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A Longitudinal Study on e-Bank Trust

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Abstract. The study has two main objectives: to analyse the evolution of trust perceptions over time and to confirm demographic differences accounted in other studies. Results indicate significant differences in customer-perceived trust in internet banking over time: perceived trust, as well as all observed variables (privacy, security, confidentiality, accurateness and completeness) and constructs (trust, trust in the medium and trust in the information) decreased significantly during the 4 year period (2003-2007). A usage and demographic pattern was found among users with low trust perceptions: men, less frequent users (those using the service less frequently than once a week) and participants with over 3 years of use of Internet banking services.

Keywords: Internet Banking, Trust, Security, Privacy, Confidentiality.

1. Introduction

The success of Internet banking services is closely related with trust and risk avoidance [1,2]. Earlier studies have found that financial services customers are especially reluctant to disclose personal information since they fear sharing their financial life with other Internet users [3].

The increasing number of phishing attacks, *bogus* numbers strategies, *man-in-the-middle* and other ways of collecting information from costumers, endanger consumers' trust in online banking services [4]. Wolfe [5] states that 60% of the banks are planning to increase their budgets for fraud detection and customer authentication technology along 2009, given that hackers are expanding their efforts: in the second half of 2007, and in comparison to the first semester of the same year, there was an increase of 86% in the detection of harmful programs designed to steal bank account credentials.

This study is aimed at exploring the determinants of perceived trust among customers in two moments: 2003 and 2007. At a first moment, one will summarise the relevant literature on trust, security, confidentiality and security. Afterwards, research hypotheses are presented, followed by a methodological and sample description. Finally, results, conclusions and suggestions are exposed. Address

2. Literature Review and Hypotheses Development

Trust is usually related to security and risk avoidance [2,6,7,8]. Security perceptions are defined as "the subjective probability with which consumers believe that their private information will not be viewed, stored and manipulated during transit and storage by inappropriate parties in a manner consistent with their confident expectations" [2, p.818]. Internet confidentiality is often considered as a security-related issue [9] and security during transport of data is a basic requirement for confidentiality [10]. Privacy has been a focus of interest of multiple disciplines. Marketing literature discusses consumer privacy in the sense of a consumer's control over information disclosure and the environment in which a consumer transaction occurs. In that sense, the lack of online privacy means the process by which personal information is gathered and used [11]. Governmental actions, industry regulations, security seal programs and different types of technological solutions have been used to protect consumer privacy in Internet. However, the most important

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issue is too often forgotten – How do customers perceive privacy? No matter how technically safe the provided information in the Internet is, if customers perceive it as a risk to their privacy, the service will fail.

Many involved in online retailing assume that consumer concerns regarding privacy and security issues are solved by time, yet some others argue that greater Internet experience and increased publicity of the potential risk of online transactions will lead to increased risk perceptions [12]. Yousafzai et al. [13] propose a model of e-trust for electronic banking in which perceived privacy and security are seen as two major prerequisites of trust. Consumers' trust in Internet banking has two implicit dimensions: "trust in the bank" and "trust in the integrity of the transaction medium" [13,14]. Since the service is mediated through the web site, the information offered by the interface plays a central role [15]. Thus, "trust in the bank" is formalised as "trust in the information".

The measure for trust in the information has two items: accuracy of the information provided and completeness and relevance of information. Trust in the medium (Internet) is operationalised using privacy, security and confidentiality perceptions as measured variables.

Given that trust is positively related with willingness to engage in e-banking [13], it is assumed that trust level increases with time and user experience, measured in this study by the variables 'year', 'frequency of use' and 'length of time in using the service'. Therefore, some significant differences across time and usage variables are anticipated:

H_1: Perceived trust is significantly higher in users' perceptions registered for 2007 than those of 2003.

H_2: Perceived trust is significantly higher in customers with a greater frequency of use.

H_3: Perceived trust is significantly higher in customers using the service for longer time.

Karjaluoto et al. [16] and Muñoz and Cruz [17] found that a typical online banking user is a relatively young man with a high level of education.

Kivijärvi et al. [14,18] explored gender differences across 2 countries (Portugal and Finland) and found that Portuguese women expressed an higher overall trust on online banking than men. Cruz et al. [19] conducted a study on perceived privacy and women revealed the same perceptions pattern.

Accordingly, and based on earlier findings, the following hypothesis is formulated:

H4: Consumer perceived trust is higher among women than men (for both years).

3. Research Methodology

The data was collected through online questionnaires during 2003 and 2007. The questionnaires were available at major retail Internet banks in Portugal. The five variables were collected with seven-point *Likert* scale statements, ranging from totally disagree (1) to totally agree (7). Altogether, 743 complete observations (without missing values) were collected for 2003 and 1.721 for 2007.

Information on sex, age, education and occupation was gathered. Regarding usage experience, the questionnaire contained information about the length of time using the service and frequency of its use. A Structural Equation Model (with AMOS software) was estimated and its fit and constructs' reliability were checked. Assuming that the constructs are representative of the original variables, some latent scores were computed at the constructs' level. Using non-parametric tests, due to non-normality distribution of the constructs, the differences implicit in the hypotheses were assessed.

4. Sample Description

Both 2003 and 2007 samples were male predominant: 65.5 % and 62.7%, respectively. The samples included relatively younger users with those under 40 years old being 71.4 % and 74.5%, respectively. As expected, the 2007 respondents are more experienced users: the majority (54.7%) of the 2003 respondents had less than 2 years of experience in using the service and none accounted more than 3 years. For 2007, 42.6% had less than 2 years of experience in using the service and 39.9% were users of the online service for more than 3 years.

The vast majority (57.2%) of 2003 participants have secondary level education, whereas for 2007 half of the users have university education level (49.8%).

The most frequent occupation among respondents, both for 2003 and 2007, was "entrepreneurs, managers and executives" (35.5% and 54.4%, respectively).

5. Results

A SEM was estimated for the entire set of data (2003 and 2007) and the second order structural model showed that 'Trust' derives from 'trust in the information' (standardized structural impact=0.98) and from 'trust in the medium' (0.66) (see Figure 1).

The constructs' Cronbach's Alphas indicated acceptable internal consistency reliability (trust in the information=0.69; trust in the medium=0.79) and the estimated structural model showed a suitable fit (χ^2=117.137; d.f.=5; p=0.000; CFI=0.970; RMSEA=0.067; GFI=0.981). All coefficients proved to be significant (p<0.05). Therefore, we assume the model as being representative of trust perceptions.

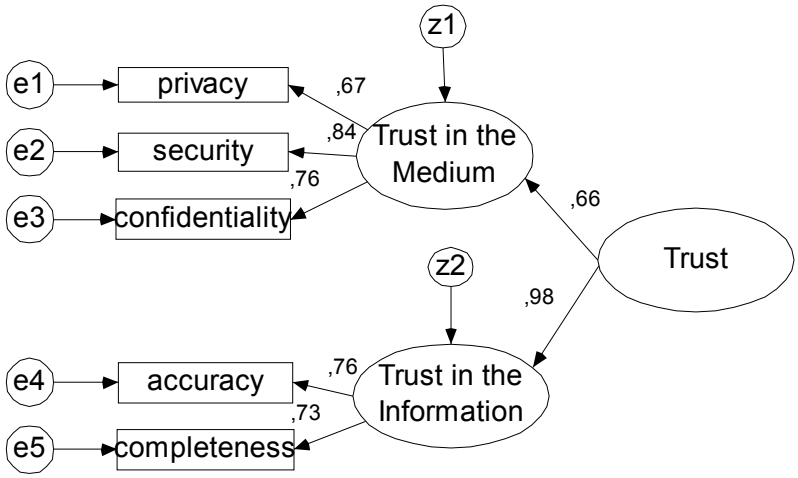

Fig. 1. Trust Structural Model (standardized parameter estimates)

All responses expressed high levels in all variables and constructs (means>5.51: the trust threshold has already been achieved). Non-parametric tests were applied to test the differences in the variables and constructs along the years and according to demographics and usage variables.

The 2007 sample registered significantly lower values for all variables and constructs (see Table 1) and, thus, H_1 was not corroborated. With time, users accounted less perceived trust; a fact that is reflected in both observed variables (privacy, security, confidentiality, accurateness and completeness) and unobserved constructs (trust in the medium and trust in the information).

TABLE 2 VARIABLES AND CONSTRUCTS LEVELS ALONG THE YEARS (UNIVARIATE NON-PARAMETRIC TEST)

Year	Privacy	Security	Confidentiality	Accurateness	Completeness	Trust_Info*	Trust_Medium*	TRUST*
2003	6.55	6.19	5.92	6.53	6.14	6.19	5.77	6.01
2007	6.15	5.90	5.78	6.28	5.54	5.84	5.51	5.68
Sig.**	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

* constructs' latent scores

** *Kolmogorov-Smirnov Z* test

To test H_2, one has analysed the perceived trust variance across the frequency of use categories. When these two years are analysed as a whole, the perceived trust increases significantly with frequency of use (sig.=0.000), corroborating H_2. However, when frequency is crossed with time, it is possible to conclude that the result obtained in Table 2 derives mainly from heavy users (those using the service at least once a week).

TABLE 2 PERCEIVED TRUST ACROSS THE FREQUENCY OF SERVICE USE (UNIVARIATE NON-PARAMETRIC TEST)

		Trust_Info	Trust_Medium	TRUST
A few times a year	2003	6.226	5.506	6.031
	2007	5.710	5.390	5.549
	sig.*	0.166	0.909	0.166
1-3 times a month	2003	5.716	5.347	5.553

	2007	5.815	5.484	5.652
	sig.*	0.922	0.603	0.907
Once a week	2003	6.196	5.783	6.018
	2007	5.904	5.562	5.738
	sig.*	0.000	0.000	0.000
Daily	2003	6.231	5.793	6.051
	2007	5.886	5.547	5.720
	sig.*	0.000	0.000	0.000

* Kolmogorov-Smirnov Z test

When considering each year separately, the answers related to 2003 show that the perception of trust increases significantly with the length of Internet banking use, mostly after 1 year of using the service.

As for the data concerning 2007, it is possible to see that H_3 is not confirmed: after a 3 year period in using the service, the perceived trust decreases. Again, perceived trust in 2007 is significantly lower (sig.<0.000) than the one registered for 2003, regarding all categories of length of use. Results also corroborate H_4: women present a higher perceived trust when compared with men (either considering each year separately or the sample as a whole).

Considering other demographic variables, like education, respondents with university education showed lower perceptions of trust.

In what respects age, no significant differences were accounted for the total sample (2003 and 2007). However, an approach to the 2003 sample showed that younger users accounted for significantly lower levels of trust. The same results were achieved in other studies [19].

Domestics, students, unemployed and retired users presented a lower perceived trust (again, only significant when considering the sample as a whole).

6. Conclusions

The estimated structural model showed that trust in the information is the most intense determinant of overall trust. Using construct's latent scores, results suggest significant differences in customer-perceived trust over time: perceived trust, as well as all observed variables and constructs, decreased significantly during the 4 year period (2003-2007). According to Miyazaki and Fernandez [9], an increased publicity of the potential risk of online transactions will lead to increased insecurity perceptions and, thus, to lower levels of trust over time. Our results are convergent to these ideas: users are aware of the risks and becoming less willing to trust over time. Some security measures, like the implementation of matrix cards, multifactor authentication and layered security, might lead the consumer to a double perception: on one hand, it is clear that the bank is concerned about the users' security and, on the other, the existence of hackers' attacks and the associated dangers become more visible. Accuracy, completeness and relevance of information provided by the bank are also major contributors to the lower perceived trust over time.

A special attention should be paid to those groups registering lower perceptions of trust. For this task, several demographic and usage variables are recommended for a reliable segmentation: sex, frequency of service use, length of time of service use, education and occupation.

Males using the service less than once a week, those with an university level of education and using the service for more than 3 years, domestics, students, unemployed and retired users, should be a priority in order to enhance their level of perceived trust.

Communication strategies to enhance users' perception of trust should be closely related to incentives to the use of the service: users with a longer experience are those who use the service less frequently and, simultaneously, register low values of perceived trust.

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