A logit model of electronic banking adoption: The case of Komercijalna Banka AD Skopje

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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. Other authors (Daniel, 1999; Karjaluoto, 2002a) 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 (2002a) indicated that Internet technology is the main electronic distribution channel in the banking industry. In more detail Karjaluoto (2000a) 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.

Electronic banking technologies have contributed to improving of effectiveness of banks' distribution channels through reducing the transaction cost and increasing the speed of service (Chang, 2002; VanHoose, 2003). Other advantages include mass customization, marketing and communication activities, and maintaining the customers and attracting new ones, From the customer's perspective, e-banking allow customers to save time and cost (Anguelov, Hilgert & Hogarth, 2004). Due to the advantages of e-banking for both banks and customers, the adoption of electronic banking recently has rapidly grown as a channel of distribution of banking products and services.

Despite the rapid acceptance of e-banking worldwide, the level of adoption of electronic banking services by Macedonian retail customers is still low. According to the latest data of the State Statistical Office of the Republic of Macedonia (Newsrelease No. 8.1.10.21 as of 20th October 2010), in the first quarter of 2010 only 9% of all internet users in the last 3 months used Internet for e-banking and e-commerce.

Komercijalna banka AD Skopje, as a leading Macedonian bank, was among the first banks to offer Internet banking services to retail customers in 2003. In the period 2007-2010 the number of users of e-

banking service of Komercijalna Banka AD Skopje 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 Komercijalna Banka use the service Internet bank points out that this service is underutilized in spite of its availability. 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 bank.

Although the literature on electronic banking is abundant, the literature on the determinants of adoption of electronic banking in transition countries is still in its infancy. The purpose of this paper is to investigate the factors influencing the adoption of electronic banking (e - banking) by the Macedonian retail customers and to identify the key determinants among them. To achieve this goal we develop a binomial logit model.

2. Factors affecting adoption of electronic banking

Previous empirical studies (Dwivedi and Lal, 2007; Choudrie and Papazafeiropoulo, 2006; Choudrie and Dwivedi, 2005; So, Wong and Sculli, 2005; Chinn and Fairlie, 2004; Choudrie and Lee, 2004; Pikkarainen et al., 2004; Venkatesh at. al, 2003; Gerrard and Cunningham, 2003; Chang, 2002; Karjaluoto et al., 2002; Mattila, 2001; Polatoglu and Ekin, 2001; Jayawardhena and Foley, 2000; Tan and Teo, 2000; Daniel, 1999; Sathye, 1999;) have identified a number factors that affect the adoption and usage of electronic banking services. They are briefly presented below, followed by formulating a testable hypotheses 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, (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: Higher paid customers, who have higher value of time than customers with lower income, are more likely to favor electronic banking. Empirical findings of income positively influencing adoption of electronic banking can be found in Al-Ashban and Burney's (2001), Stavins's (2001) and Karjaluoto's (2002) studies.

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

Education - Al-Ashban and Burney (2001) and Stavins (2001) studies 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. However, the effect of education on adopting Internet banking should also depend on the age of the customer. For example, the attitude of a college graduate towards adopting e-banking is different at age 35 than 55 because the benefits and costs of adopting are different.

H_3: Well educated customers are more likely to adopt electronic banking. However, the effect of

education on adopting electronic banking also depends on the age of the consumer.

Gender - a number of empirical studies (Laukkanen & Pasanen, 2008; MacGregor & Vrazalic, 2006; Chen & Wellman, 2004; Venkatesh & Morris, 2000) show that males are more likely than females to adopt e-service. 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 (Lee, 2009; Hua, 2009; Salisbury, 2001; Miyazaki and Fernandez, 2001) 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. Hua (2009) showed that perceived ease of use is of less importance than privacy and security and clarified that "security is the most important factor influencing user's adoption". 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 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 is 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 - A significant number of studies found that the perceived ease of use has an important effect on customer's decision to adopt a new technology (Chau & Lai, 2003; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000). 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 (Chau & Lai, 2003; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000).

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 at home – Access to Internet at home gas 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 1000 retail customers of Komercijalna banka who are non-users of its electronic banking service "Internet Bank' which took place in March 2011. The names and addresses for the phone survey were randomly drawn from the data bank of Komercijalna banka of those retail customers who were willing to use their personal data for marketing purposes. Out of 1000 contacted reatil customer, 900 were willing to answer the questionnaire.

In order to identify the determinants of adoption of the electronic banking service of Komercijalna Banka called "Internet Banka", to measure the significance of each one and to determine the key factors that improve the decision of the retail customers to adopt the e-banking service of this bank, we estimate a

binomial logit model using the computer package EViews 6.

The discrete dependent variable EBANK measures whether an individual is an electronic banking or non-electronic banking user. The dependent variable is based on the question asked in the telephone survey: "Are you a user of the e-banking service of Komercijalna Banka?"

In our model we assume that the decision of individuals to use e-banking is a function of the following 13 variables: information about e-banking service, user friendliness, willingness to use alternative channels of distribution, personal computer skills, access to Internet at home, trust in Komercijalna Banka, security of the bank's web site, fear of misuse of personal data, customers' gender, education, occupation, monthly income and customer's age. In our model we do not explicitly introduce cost and speed of transactions. These determinants of adoption of e-banking are parameterized in terms of the constant.

The proposed logit model has the following form:

USERS = *f* (GENDER, AGE, INTERNET, INCOME, SERVICE. EDUCATION, FEAR, SECURITY, ε) (1)

Where:

USERS = Use of e-banking; 1 if the respondent is an electronic banking user; 0 otherwise;
GEN (+) = Gender; 1 if male; 0 otherwise;
AGE (-) = Age level; 1 if respondent is below 40; 0 otherwise;
INTERNET (+) = Internet access at home; 1 if the respondent has access to Internet at home; 0 otherwise;
INCOME (-) = Monthly income; 1 if 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 if respondent completed high school; 0 otherwise;
FEAR (-) = Fear of misuse of personal data; 1 if respondent is afraid that his/her personal data will be misused; 0 otherwise
SECURITY (+) = Perceived security; 1 if respondent perceives Komercijalna Banka's as secure; 0 otherwise;
ε = Error term.

Through the above logit model, it is possible to determine which factors will significantly affect consumers' adoption behaviour for Internet banking.

4. Empirical results

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

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

EViews - [Equation: EQ02 Workfile: REZULTATI OD ISTRAZUVANJE

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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	0.867454	0.537160	0.5912
GENDER	-0.597747	0.914857	-0.653378	0.5135
AGE	2.657883	1.225990	2.167948	0.0302
INTERNET	-0.020589	0.860032	-0.023917	0.9809
INCOME	-1.460957	1.011307	-1.444029	0.1487
SERVICE	-0.920210	1.021329	-0.900992	0.3676
EDUCATION	1.324471	0.664331	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	0.395881	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		

The results of our binomial logit model indicated the demographic factors, age and education are significant factors for adoption of the e-banking service of Komercijalna Banka. Customer's age is found to be the most significant factor affecting the adoption of "Internet Banka" of Komercijalna Banka AD Skopje. Retail customers who are younger that 40 are more likely to adopt Internet banking. 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. Education also had a significant impact on the adoption of Komercijalna Banka's e-banking service. Retail customers with higher education 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 Komercijalna Banka AD Skopje.

5. Conclusion

Our research has shown that the development of the e-banking service of Komercijalna Banka AD Skopje 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 factors, age and education are the key determinants of adoption of the e-banking service of Komercijalna Banka by its retail customers. These demographic factors can provide basic information for Komercijalna Banka to segment its retail customers and approach them in the most effective marketing way.

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RÉSUMÉ (ABSTRACT)

Although online 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 electronic banking (e - banking) by the Macedonian retail customers 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 the e-banking service of Komercijalna Banka by its retail customers. The results of this study provides a solid ground for developing an appropriate marketing's strategy to encourage the adoption of e-banking by the Macedonian retail banking customers.