those variables that explain mobile banking non-adoption behaviour. A set of variables related to innovation resistance, consumer demographics and other background variables were derived from the earlier literature and inputted as independent variables in logistic regression analysis. In the following these variables are explained in more in-depth.

Independent variables and hypotheses development

The earlier literature has explained resistance through two constructs, habit or satisfaction with an existing behaviour and perceived risks associated with innovation adoption (Sheth,

1981). Consequently Ellen *et al.* (1991) note that satisfaction with current performance increases resistance to alternatives and reduces the likelihood of adoption. Perceived risks, for their part, derive from physical, social or economic consequences, performance uncertainty and perceived side effects of the innovation (Sheth, 1981). As a part of the risk barrier, Ellen *et al.* (1991) emphasize the role of perceived self-efficacy, being the perceived ability or skill to successfully perform a given task, in consumer resistance to technological innovations. These views assume that resistance derives from two constructs: perceived benefits over existing methods and perceived risks associated with innovation adoption. Ram and Sheth (1989) explain consumer resistance through five distinct barriers namely usage, value, risk, tradition and image, providing a more comprehensive view to the phenomenon. Leaning on earlier studies on internet and mobile banking resistance (Kuisma *et al.*, 2007; Laukkanen *et al.*, 2007; 2008), this study also follows the consumer resistance typology suggested by Ram and Sheth (1990). Referring to the discussion above we hypothesise that:

H1: Usage, value, risk, tradition and image barriers determine mobile banking non-adoption behaviour

The impact of demographics on electronic services adoption has been extensively studied in the past (Harrison and Rainer, 1992; Karjaluoto *et al.*, 2002; Cruz *et al.*, 2009, 2010ab; Nysveen *et al.*, 2005ab; Meuter *et al.*, 2005; Laukkanen *et al.*, 2007; Laukkanen and Pasanen, 2008). Studies focusing on new technologies adoption refer to a predominance of male, younger, more educated and having a higher income, when compared to those who do not adopt innovations (Darian, 1987; Dickerson and Gentry, 1983; Labay and Kinnear, 1981; Sim and Koi, 2002; Venkatraman, 1991).

Gender is one of the most studied demographic characteristics in electronic services context. When compared to women, male perceive less risk in online business activities (Garbarino and Strahilevitz, 2004; Nysveen *et al.*, 2005ab; Venkatesh *et al.*, 2003). Males tend to evaluate mobile commerce more positively than women (Yang, 2005) and this attitude might be related to a greater valuation of non-store shopping in general (Markus and Kitayama, 1991; Citrin *et al.*, 2003). Some studies evidence a male preponderance among users of mobile banking services (Flinders, 2008; Laforet and Xiaoyan, 2005; Laukkanen and Pasanen, 2008; Suoranta and Mattila, 2004). Consequently we hypothesize:

H2: Gender determines mobile banking non-adoption behavior

Previous findings show that older individuals have lower propensity for adopting new technology-based services (Gilly and Zeithaml, 1985; Oumlil and Williams, 2000). Indeed, earlier studies (Mattila *et al.*, 2003; Laukkanen *et al.*, 2007) have shown that mature customers have more resistance to internet and mobile banking services than other bank customers. Laukkanen and Pasanen (2008) argue that a typical Finnish mobile banking user is more likely to be middle-aged (30-49 years old) and same pattern could be found for China (Laforet and Xiaoyan, 2005), Japan (Flinders, 2008) and Brazil (Cruz *et al.*, 2010a). Thus we hypothesize:

H3: Age determines mobile banking non-adoption behavior

Household income and education have been pointed to have significant impacts on the adoption of internet banking services (Karjaluoto *et al.*, 2002b; Mattila *et al.*, 2003). A greater level of education could lead to a greater understanding and ability regarding self-service technologies (Meuter *et al.*, 2005) and lower perceptions on complexity of innovations. On the other hand, a higher household income could also represent, simultaneously, greater time-saving motivations to use mobile services, as well as upturn

opportunities for accessing updated devices, such as mobile ones (Meuter *et al.*, 2005). Accordingly we hypothesize:

H4: Household income determines mobile banking non-adoption behavior

H5: Level of education determines mobile banking non-adoption behavior

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 on new electronic channels (Modahl, 2000; Dholakia and 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 between the frequency of Internet banking use and mobile banking services usage (Teo and Pok, 2003). Hence we hypothesize:

H6: Lack of previous experience on mobile services determines mobile banking non-adoption behavior

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 and Kumar, 2005). These handheld devices include traditional cell phones and other 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 and Dholakia, 2004). These devices usually have enhanced data input and output mechanisms deriving, for instance, from larger keypads, color screens and touch screens better supporting the use of mobile services. We hypothesize that:

H7: Type of device determines mobile banking non-adoption behavior

Finally, there is research evidence suggesting that depending on who pays consumer's mobile phone bill the mobile service usage may be different. For example, Aarnio *et al.* (2002) argue that those people whose phone bill is paid by their employer use mobile services the most. Thus we hypothesize that:

H8: The fact who pays the phone bills determines mobile banking non-adoption behavior

Data and methods

The questionnaire was first designed in Finnish and thereafter translated to English. The English questionnaire was then translated to Portuguese. The questionnaires both in Finland and Portugal were placed in a log-out page of large banks' online service. After removing cases with missing values and those respondents under the age 18 and those who do not own a mobile phone, a total number of 3228 effective responses were received.

Logistic regression analysis with backward stepwise selection procedure was used, with the cut-off statistical significance selected at the 0.10 level. The target (dependent) variable is a binary/dichotomous variable in which 0 = mobile banking user and 1 = mobile banking non-user. The independent variables included 18 resistance items, measured with seven-point *Likert* scale ranging from totally disagree (1) to totally agree (7), that were categorized under usage, value, risk, tradition and image barriers as suggested by Laukkanen *et al.* (2007). In addition, gender, age, household income, level of education, previous mobile service experience, type of device, and "who pays the bill" were included in the model as independent categorical variables.

Results

The results show that all the five adoption barriers have significant influence on mobile banking non-user behavior supporting hypothesis H1. Out of the 18 original items only five were not in the final logistic model. However, it seems that among demographic variables, only gender has a significant effect, while age, household income, and level of education were removed from the model (Table 1). Thus, H2 is supported but H3, H4 and H5 are rejected. In addition, the results show that previous experience on mobile banking services and type of device explain the phenomenon, supporting H6 and H7, but who pays the mobile phone bill does not seem to have an effect. Thus, H8 is rejected.

Table 1: Logistic regression results

	β	<i>S.E.</i>	<i>Wald</i>	<i>Sig.</i>	<i>Exp(β)</i>
Constant	-3.989	0.301	175.944	p<0.001	0.019
Usage barrier					
In my opinion, mobile banking services are easy to use (-)	0.457	0.057	63.121	p<0.001	1.579
In my opinion, the use of mobile banking services is convenient (-)	0.221	0.052	17.956	p<0.001	1.248
In my opinion, mobile banking services are fast to use (-)	-0.224	0.056	16.255	p<0.001	0.799
Value barrier					
The use of mobile banking services is economical (-)	0.159	0.038	17.633	p<0.001	1.173
In my opinion, mobile banking does not offer any advantage compared to handling my financial matters in other ways	0.390	0.031	155.817	p<0.001	1.477
In my opinion, the use of mobile banking services increases my ability to control my financial matters by myself (-)	0.214	0.038	31.745	p<0.001	1.239
Risk barrier					
I fear that while I am using mobile banking services, the battery of the mobile phone will run out or the connection will otherwise be lost	0.075	0.039	3.722	p=0.054	1.077
I fear that while I am using a mobile banking service, I might tap out the information of the bill wrongly	-0.146	0.042	12.233	p<0.001	0.864
I trust that while I am using mobile banking services, third parties are not able to use my account or see my account information (-)	0.094	0.035	7.135	p=0.008	1.099
Tradition barrier					
Patronizing in the banking office and chatting with the teller is a nice occasion on a weekday	-0.095	0.028	11.640	p=0.001	0.909
Image barrier					
I have a very positive image of mobile banking services (-)	0.294	0.051	33.140	p<0.001	1.342
In my opinion, new technology is often too complicated to be useful	-0.128	0.038	11.249	p=0.001	0.880
I have such an image that mobile banking services are difficult to use	0.101	0.042	5.894	p=0.015	1.106
Type of device					
Have you used any mobile service before (Yes, more than once)*			76.571	p<0.001	2.079
Have you used any mobile services before (Yes, once)	0.377	0.159	5.660	p<0.017	1.459
Have you used any mobile services before (No)	1.031	0.119	75.236	p<0.001	2.804
Gender	0.333	0.112	8.912	p=0.003	1.396

Note: -2 Log likelihood=2285.507; Cox & Snell R²=0.414; Nagelkerke R²=0.582; *Ref. Level: (-) rev. scale

The Wald statistic is commonly used to test the significance of the individual coefficient for each independent variable in a logistic regression model (Hair et al., 1998). In this case the Wald statistic shows how well the variable explains the difference between the groups of respondents. The Wald statistic show that the relative advantage, i.e. “mobile banking does not offer any advantage compared to handling financial matters in other ways”, has the

strongest effect in the model, followed by previous mobile service experience, ease of use, and type of device. Taking a closer look to the odds ratios [Exp(B)] the results show that, for instance, every time resistance due to the relative advantage increases one level on the 1 to 7 Likert scale, the likelihood of the respondent being a non-user increases nearly 1.5 times. Similarly, the odds of those who have no previous experience on mobile services or those who have used a mobile service only once being a mobile banking non-user are 2.804 and 1.459 times greater respectively than the odds of those who have more experience on mobile services in general. This indicates that if a bank customer has usage experience of some other mobile services, the likelihood of being a mobile banking user is significantly higher compared to those having no previous experience. In case of the type of device we had two categories of mobile phones, an advanced mobile phone such as a smartphone or PDA, and a basic mobile phone. The results show that those having a basic mobile phone have over 2 times greater likelihood of being a mobile banking non-user than those having an advanced mobile phone. Finally, the results indicate that the likelihood of a male being a mobile banking user is nearly 1.4 times greater compared to females.

Conclusions

The aim of the study was to identify factors explaining mobile banking non-usage behavior. The results show that the innovation resistance factors suggested by Ram and Sheth (1990) and further adapted to mobile banking context by Laukkanen *et al.* (2007) have a significant effect on mobile banking non-usage. Items such as ease-of-use and relative advantage turned out to have the most significant effect. This supports the earlier literature on Technology Acceptance and Innovation Diffusion by Davis (1989), Davis *et al.* (1989) and Rogers (2003). In addition, the results evinced that the type of device and earlier mobile service usage experience have a highly significant effect on the mobile banking non-usage behavior, while the thing who pays the bill appear not to have such a significant influence as the earlier literature suggests. Among the demographics it appears that only gender has a significant effect on the phenomenon while age, household income, and level of education had a non-significant effect. This supports the view that in the postmodern markets demographics may not explain differences between market segments (Firat *et al.* 1995, Firat & Shultz 1997).

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, 7-10 January 2002, Big Island, Hawaii, USA.
- 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.
- Bradley, L., Stewart, K., 2002. A Delphi study of the drivers and inhibitors of Internet banking. *International Journal of Bank Marketing* 20 (6), 250-260.
- Bruner II GC, Kumar A., 2005. Explaining consumer acceptance of handheld internet devices. *Journal of Business Research* 58(5), 553-558.
- Carlsson, C., Walden, P., Bouwman, H., 2006. Adoption of 3G+ services in Finland. *International Journal of Mobile Communication*, 4 (4), 369-385.
- Cruz, P., Laukkanen, T., Muñoz-Gallego, P., 2009. Exploring the factors behind the resistance to mobile banking in Portugal. *International Journal of E-Services and Mobile Applications*. 1(4), 16-35.
- Cruz, P., Filgueiras, L., Muñoz-Gallego, P., Laukkanen, T., 2010a. Mobile banking rollout in emerging markets. Evidence from Brazil. *International Journal of Bank Marketing*. 28 (5), in press.
- Cruz, P., Salo, J., Munoz-Gallego, P., Laukkanen, T. 2010b. Heavy users of e-banking and Customer Experience Management: evidences on intrinsic motivation. *International Journal of Electronic Business*, 8 (2), 187 - 209.
- Darian, J.C., 1987. In-Home Shopping: Are There Consumer Segments?. *Journal of Retailing*. 63 (2), 163–186.
- 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 (August), 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.
- Dickerson, M.D., Gentry, J.W., 1983. Characteristics of Adopters and Non Adopters of Home Computers, *Journal of Consumer Research*. 10 September. 225–235.

Ellen, P.S., Bearden, W.O., Sharma, S., 1991. Resistance to technological innovations: an examination of the role of self-efficacy and performance satisfaction. *Journal of the Academy of Marketing Science* 19 (4), 297-307.

Firat, A. F., Dholakia, N. & Venkatesh, A., 1995. Marketing in a postmodern world. *European Journal of Marketing*, 29 (1), 40-56.

Firat, A. F. & Shultz, J. C., 1997. From segmentation to fragmentation. *Markets and marketing strategy in the postmodern era. European Journal of Marketing*, 31 (3/4), 183-207.

Flinders, K., 2008. E-bank Japan sets mobile banking example. *Computer Weekly*, Retrieved October 14, 2008, from <http://www.computerweekly.com/Articles/2008/10/13/232634/e-bank-japan-sets-mobile-banking-example.htm>

Gan, C., Clemes, M., Limsombunchai, V., Weng, A., 2006. A Logit analysis of electronic banking in New Zealand. *International Journal of Bank Marketing* 24(6), 360-383.

Garbarino, E., Strahilevitz, M., 2004. Gender differences in the perceived risk of buying online and the effects of receiving a site recommendation. *Journal of Business Research*. 57. 768–775.

Gatignon, H., Robertson, T.S., 1985. A propositional inventory for new diffusion research. *Journal of Consumer Research* 11 (March), 849-867.

Gatignon, H., Robertson, T.S., 1991. Innovative decision processes. In: Robertson, T.S., Kassarian, H.H. (Eds.), *Handbook of Consumer Behavior*. Prentice-Hall. Englewood Cliffs, NJ, pp. 316-48.

Hair, J.F., Anderson, R.E., Tatham, R.L., Black, W.C., 1998. *Multivariate Data Analysis*, 5th edition, Prentice Hall, Upper Saddle River, New Jersey.

Harrison, A.W., Rainer, R.K., 1992. The influence of individual differences on skill in end-user computing. *Journal of Management Information Systems*. 9 (1). 93-111.

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.

Kleijnen, M., Ruyter, K., Wetzels, M., 2007. An assessment of value creation in mobile service delivery and the moderating role of time consciousness. *Journal of Retailing*. 83 (1). 33-46.

Kuisma, T., Laukkanen, T., Hiltunen, M., 2007. Mapping the reasons for resistance to Internet banking: A means-end approach. *International Journal of Information Management* 27 (2), 75–85.

Labay, D.G., Kinnear, T., 1981. Exploring the Consumer Decision Process in the Adoption of Solar Energy Systems. *Journal of Consumer Research*. 8 December. 271–278.

Laukkanen, T., 2007. Internet vs. mobile banking: comparing customer value perceptions. *Business Process Management Journal*, 13 (6), 788-797.

- Laforet, S., Xiaoyan, L., 2005. Consumers' attitudes towards online and mobile banking in China. *International Journal of Bank Marketing*. 23 (5). 362-380.
- 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., Laukkanen, P., 2007. Innovation resistance among mature consumers. *Journal of Consumer Marketing* 24 (7), 419-427.
- 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., Pentto, T., 2003. Internet banking adoption among mature customers: early majority or laggards? *Journal of Services Marketing*. 17 (5). 514-528.
- 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.
- Modahl, M., 2000. *Now or never*. Harper Collins: New York.
- Mylonopoulos, N. A., Doukidis, G. I., 2003. Introduction to the Special Issue: Mobile Business: Technological Pluralism, Social Assimilation, and Growth. *International Journal of Electronic Commerce*. 8 (1). 5-22.
- Nysveen, H., Pedersen, P.E., Thorbjørnsen, H., 2005a. Intentions to Use Mobile Services: Antecedents 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.
- Ram, S., 1987. A model of innovation resistance. *Advances in Consumer Research* 14, 208–212.
- Ram, S., 1989. Successful innovation using strategies to reduce consumer resistance: An empirical test. *Journal of Product Innovation Management* 6 (1), 20-34.
- Ram, S., Sheth, J.N., 1989. Consumer resistance to innovations: the marketing problem and its solutions. *Journal of Consumer Marketing* 6 (2), 5–14.
- Sim, L.L., Koi, S.M., 2002. Singapore's Internet Shoppers and Their Impact on Traditional Shopping Patterns. *Journal of Retailing and Consumer Services*. 9 (2). 115-124.
- Teo, T., Pok, S., 2003. Adoption of WAP-enabled mobile phones among Internet users. *Omega*. 31, 483–498.

Venkatraman, M. P., 1991. The Impact of Innovativeness and Innovation Type on Adoption. *Journal of Retailing*. 67 (1). 51–67.

Walden, P., Han, S., Carlsson, C., Majlender, P., 2007. The Sleeping Giant- A Longitudinal Study Surveying the Mobile Service Market in Finland. in Proceedings of the Fifteenth European Conference on Information Systems, Osterle, H. and Schelp, J., Winter R. Ed., pp-1875-1884, University of St. Gallen, St. Gallen, Switzerland. Available at URL: <http://is2.lse.ac.uk/asp/aspecis/20070179.pdf> retrieved January 19th, 2010.

Wang, Y.-S., Lin, H.-H. and Luarn, P. (2006), “Predicting consumer intention to use mobile service”, *Information Systems Journal*, Vol. 16 No. 2, pp. 157-179.

Yang, K., 2005. Exploring factors affecting the adoption of mobile commerce in Singapore. *Telematics and Informatics*. 22 (3). 257-277.