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AN EMPIRICAL ANALYSIS OF FACTORS AFFECTING THE ADOPTION OF ELECTRONIC BANKING IN MACEDONIA: A LOGIT MODEL

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Abstract

Although electronic banking has become an increasingly widespread banking channel in the world in the last years, its rate of adoption by the Macedonian retail banking customers remains still low. The purpose of this paper is to investigate the factors influencing the adoption of the electronic banking (e-banking) service of the biggest and leading Macedonian commercial bank - Komercijalna banka AD Skopje and to identify the key determinants among them. To achieve this goal we developed a binomial logit model. The findings indicate that the demographic factors, age and education, are the key determinants of adoption of e-banking by the retail customers of Komercijalna banka. Furthermore, the obtained results will have important practical implications for the Macedonian banking sector and also for the government since both will be aware of the key factors that should be taken into account to foster the usage of e-banking service and thus reaping out its benefits.

Keywords: customer behaviour, channels of distribution, electronic banking, logit model, Macedonian banking industry.

Topic Groups: Research methods, Marketing and consumer behavior, Technology and innovation management.

1 INTRODUCTION

The development of the banking industry has been significantly influenced by the evolution of the information technologies for over three decades (Chang, 2002; Gourlay & Pentecost, 2002; VanHoose, 2003). The information technology revolution in the banking industry has been most evident in the distribution channels from over-the-counter to introduction of the credit card and the automatic-teller-machine (ATM) in the early 1970s, telephone banking in the early 1980s, personal computer (PC) banking in the late 1980s and most recently electronic banking (e-banking). Daniel (1999) described electronic banking as the provision of banking services to customers through Internet technology. Karjaluoto (2002) indicated that banks have the choice to offer their banking services through various electronic distribution channels technologies such as Internet technology, video banking technology, telephone banking technology and WAP technology. However, Karjaluoto (2002) indicated that Internet technology is the main electronic distribution channel in the banking industry. In more details Karjaluoto (2000) described e-banking as an online banking that involves the provision of banking services such as accessing accounts, transferring funds between accounts, and offering an online financial services.

Despite the considerable diffusion of consumer internet banking in many countries to date, Macedonia is lagging far behind the European Union's average, but also the EU candidate countries in the use of the Internet for Internet banking (see Table 1).

Table 1: Use of Internet for Internet banking¹ in the EU and EU candidate countries (in % of individuals aged 16 to 74)

Country	2006	2007	2008	2009	2010
European Union (27 countries)	21	25	29	32	36
Croatia	na	9	13	16	20
Macedonia	0	na	3	4	4
Turkey	na	4	5	5	6

Source: Eurostat, Retrieved from World Wide Web on 25th November 2011 at [http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1\]&language=en&pcode=tin00099](http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1]&language=en&pcode=tin00099).

According to the latest data of the State Statistical Office of the Republic of Macedonia (Newsrelease No. 8.1.11.25 as of 21th October 2011), 10,8% of individuals aged 16 to 74 used Internet banking in the last 3 months before the survey i.e. in the first quarter of 2011.

On the other hand, the degree of Internet penetration in Macedonia as a measure of customer readiness to transact on-line, has significantly increased in the last five years. The percentage of Macedonian households who have Internet access from home has increased from 14% of households in 2006 to 55% of households in 2011 and the percentage of individuals aged 16 to 74 who are regularly using the Internet has grown from 21% to 50% of individuals aged 16-74 regularly using the Internet. A statistical analysis on supply-demand dynamics (Bughin, 2001) concludes that the degree of Internet penetration has a more than proportional effect when a country achieves a penetration of 30% of quarterly Internet usage. This means that in countries where this threshold has already been

¹ According to Eurostat Internet banking includes electronic transactions with a bank for payment etc. or for looking up account information.

surpassed, on-line banking usage will start to increase disproportionately. Similar findings are suggested by OECD research (Christiansen, 2001).

In order to grow to exploit the benefits of e-banking. Macedonian banks have to focus on increasing the consumer internet banking demand. To achieve that, they must gain an understanding of the key factors that influence consumer adoption and use of e-banking.

The purpose of this paper is to investigate the factors influencing the adoption of electronic banking (e-banking) by the retail customers of Komercijalna banka AD Skopje (KB) and to identify the key determinants among them by developing a binomial logit model.

KB is the biggest bank in Macedonia, its experience with e-banking adoption is likely to be representative of the adoption situation among the domestic banks in Macedonia. It was among the first banks in Macedonia to offer Internet banking services to retail customers in 2003. In the period 2007-2010 the number of users of e-banking service of KB significantly increased from 6,323 customers who used the service Internet Bank to 7,508 customers in 2010 which represents an increase of 18.74%. However, the fact that only 2% of all retail customers of KB use its service "Internet banka" points out that the development of the e-banking service is not sufficient alone to ensure its adoption by retail customers. A complex set of factors affect the adoption of the e-banking service. Thus, an understanding of the determinants of adoption of e-banking by Macedonian individuals should help the Bank's management to formulate marketing strategy for more efficient implementation of the service called "Internet banka".

The rest of the paper is organized as follows. After the Introduction section, a brief literature review of the prior research is presented in Section 2. The research methodology for the study is described in Section 3. Section 4 provides the estimation results and discussion of the findings. Finally, Section 5 includes conclusions and implications.

2 LITERATURE REVIEW

Turning to the literature dealing directly with factors affecting the adoption and use of Internet banking (Daniel, 1999; Sathye, 1999; Jayawardhena and Foley, 2000; Tan and Teo, 2000; Mattila, 2001; Polatoglu and Ekin, 2001; Chang, 2002; Karjaluoto et. al., 2002; Venkatesh et. al., 2003; Gerrard and Cunningham, 2003; Chinn and Fairlie, 2004; Choudrie and Lee, 2004; Pikkarainen et al., 2004; Choudrie and Dwivedi, 2005; So, Wong and Sculli, 2005; Dwivedi and Lal, 2007) we have identified a number of interrelated factors that affect the adoption and usage of electronic banking services. They are briefly presented below, followed by formulating a testable hypothesis for each factor.

Customer's age - Age affects the attitude of individuals towards Internet banking and their ability to learn how to use it. Barnett (1998) showed that the younger the consumers, the more comfortable they were in using electronic banking. Similarly, Karjaluoto et. al., (2002) demonstrated that electronic banking users were younger than non-electronic banking users. These findings imply that younger customers are more likely to adopt electronic banking:

H_1 : Younger customers (up to 35) are more likely to adopt e-banking.

Customer's income - Empirical findings of income positively influencing adoption of electronic banking can be found in Al-Ashban and Burney's (2001) and Karjaluoto's (2002) studies.

Higher paid customers, who have higher value of time than customers with lower income, are more likely to favour electronic banking.

H_2 : Higher paid customers are more likely to adopt electronic banking.

Education - Al-Ashban and Burney (2001) study showed that as consumers increased their educational qualification level, their adoption of electronic banking would increase as well. Bartel and Sicherman (1998) indicated that more educated individuals may require less training in response to technological change if their general skills enable them to learn the new technology. Consequently, well educated individuals will respond more quickly than less educated individuals when Internet banking is introduced.

H_3 : Well educated customers are more likely to adopt electronic banking.

Gender - a number of empirical studies (Venkatesh & Morris, 2000; Chen & Wellman, 2004; MacGregor & Vrazalic, 2005; Laukkanen & Pasanen, 2008) show that males are more likely than females to adopt e-service. This could be explained with the fact that men are more interested than women in technology, and they are also more tech savvy. Thus the following hypothesis can be formulated:

H_4 : Males are more likely to adopt the e-service than the females.

Security - Security refers to the ability to protect against potential threats. The results of the previous empirical studies (Miyazaki and Fernandez, 2001; Salisbury, 2001; Lee, 2009; Hua, 2009) have shown that the customers' decision to adopt the e-banking service is significantly influenced by their perception of the level of security control of the bank's website. Thus, the following hypothesis is formulated:

H_5 : Customers who do not perceive bank's web site as secure are less likely to adopt the e-banking service.

Fear of misuse of personal data - Some empirical studies (Miyazaki and Fernandez, 2001; Gefen et. al, 2003; Nissenbaum, 2004) have shown that online consumers might refrain from using online services because of the fear that their personal sensitive information may be misused (sold to third parties). As such the following hypothesis will be tested:

H_6 : Customers who are afraid that their personal data will be misused are less e likely to adopt this service.

Perceived ease of use - In the online context perceived ease of use was found to affect e-service adoption significantly, reflecting the importance of the role of the ease of use variable on adoption of e-services (Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Chau & Lai, 2003). Therefore the following hypothesis can be formulated:

H_7 : Customers who perceive e-banking as easy to use are more likely to adopt the e-banking service

Access to Internet from home – Access to Internet at home has been identified as one of the most important factors for adoption of electronic banking in European Union candidate countries and Macedonia is one of them. Hence, the following hypothesis can be formulated:

H_8 : Customers who can access Internet at home are more likely to adopt the e-banking service.

3 METHODOLOGY

The data for this research was obtained through a telephone survey of 370 retail customers of KB who are non-users of the electronic banking service of KB called "Internet Banka" and who have agreed that their personal data can be used for marketing purposes.. The survey took place in the period 8th April-16th May 2011. The names and addresses for the phone survey were randomly drawn from the data bank of KB. Out of 370 contacted retail customers, 91 customers were willing to answer the questionnaire which is equal to 24,59% response rate.

The questionnaire on e-banking adoption consisted of 8 questions. It contained 4 questions on demographic variables (gender, age, education and personal income), 1 question about customer's access to Internet at home, 1 question about how customers perceive e-banking (as user friendly or a complex service), 1 question regarding customer's fear of misuse of personal data and 1 question about how secure the customer perceives banking via Bank's web site.

Before presenting the results from the binomial logit models of the adoption process of e-banking, we examine the structure of the non-users of the e-banking service of KB. We focus on the non-users since the purpose of the paper is to identify the key barriers to acceptance of e-banking by Macedonian retail customers and due to the fact that the majority of the respondents (92% of the total number of respondents) were non-users of "Internet Banka".

Regarding gender, more than half of the respondents (57%) were male, whereas 43% of all respondents were female.

The age variable was grouped into two categories: 1) Between 18 and 40 years old and 2) 40 and over 40 years old. The majority of respondents (56%) are above 40 years old whereas 42% of the respondents belong to the younger group between 18 and 40 years old.

The survey uses only a grouped dummy for higher education i.e. university or above is used in the analysis in order to minimize the loss in degree of freedom by having too many insignificant variables suggested by the non-parametric tests. A very high proportion (64%) indicated no educational attainment of university or above.

The monthly income variable was categorized into two: 1) Below MKD 30,000 (which is the monthly average personal income suggested by the State Statistical Office of the Republic of Macedonia) and 2) MKD 30,000 and above. A very high proportion (83%) indicated that they earn less than MKD 30,000.

Most of the non-users of the e-banking service of KB (64%) perceive this service as user friendly service, whereas 34% of the respondents answered that they did not perceive it as user friendly.

Regarding access to Internet from home, the majority of the respondents (75%) have access to Internet from home.

Most of the non-users of the e-banking service of KB (68%) consider its web site as secure for doing banking and the majority of the respondents (78%) were not afraid that their personal data could be misused.

In order to identify the key factors that affect the decision of the retail customers to adopt the e-banking service of KB, we estimate the following binomial logit model using the computer package EViews 6:

$$\text{USERS} = f(\text{GENDER, AGE, INTERNET, INCOME, SERVICE, EDUCATION, FEAR, SECURITY}, \varepsilon) \quad (3)$$

where:

- USERS = Use of e-banking; 1 if the respondent is an electronic banking user; 0 otherwise;
- GEN (+) = Gender; 1 if the respondent is male; 0 otherwise;
- AGE (-) = Age level; 1 the respondent is below 40; 0 otherwise;
- INTERNET (+) = Internet access at home; 1 if the respondent has access to Internet from home; 0 otherwise;
- INCOME (-) = Monthly income; 1 if the respondent's monthly salary is below MKD 30,000; 0 otherwise;
- SERVICE (+) = Perceived user friendliness; 1 if e-banking is perceived as user friendly service; 0 otherwise
- EDUCATION (+) = Education level; 1 the respondent completed higher education (university or above); 0 otherwise;
- FEAR (-) = Fear of misuse of personal data; 1 if the respondent is afraid that his/her personal data will be misused; 0 otherwise
- SECURITY (+) = Perceived security; 1 if the respondent perceives KB's web site as secure; 0 otherwise;
- ε = Error term.

In our model we do not explicitly introduce cost and speed of transactions in the model. These determinants of adoption of e-banking are parameterized in terms of the constant.

4 EMPIRICAL RESULTS AND DISCUSSION

The results of our binomial logit model are presented in Figure 1.

The obtained results provide strong evidence that a probability of electronic banking adoption by Macedonian citizens is affected by individual characteristics (age and education). Customer's age is found to be the most significant factor affecting the adoption of "Internet Banka" of KB. The age group between 18-40 is more likely to adopt electronic banking than the age group of 40 or above. This finding is in line with the results of the previous empirical studies which found that the typical online banking customer is a young person who is familiar with PC and Internet navigation.

Figure 1: Results of the binomial logit model in EViews 6

Dependent Variable: USERS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 03/21/11 Time: 15:12
Sample: 1 89
Included observations: 84
Convergence achieved after 5 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.460590	0.857454	0.537160	0.5912
GENDER	-0.597747	0.914857	-0.653378	0.5135
AGE	2.657883	1.225990	2.167948	0.0302
INTERNET	-0.020569	0.860032	-0.023917	0.9809
INCOME	-1.460357	1.011307	-1.444029	0.1487
SERVICE	-0.920210	1.021329	-0.900992	0.3676
EDUCATION	1.324471	0.654331	1.993693	0.0462
FEAR	0.321049	1.005400	0.319325	0.7495
SECURITY	-0.813718	0.851125	-0.956049	0.3390

Mean dependent var	0.750000	S.D. dependent var	0.435613
S.E. of regression	0.385881	Akaike info criterion	1.002994
Sum squared resid	11.16783	Schwarz criterion	1.263439
Log likelihood	-33.12575	Hannan-Quinn criter.	1.107691
Restr. log likelihood	-47.23615	Avg. log likelihood	-0.394354
LR statistic (8 df)	28.22081	McFadden R-squared	0.298720
Probability(LR stat)	0.000434		

Obs with Dep=0	21	Total obs	84
Obs with Dep=1	63		

As can be seen from Figure 1, education also had a significant impact on the adoption of KB's e-banking service. Retail customers with university degree are more likely to adopt electronic banking than those with secondary education. Other variables were denoted as non-significant variables for the adoption and usage of the e-banking service of KB.

In summarizing the results from the binomial logit model, traditional demographic variables (age and education) play an important role in electronic banking adoption decision. By contrast, customers' gender, access to Internet at home, customer's monthly income, perceived user friendliness, fear of misuse of personal data and perceived security are not significant for the likelihood of e-banking adoption.

5 CONCLUSIONS AND IMPLICATIONS

This study examines the factors affecting adoption and usage of the e-banking service of the biggest and leading bank in Macedonia-Komercijalna banka AD Skopje. Our research has shown that the development of e-banking is not sufficient alone to ensure its adoption by the retail customers. A complex set of different determinants affect the adoption of the e-

banking service. The results of our binomial logit model indicated the demographic characteristics, age and education, as the most influential factors explaining the adoption and use of the e-banking service of KB.

Our study makes an important contribution to the emerging literature on Internet banking. It is the first study of its kind, that we are aware of, to empirically examine the different factors affecting the adoption and use of electronic banking in Macedonia. The empirical results of this study should provide insight on consumer adoption of e-banking in Macedonia, a country which is quite different from the developed economies that have been subjects of most empirical studies on adoption of e-banking services. Furthermore, the obtained results will have important implications for the Macedonian banking sector and also for the government since both will be aware of the key factors that should be taken into account to foster the usage of e-banking service and thus reaping out its benefits. It is also hoped that the applied methodology and the obtained empirical results will help future studies on factors affecting the adoption and usage of e-banking by citizens of the Western Balkan countries.

However, there are several limitations of our study. First, the obtained results are based only on a quantitative research (survey). The obtained findings would have been strengthened if the survey was supplemented with qualitative research i.e. with interviews with retail customers which could provide more in-depth on the factors affecting the adoption i.e. non-adoption of e-banking. In-depth interviews are used to verify and reinforce the data collected from the survey. Second, our study does not take into account the effect of time on adoption and use of e-banking by retail customers. The results of our study would have been reinforced by carrying out a longitudinal research in order to observe the effect of time on adoption and use of e-banking by retail customers. This was not possible due to time and resources constraints.

Hence, in the future research we would try overcome the above mentioned limitations by combining the quantitative research with in-depth interviews and by undertaking a longitudinal study. In order to test whether the obtained findings are specific to Macedonian retail customers or are similar across transition economies in the region, we will extend our research by including banking retail customers from Western Balkan countries (Croatia, Serbia, Bosnia and Herzegovina, Montenegro and Albania).

Practical implication of these empirical results is that in order to attract more e-banking customers, mainly from the active banking age group (40 and above years old) who perform larger and more complex banking transactions than younger generation, banks in Macedonia need to highlight that e-banking is easy to use. Moreover, they should give customers step-by-step instructions for doing it by inclusion of demo applications on their official web sites or on CD which simulate the mode in which transactions are processed on Internet. In parallel with that, they should make e-banking interface as simple as possible. Banks also need to make the consumers aware about the benefits of e-banking by providing them with the details of the benefits in their promotional and advertising activities.

From a policy perspective, the obtained empirical results point out the need of more intensive cooperation between Macedonian commercial banks and the government of the Republic of Macedonia in order to develop a positive attitude towards electronic banking, through general public awareness campaign. Private-public cooperation is also needed for stimulating the demand for e-banking, by increasing the level of Internet penetration at home and education not only at schools, but also organizing adults' training courses in order

to train older people, who belong to the active banking age group, but they did not have a chance to have internet education at school or at work.

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