Impact of e-Quality and Service Recovery on Loyalty: A Study of e-Banking in Spain

Frederic Marimon
Universitat International de Catalonia
Faculty of Economics and Social Sciences
Immaculada 22
08017 Barcelona
Spain

Tel: +34 93 254 18 00
E-mail: **fmarimon@cir.uic.es**

Luc Honore Petnji Yaya(*)
University of Girona
Polytechnic Superior I
Av. Lluis Santalo´, s/n,
17071 Girona,
Spain

Tel: +34 67 118 08 85
E-mail: **arinopetnji@hotmail.com**

Marti Casadesus Fa
University of Girona,
Departament d'Organitzacio´,
Gestio´ Empresarial i Desenvolupament de Producte,
Av. Lluis Santalo´, s/n,
17071 Girona,
Spain

Tel: +34 972 41 8286
E-mail: **marti.casadesus@udg.edu**

(*) corresponding author

Abstract

The purposes of this study are twofold: (i) to propose and apply scales to measure service quality and service recovery in the setting of electronic banking (e-banking) services; and (ii) to examine the impact of electronic service quality (e-quality) and service recovery (e-recovery) on loyalty (e-loyalty) in the setting of e-banking services.

An online questionnaire is used to survey 428 Spanish customers of e-banking services (123 of whom have reported a service failure) using modified versions of the E-S-QUAL and E-RecS-QUAL scales (Parasuraman *et al.*, 2005). The data are analysed by exploratory factor analysis to: (i) test the applicability of the scales to the setting of online banking services: and (ii) generate and test a model of e-quality, e-recovery, and e-loyalty using structural equation modelling (SEM).

Three of the four dimensions of the original E-S-QUAL scale and two of the three dimensions of the original E-RecS-QUAL scale are confirmed in the setting of e-banking services. The study reassures managers of online banks that modified versions of the E-S-QUAL and E-RecS-QUAL scales are appropriate instruments for measuring e-quality and e-recovery. The study also provides empirical evidence that efficiency of a website and responsiveness to complaints have a positive influence on e-loyalty.

The study is the first to provide definitive empirical evidence (in the context of e-banking) of the presumed link between: (i) the e-quality and e-recovery dimensions proposed in the E-S-QUAL and E-RecS-QUAL scales; and (ii) the construct of loyalty.

Keywords: loyalty; recovery; electronic commerce; electronic service quality; E-S-QUAL; E-RecS-QUAL

1. Introduction

Service quality and service recovery are related to customer loyalty in different ways. Whereas quality is only indirectly related to loyalty via perceived value and satisfaction (Anderson & Srinivasan, 2003; Ribbink *et al*., 2004; Boshoff, 2007; Cristobal *et al*., 2007; Marimon *et al*., 2010; Lin, 2010), recovery has a direct relationship with loyalty (McCollough *et al*., 2000; Parasuraman, 2006; Lin, 2010). The question that then arises for electronic commerce (e-commerce) is the extent to which loyalty depends on electronic quality (e-quality) and the extent to which it depends on electronic service recovery (e-recovery). In other words, is e-quality or e-recovery the more important when an e-commerce company is designing its loyalty strategy?

To measure service quality and service recovery in the context of e-commerce, Parasuraman *et al*. (2005) have proposed two scales: 'E-S-QUAL' to assess e-quality and 'E-RecS-QUAL' to assess e-recovery. Although some authors have applied these instruments in a variety of settings (Kim *et al*., 2006; Boshoff, 2007; Akinci *et al*., 2010; Fuentes-Blasco *et al*., 2010; Marimon *et al*., 2010), these scales have received relatively little research attention compared with that accorded to the well-known 'SERVQUAL' instrument (Parasuraman *et al*., 1988), which, in many ways, can be considered an antecedent of the two more recent e-commerce scales.

Despite their relative lack of research attention, these two e-service scales have enabled researchers to examine the relationships that exist between e-quality and various other constructs—such as perceived value, satisfaction, and loyalty (Srinivasan *et al*., 2002; Sigala & Sakellaridis, 2004; Huang, 2008; Fuentes-Blasco *et al*., 2010). These relationships are important in all services, but they are especially significant in the case of e-services because the cost (to the customer) of changing his or her provider is low and the change is as easy as a 'click' (Fuentes-Blasco *et al*., 2010). One can argue that switching online banking provider is not as easier as in e-tailing, given that e-banking may be tight to traditional accounts and switching requires at least setting up a new account, closing the earlier account. It incorporates setting up balances transfer, wage payments and initiating new automatic payments and direct debit to replace those operating

at the old bank. However, in the past few years online banks competitors have started to actively promote switching provider as part of their "free" services. They often claimed that switching banks is easier today than it use to be, since they have made the process as simple and as easy as possible. This view is supported from the extant of literature. E.g. Sherry (2002) argued that in the 70´s customers were at the mercy of the bank and that changing banks was effectively impossible due to the penalties that existed; whereas she claimed that today it simply takes a phone call to switch. In the same vein, Trout (2006) in his study found that 70% of respondents expected changing banks would be a hassle, but nearly 90% of switchers found it easier than expected. Obviously, competing in such condition is as thorny as in an online shopping setting. As a consequence, several authors have emphasised the importance of enhancing loyalty among internet consumers. Likewise, it is self-evident that an understanding of the antecedents of e-loyalty is likely to enhance business performance (Petnji et al., 2011)

Against this background, the purposes of this study are twofold. The first is to propose scales to measure e-quality and e-recovery in the context of the Spanish e-banking sector. The second is to assess the impact of e-quality and e-recovery on e-loyalty.

The remainder of this paper is structured as follows. After this introduction, the second section presents a review of the relevant literature. In the third section, the methodology of the empirical study is described. The results are presented in the fourth section (validation of the scales to assess e-quality and e-recovery; and analysis of the impacts of e-quality and e-recovery on loyalty). The conclusions and managerial implications are presented in the final section.

2. Literature review

2.1 Measuring e-quality

Unlike the service quality literature, the number of studies on electronic service quality is still at its preliminary phase both from theoretical and empirical perspectives (Akinci et al., 2010). Literally electronic service quality is a new concept and the way is conceptualized varies greatly. E.g. Santos (2003) defines service quality in e-commerce as "the consumers´ overall evaluation

and judgement of the excellence and quality of service offerings in the virtual market place". This definition is in a somewhat circular way (Kim at al., 2006) and do not capture all the aspects of the purchasing process (Parasuraman et al., 2005). Nevertheless, this study adopted (Zeithaml et al., 2002) definition as it captures all the aspects of purchasing process (from pre-sale to the post-sale) and is a relevant conceptualisation in our context. Since the meaning of service in the definition is comprehensive and includes prior technical aspects (e.g. secure electronic transaction symbols, search engines and one click order placement) and aspects subsequent to the website service (e.g. delivery period, exchanges, and refund) (Parasuraman et al., 2005; Fuentes-Blasco et al., 2010). According to Zeithaml et al. (2002), e-service quality is defined "as the extent to which a web site facilitates efficient and effective shopping, purchasing and delivery of product and services"

Bearing in mind the natural differentiation between e-banking and e-retailers and drawing on Zeithaml et al. (2002), this study defined e-SQ in an online banking setting as the extent to which a web site facilitates efficient and effective online operation/transaction and delivery of product and services.

Additionally, to deliver superior service quality, managers of companies with web presences must first understand how consumers perceived and evaluate online customer service quality (Parasuraman et al., 2005). Previous study provide important framework and research instruments. A variety of scales utilising various dimensions of quality have been suggested for measuring service quality in the context of electronic commerce. Many of these have focused on the quality of the website itself. For example, Chen and Wells (1999) developed a measure of website quality, which consisted of three dimensions (entertainment, informativeness, and organisation). In a similar vein, Yoo and Donthu (2001) developed an instrument called 'SITEQUAL', which had four dimensions (ease of use, aesthetic design, processing speed, and security). Subsequently, Loiacono et al. (2002) used interviews with consumers and website designers to develop 'WebQual', which consisted of 12 dimensions of online service quality (informational fit-to-task, interactivity, trust, response time, ease of understanding, intuitive operations, visual appeal, innovativeness, flow/emotional appeal, consistent image, online

completeness, and better than alternative channels). Coincidentally, Barnes and Vidgen (2002) also developed a scale of website quality with the same name: 'WebQual'.

Apart from these measures of website quality, other authors, such as Zeithaml *et al.* (2000), have proposed a more comprehensive conception of e-service quality in terms of evaluation of the whole service encounter—including both the transaction and the post-transaction process. Some years later, Parasuraman *et al.* (2005) acted on this wider view of e-service quality in publishing the 'E-S-QUAL' instrument for assessing e-services. The E-S-QUAL scale contains 22 items gathered in four dimensions: (i) 'efficiency' (the ease and speed of accessing and using the site); (ii) 'fulfilment' (the extent to which the site's promises about order delivery and item availability are fulfilled); (iii) 'system availability' (the correct technical functioning of the site); and (iv) 'privacy' (the degree to which the site is safe and protects customer information). This scale was, in many ways, an adaptation (for the e-commerce context) of the well-known 'SERVQUAL' scale (Parasuraman *et al.*, 1988), which had been developed two decades previously for measuring general service quality. As a pioneering instrument for measuring service quality, SERVQUAL has been successfully adapted for use in a wide variety of services sectors and contexts (Ladhari, 2009). For example, in the banking industry, which is the field of interest to the present study, Kumar *et al.* (2010) recently used the SERVQUAL instrument to assess the quality of service provided by both Islamic and conventional banks in Malaysia.

The E-S-QUAL scale itself has been adapted to a variety of e-commerce settings. For example, Boshoff (2007), who investigated the relationship between e-quality and loyalty, proposed that the instrument should have six dimensions, rather than the four of the original instrument. Marimon *et al.* (2010), who applied the instrument to an analysis of the relationship between purchasing and loyalty in the context of an e-supermarket, expanded Boshoff's (2007) model by adding a new construct. More recently, Meng (2010) applied the scale in an African American cultural setting and a Chinese cultural setting. Fuentes-Blasco *et al.* (2010) also made an interesting contribution when they adapted items from the E-S-QUAL scale to assess service quality in an e-bank. Their study confirmed Parasuraman and Grewal's (2000) theoretical 'consequence chain'—that e-service quality impacts on perceived value, and that perceived value

then has a positive effect on e-loyalty. Akinci *et al.* (2010) also utilised the E-S-QUAL scale in assessing the e-service quality offered by 13 banks in Turkey. Their study provided a refined and more stable version of the scale for use in Internet banks.

Before the publication of the E-S-QUAL scale by Parasuraman *et al.* (2005), other authors had proposed scales designed specifically for assessing quality in the particular setting of e-bank services. For example, Zhilin *et al.* (2004) proposed a five-dimensional measurement instrument (reliability, responsiveness, competence, ease of use, product portfolio, and security), whereas Osman *et al.* (2005) proposed a different five-dimensional scale adapted to the Cyprus e-banking market (service environment, interaction quality, reliability, empathy, and technology).

2.2 Relationship between e-quality and e-loyalty

Loyalty has been conceptualised and defined in various ways. The extant of literature indicates there are two trains of though dominating the conceptualization of customers´ loyalty. One approach regards loyalty in behavioural terms. Drawing on that, Srinivasan et al. (2002) defined e-loyalty as a "customer's favorable attitude toward the e-retailer that results in repeat buying behavior". Whereas, the other approach argues that effective feelings are important to the conceptualization of loyalty concept. According to this view, loyalty involves attitudes, psychological involvement, notions of favouritism, and a sense of goodwill towards a particular product or service (Kim et al., 2006). Taken together, it would seem that is best understood by considering both behavioural and attitudinal loyalty (Petnji et al., 2011). Subsequently, based on the previous arguments and given the difficulties related to the acquisition of customers in online banking, this study adopts both concepts.

Several studies have confirmed that there is a direct relationship between service quality and loyalty in the context of e-commerce. Sigala and Sakellaridis (2004) concluded that e-quality is a vital antecedent of both online purchases and e-loyalty. Huang (2008), who undertook a literature review of the subject, contended that there is a consensus among scholars that e-quality is a prerequisite of loyalty. More recently, Fuentes-Blasco et al. (2010) also undertook a review

of the literature on the relationship between e-quality and e-loyalty. Their conclusion was that superior e-service quality leads to enhanced customer satisfaction and retention.

2.3 Measuring e-service recovery

The term 'service recovery' refers to "…. the actions taken by a service provider to address a customer complaint regarding a perceived service failure" (Grönroos, 1988). These actions are designed to resolve problems, alter negative attitudes of dissatisfied customers and to ultimately retain these customers (Sousa and Voss, 2009). Service recovery in traditional services has received considerable attention in the academic literature (Davidow, 2003; McCollough et al. 2000; Tax et al., 1998; Parasuraman, 2006) because effective recovery management has been shown to have a significant positive effect on customers who have reacted adversely to a service failure (Berry and Parasuraman, 1991). An understanding of effective recovery management is particularly relevant for service providers because the distinctive characteristics of service (especially the inseparability of production and consumption) makes it impossible to ensure 100% error-free service (Fisk et al., 1993).

E-service recovery is an important aspect of e-service, since it addresses the web site's service in response to problems or questions experienced by customers. However, from the extant of literature this topic has received limited attention in the context of online setting. Perhaps because (i) is a new concept, since there is reduced or not all human interaction it is unclear whether the understanding of the concept from traditional service is transferable to online services and (ii) acquiring data to measure e-service recovery is difficult. Moreover, to assess the effectiveness of such service recovery in the context of e-commerce, a valid and reliable measurement instrument is required. The most widely used instrument appears to be the E-RecS-QUAL scale (Parasuraman *et al.*, 2005). This scale includes 11 items arranged in three dimensions: (i) 'responsiveness' (effective handling of problems and returns through the site); (ii) 'compensation' (the degree to which the site compensates customers for problems); and (iii) 'contact' (the availability of assistance through telephone or online representatives). Meng (2010) applied the E-RecS-QUAL scale to an African American cultural setting and a Chinese cultural

setting. However, studies suggest that certain modifications of this scale are usually required for application in various settings, including the e-banking sector (Kim *et al*., 2006; Fuentes *et al*., 2008; Yen & Lu, 2008; Akinci *et al.*, 2010).

2.4 Relationship between e-service recovery and e-loyalty

The best scenario for service providers is to deliver a service without failures (McCollough *et al.*, 2000). In general, companies fare better in the eyes of consumers by avoiding service failure than by responding to failure with superior recovery. However, when the failure has occurred, effective service recovery is considered essential to business survival in general (Berry & Parasuraman, 1991), and to e-commerce in particular (Reichheld & Schefter, 2000). This is because service recovery has been shown to play a crucial role in maintaining customer loyalty—either directly (Srinivasan *et al*., 2002; Reichheld & Schefter, 2000; Semeijn *et al*., 2005) or indirectly through enhanced perceived value (Boshof, 2007; Marimon *et al*., 2010; Fuentes-Blasco *et al*., 2010).

Effective service recovery is especially important in services provided on the Internet. This is because online customers are difficult to attract and retain (Srinivasan *et al*., 2002); moreover, it is very easy for online customers to switch their online providers (Reichheld & Schefter, 2000; Semeijn *et al*., 2005).

Various studies have utilised the E-RecS-QUAL scale (Parasuraman *et al*., 2005) to investigate these issues. As noted above, Fuentes-Blasco *et al.* (2010) confirmed Parasuraman and Grewal's (2000) finding that e-service quality impacts on loyalty via perceived value. To measure the constructs of e-service quality and e-recovery, these authors adapted the items from both the E-S-QUAL and E-RecS-QUAL scales (Parasuraman *et al.*, 2005). In another recent study, Akinci *et al.* (2010) utilised the E-RecS-QUAL scale to assess service recovery offered by 13 banks in Turkey. This study showed that two of the dimensions of the scale ('responsiveness' and 'compensation') had a significant and positive effect on customer loyalty, whereas the third dimension ('contact') had no effect on customer loyalty (perhaps because online customers are reluctant to experience interpersonal interaction even when a problem occurs).

3. Methodology

3.1 Sample and data collection

From the Spanish banks´ derive database, online banking users were randomly invited by mail and directed to a specific website containing the structured questionnaire, which they then self administered. The questionnaire began with a filter screening question, seeking only respondents who are: (i) consumers of e-banking services; the second part began with a dichotomous screening question seeking only respondents who (ii) experienced at least one problem with e-banking services.

The field work was completed in May 2010. After refusing some incomplete or invalid questionnaires, 428 valid questionnaires remained from Spanish customers of e-bank (a list of 20 different e-banks were detected as providers to the respondents); of these, 123 had experienced a problem with the service they had received. The demographic characteristics of the sample are summarised in Table 1. No gender bias was detected. A little more than half (59.8%) of the respondents were aged less than 34 years. The educational level of the sample was high, with two-thirds of the sample having a university degree. The table also shows the demographics of the sub-sample of respondents who had complained about the service received. There was again no gender bias in this sub-sample. Half of the respondents were aged less than 34. The educational level was again high, with two-thirds of the sub-sample having a university degree.

Evidently to congregate external validity conditions, it was necessary to check that the final data collected was undeniably a representation of the online banking population. It was reported that 62.2% of Spanish general populations were internet users in April 2011 (Internet World Stats, April 2011). Besides, The success of online banking in Spain was evidenced by the number of current and potential users of these services, with 14.68 million internet users frequenting banking websites in 2008 (Fundacion Orange, 2008). The percentage difference in four demographic characteristics between online bank population (Instituto Nacional de Estadística's, 2011) and the final data set of this study were analyzed using the Wilcoxon–Mann–Whitney test. Four contrasts were assessed between the two groups assuming a null hypothesis that there was no difference of

means between the groups. The results show no statistical differences; hence the sample replicates the general population in term of gender, age, education and annual income.

Moreover, the sample of service recovery was constructed by self-selection of respondents. It was as well necessary to assess representativeness of the final data of service recovery with the aim population sample (428). A comparison of demographic variables between the two samples (respondents who had not reported any problems and those who had reported a problem) was conducted using the Wilcoxon–Mann–Whitney test. The findings indicated that no differences were detected in "gender" and "educational" level. However, the characteristics of "age" and "annual income" p-value $\leq$ 0.05, indicates that there was some differences. A thorough data analysis shows there was a slight disparity (10%). Respondents aged 17-23 and annual income <12,000 failed to report non-routine encounters. It appears not to be a surprise as the data profile of this particular group indicates that they were likely to be students. Students are emblematic and very knowledgeable representation of the sizeable body of web users. They might not have reported service failure, since they can solve some non-routine encounters by seeking advices from their friends and family through social network media. To sum-up, the lack of any significant difference indicates that the collected information of service recovery has certain reference value and indeed is a representation of the population.

Take in Table 1 about here

Table 1: Demographic characteristics of sample

3.2 Questionnaire

As noted above, the two objectives of the study were: (i) to propose scales to measure e-quality and e-recovery in the context of the Spanish e-banking sector; and (ii) to assess the impact of e-

quality and e-recovery on e-loyalty. To gather data for these purposes, the questionnaire included items for:

* e-service quality and e-recovery (for the first objective); and

* perceived value and loyalty intentions (for the second objective).

The rationale for collecting data on 'perceived value' will become apparent when the proposed model for the second objective is presented in detail below (see Section 4.2).

3.2.1 Items for e-service quality and e-recovery

The items for e-service quality and e-recovery were adapted from the original E-S-QUAL and E-RecS-QUAL scales (Parasuraman *et al.*, 2005). In accordance with Akinci *et al.* (2010), some items in the original scales were removed to facilitate application of the scales in online banking services.

With regard to the E-S-QUAL scale, three items (FUL2, FUL4, and FUL5) in the 'fulfilment' dimension were removed because they referred to the physical delivery of goods, which was not applicable in the present case. The full list of items for e-service quality were as follows:

Efficiency

* EFF1 This site makes it easy to find what I need.

* EFF2 It is easy to get anywhere on the site.

* EFF3 This site enables me to complete a transaction quickly.

* EFF4 Information on this site is well organised.

* EFF5 The website loads its pages quickly.

* EFF6 This site is simple to use.

* EFF7 This site enables me to get on to it quickly.

* EFF8 This site is well organised.

System availability

* SYS1 This site is always available for business.

* SYS2 This site launches and runs right away.

* SYS3 This site does not crash.

* SYS4 Pages at this site do not freeze after I enter my order information.

Fulfilment

* FUL1 Orders are delivered when promised.

* FUL2 Orders are delivered promptly and accurately.

* FUL3 This website is truthful about its offerings.

* FUL4 This website makes accurate promises about delivery of products.

Privacy

* PRI1 This website protects information about my web-shopping behaviour.

* PRI2 This website does not share my personal information with other sites.

* PRI3 This site protects information about my credit card.

With regard to the E-RecS-QUAL scale, the first two items of the original 'responsiveness' dimension and the second and third items of the 'compensation' dimension were discarded because they were not applicable to this particular sector. Seven items were retained. These were arranged in three dimensions as follows: 'responsiveness' (three items); 'compensation' (one item); and 'contact' (three items). The full list of items for service recovery was as follows:

Responsiveness

* RES1 This site offers a meaningful guarantee.

* RES2 This site tells me what to do if my transaction is not processed.

* RES3 This site takes care of problems promptly.

Compensation

* COM1 This site compensates me for problems it creates.

Contact

* CON1 This site provides a telephone number to reach the company.

* CON2 This site has customer service representatives available online.

* CON3 This site offers the ability to speak to a real person if there is a problem.

3.2.2 Items for 'perceived value' and 'loyalty intentions'

The items for measuring 'perceived value' and 'loyalty intentions' were adopted with minor alterations from Parasuraman *et al*. (2005). The items for 'perceived value' and 'loyalty intentions' were as follows:

Perceived value

* PEV1 The prices of the products and services available at this site are economical.

* PEV2 Overall, this site is convenient to use.

* PEV3 This site gives me a feeling of being in control.

* PEV4 Overall, this site provides value for money and effort.

Loyalty intentions

* LOY1 I will say positive things about this online banking site to other people.

* LOY2 I will recommend this online banking site to someone who seeks my advice.

* LOY3 I will encourage friends and others to do business with this site.

* LOY4 I consider this online banking site to be my first choice for future transactions.

* LOY5 I will do more business with this site in the coming months.

All items were measured on five-point Likert-type scales (1 = 'strongly disagree'; 5 = 'strongly agree').

4. Results

4.1 Scales to assess e-quality and e-recovery

A preliminary survey of scale dimensionality was undertaken by exploratory factor analyses with varimax rotation (Hair *et al*., 1998) using the Kaiser criteria of eigenvalues greater than 1.

The *first* of those exploratory factor analyses involved the items for e-quality (as listed above). The Kaiser-Meyer-Olkin (KMO) measure was 0.935. Bartlett's sphericity test was 5,125.3 (df = 171) with a significance of 0.000. Three dimensions, which accounted for 64.11% of the variability of the sample, were identified.

The *first factor* (labelled 'efficiency') gathered seven of the eight efficiency items noted above. Only item EFF5 ('the website loads its pages quickly') migrated from this factor to the second factor.

The *second factor* was labelled 'system availability'. In all, seven items loaded on this 'new' factor of system availability: (i) the original four items of 'system availability' noted above; (ii) the first two items of 'fulfilment'; and (iii) the item EFF5 (previously noted).

The *third factor* neatly included all three items of 'privacy' noted above.

As a result of this analysis, two of the original 'fulfilment' items were included in 'system availability', and the other two were discarded because they loaded equally on 'efficiency' and 'privacy'. As a consequence, the original 'fulfilment' dimension was removed. This finding is consistent with previous studies (Fuentes-Blasco *et al*., 2010; Marimon *et al*., 2010; Boshoff, 2007). The overall result is also consistent with the literature (Meuter *et al*., 2000; Zeithaml *et al*., 2002; Boshoff, 2007; Fuentes-Blasco *et al*., 2010; Marimon *et al*., 2010) in demonstrating that e-quality is a multidimensional (rather than uni-dimensional) construct.

The *second* exploratory factor analysis involved the items for e-recovery (noted above). The KMO index was 0.847, and the Bartlett test was 347 (df = 21) with a significance of 0.000. Only two factors with eigenvalues greater than 1 appeared. These explained 69.6% of the variance. The first, which was labelled 'responsiveness', gathered: (i) the three factors of the original dimension of 'responsiveness' noted above; and (ii) the only item of 'compensation'. The second factor, which was labelled 'contact', included the original three items of 'contact'.

The two analyses thus revealed five dimensions across the two constructs: (i) 'efficiency', 'system availability', and 'privacy' for *e-quality*; and (ii) 'responsiveness' and 'contact' for *e-recovery*. The next step was to assess the reliability of each these five factors (see Table 2). Cronbach's alpha and composite reliability exceeded the threshold value of 0.7 for internal consistency in every instance (Nunnally & Bernstein, 1994).

Take in Table 2 about here

Table 2: Reliability analysis of adapted E-S-Qual and E-RecS-Qual scales

Two first-order confirmatory factorial analyses utilising robust maximum-likelihood estimation were performed using EQS software: (i) involving the retained items in the amended E-S-QUAL scale to assess e-quality; and (ii) involving the retained items in the amended E-RecS-QUAL scale to assess e-recovery.

In the first of these analyses (for the amended E-S-QUAL), the comparative fit index (CFI) was 0.933 and the root mean-square error of approximation (RMSEA) was 0.065. The Bentler-Bonett non-normed fit index (NNFI) was 0.921. The Satorra-Bentler scaled chi-square was 323.63 on 116 degrees of freedom, and its probability value for the chi-square statistic was 0.000. These results indicate that global fit was acceptable (Byrne, 1994; Hu & Bentler, 1999). The loads were all high (at a significance level of 0.05). The amended model was therefore shown to be an acceptable fit for the data.

In the second confirmatory analysis (for the amended E-RecS-QUAL scale), the Satorra-Bentler scaled chi-square was 10.41 on 13 degrees of freedom and its probability value for the chi-square statistic was 0.660. The CFI was 0.996 and the RMSA 0.028. This model was thus also confirmed.

The ontological validity of both multidimensional scales can be assumed on the basis of the close similarity between the modified scales and the original E-S-QUAL and E-RecS-QUAL models of Parasuraman *et al*. (2005). Convergent validity was confirmed when the factor loadings of the confirmatory model were found to be statistically significant (level of 0.05) and greater than 0.5 (Sanzo *et al*., 2003).

In summary, the first objective of this study was realised by establishing that two modified scales derived from the generic E-S-QUAL and E-RecS-QUAL scales are suitable for assessment of quality and recovery in e-banking services in the Spanish context.

4.2 Impacts of e-quality and e-recovery on e-loyalty

4.2.1 Structural equation modelling (SEM)

To analyse the extent to which quality and recovery impact upon customer loyalty in this context, structural equation modelling (SEM) was conducted using a partial least squares (PLS) procedure run in the Smart-PLS software package, which allows path modelling with latent variables (Ringle *et al*., 2005). The PLS procedure is able to model latent constructs under conditions of non-normality and small-to-medium sample size (Compeau & Higgins, 1995). Rather than assuming equal weights for all indicators of a scale, PLS allows each indicator to vary with regard to how much it contributes to the composite score of the latent variable. Indicators with weaker relationships to related indicators and the latent construct are thus given lower weightings

4.2.2 Proposed model

To investigate how e-quality and e-recovery affect e-loyalty, the model shown in Figure 1 is proposed. The model shows the three dimensions of e-quality ('efficiency', 'system availability', and 'privacy') and the two dimensions of e-recovery ('responsiveness' and 'contact') that were derived from the exploratory factor analyses described above (Section 4.1).

Take in Figure 1 about here

Figure 1: Hypothesised relationships among the constructs of the model

Drawing on the literature review (Section 2), this model contains six hypothesised relationships among the various constructs:

* *Hypothesis H1:* The efficiency of a website is positively related to customer perceived value.

* *Hypothesis H2:* The system availability of a website is positively related to customer perceived value.

* *Hypothesis H3:* The privacy of a website is positively related to customer perceived value.

* *Hypothesis H4:* Customer perceived value in a website is positively related to loyalty to that website.

* *Hypothesis H5:* The responsiveness of a website is positively related to loyalty to that website.

* *Hypothesis H6:* The contact offered by a website is positively related to loyalty to that website.

4.2.3 Scales for 'perceived value' and 'loyalty'

To test these hypotheses, the scales for the constructs of 'perceived value' and 'loyalty' had to be validated for reliability. Both scales proved to be uni-dimensional, and exploratory factor analyses of the scales extracted only one factor in each case. Cronbach's alphas confirmed the reliability of the constructs (see Table 3).

Take in Table 3 about here

Table 3: Reliability analysis of constructs of 'perceived value' and 'loyalty'

4.2.4 Evaluation of measurement model

Evaluation of the measurement model involved assessment of: (i) the validity of individual items; (ii) the reliability of subscales (internal consistency); (iii) convergent validity; and (iv) discriminant validity of the constructs.

The *validity of individual items* within the constructs was confirmed by load values greater than 0.707 (Carmines & Zeller, 1979). Table 4 shows that only item 'EFF 5' did not satisfy this criterion, but because it was so close to the threshold it was decided that it could be retained, in accordance with the relaxed criterion suggested by Barclay *et al*. (1995). The robustness of these loads was analysed by a 'bootstrapping' process; that is, taking 1000 subsamples of a hundred cases of each. All the *p*-values were found to be greater than the 1.96 threshold.

Take in Table 4 about here

Table 4: Loads on the exterior model.

The *internal consistency* (reliability) of the subscales had been previously demonstrated (see Tables 2 and 3). In addition, assessment of the reliability of the reflective constructs was checked by composite reliability. As shown in Table 6, all values exceeded the recommended value of 0.8 (Nunnally & Bernstein, 1994).

With regard to *convergent validity*. the average variance extracted (AVE) for all scales was greater than Fornell and Larcker's (1981) recommended value of 0.5 (see Table 6).

To assess *discriminant validity*, the criterion of Fornell and Larcker (1981) was adopted— that the square root of the AVE should be greater than the correlations presented by each construct with other constructs. Table 5 shows that this was so.

Take in Table 5 about here

Table 5: Discriminant validity.

4.2.5 Evaluation of structural model

The goodness-of-fit index proposed by Tenenhaus *et al*. (2004), which takes into account both the explained variances for the latent dependent variables and their commonalities, was 0.3235 (see Table 6). The model explained more than half of the variance of each independent variable.

Take in Table 6 about here

Table 6: Model fitness

All the paths, with the exception of that between 'contact' and 'loyalty' (Hypothesis H6), were significant ($p< 0.01$) (see Table 7). In other words, five of the six hypotheses were confirmed. The lack of evidence for the direct influence of 'contact' on loyalty (Hypothesis H6) in the present study is in accordance with Akinci *et al*. (2010), who suggested that online service

customers might be reluctant to experience direct interpersonal interaction, even when a problem occurs.

It should also be noted that the strong relationship between 'perceived value' and 'loyalty' in the present study is consistent with several previous studies (Anderson & Srinivasan, 2003; Ribbink *et al*., 2004; Boshoff, 2007; Cristobal *et al*., 2007; Marimon *et al*., 2010; Lin, 2010).

Take in Table 7 about here

Table 7: Path coefficients and t-statistics

In terms of the antecedents of 'perceived value', the e-quality dimension of 'efficiency' was the most significant; in contrast, the coefficients of 'system availability' and 'privacy' were significantly lower. It would seem that the ease and speed of accessing the website is the most important factor in determining 'perceived value', whereas the technical function of the site and the protection of customer information are less important.

Table 8 shows the effect on 'loyalty' of the total effect of the three dimensions extracted from the E-S-QUAL scale and the two constructs extracted from the E-RecS-QUAL scale .

Take in Table 8 about here

Table 8: Total effects of the constructs on loyalty

The results show that 'efficiency' and 'responsiveness' had equivalent effects on loyalty. This indicates that the ease and speed of accessing and using the site (efficiency) was as important as the effective handling of problems (recovery). It should also be noted that 'system availability' and 'privacy' had similar total effects.

5. Conclusions and Limitations

This study first seeks to develop a multi items scale that could be used to measure the service quality of online banking and to comprehend the fundamental service quality dimensions. The

study showed that an amended version of the E-S-QUAL scale (Parasuraman *et al.*, 2005) is a valid instrument for measuring e-service quality in the context of Spanish e-banking services. The modified version of the scale moved two items of the original 'fulfilment' dimension into the 'system availability' dimension. The remainder of the original 'fulfilment' dimension was then discarded. The amended version of the scale thus has three dimensions ('efficiency', 'system availability' and 'privacy'), rather than the original four. This modification is in some extent accordance with Boshoff (2007), who also removed the 'fulfilment' dimension in his model. The modification is also supported to some degree by Fuentes-Blasco *et al.* (2010), who found out that this dimension had a lower coefficient path to e-quality in their model.

Of the three remaining dimensions, the present study finds that 'efficiency' is the most important in engendering customer loyalty, with the other two ('system availability' and 'privacy') being equally (but less) important. All three dimensions have been shown to influence loyalty through 'perceived value'.

The study has also found that an adaptation of E-RecS-QUAL scale (Parasuraman *et al.*, 2005) is valid for assessing service recovery in the context of Spanish e-banking services. The modified scale merged the dimensions of 'responsiveness' and 'compensation' into one factor (labelled 'responsiveness'). The third dimension of the original scale ('contact') was retained.

This study has also shown that e-service recovery has a significant direct impact on e-loyalty; indeed, this effect is equivalent in magnitude to the effect of 'efficiency' (a dimension of e-service) on loyalty. These results are consistent with Akinci *et al.* (2010), who reported that 'responsiveness' and 'compensation' (dimensions of e-service recovery) have a significant and positive effect on loyalty. The present study also agrees with Akinci *et al.* (2010) in not finding any solid evidence of a relationship between 'contact' (a dimension' of recovery) and e-loyalty.

These findings have important implications for e-service managers in developing their recovery strategies. First, it would seem that not all recovery actions are equally important. The recovery dimension that really explains loyalty is 'responsiveness' (effective handling of problems and returns through the site). This is the best way to restore customer confidence after a bad service experience. In contrast, availability of a real person ('contact') is not significant in

producing loyalty. Managers should bear this in mind in allocating resources with a view to enhancing customer loyalty.

Managers should also note that 'efficiency' is the most important dimension of e-service quality in its effect on loyalty; indeed, it is slightly more important than service recovery. The implication is that providing a service free of failures is the best way to enhance customer loyalty (McCollough et al., 2000). In other words, avoiding service failure is better than responding to failure; nevertheless, when service failure does occur, the 'responsiveness' dimension of e-service recovery has a significant effect on loyalty in e-services, as it does in all service settings (Berry & Parasuraman, 1991; Fisk *et al*., 1993; Reichheld & Schefter, 2000).

Given the phenomenal growth of e-services, previous studies provide important theoretical framework and research instruments for scales evaluation of e-services quality e.g. E-S-QUAL and E-RecS-QUAL (Parasuraman et al 2005). Other studies adopted formal procedures for empirically validating e-SQ measurement scales in online shopping (Boshoff, 2007; Fuentes-Blasco et al., 2010). However, very few succeeded in an attempt to propose scales to measure e-SQ in pure service oriented setting. E.g. in an endeavour to propose a more stable version of the E-S-QUAL to evaluate e-service quality in online banking in Turkey, Akinci et al. (2009) reported some problems with the discriminant validity of their study. Furthermore, in an attempt to reassess the scales in South Africa, (Boshoff, 2007) admitted they kept items with poor loadings (lower than 0.35) in the confirmatory factor analysis of their study. This paper goes one step further by proposing e-SQ scales from a culturally different country and different industry (e-banking). In contrast to previous study, there are some new contributions to drawn from this research. This study is the first attempt to proposed a more stable and reliable version of the amended E-S-QUAL to evaluate electronic service quality in a pure service setting. Moreover, it proposed and test a model that explain better the direct relationship between service recovery and loyalty and the mediating role between the relationship of service quality and loyalty of value.

This study has several acknowledge limitations which should be address in the future. The empirical data for this study was confined to one online service industry in one country. In the future, researchers may replicate the study in other settings and to a culturally different country

to enhance the scales external validity and reliability. To measure e-service recovery a filtering process with a dichotomous question was applied. Given that this study was exploratory it was necessary to lower variability in order to verify the feasibility and reliability of our model. Further research may categorize non-routine encounters from a single/simple defect (e.g. safety concern) to the most important (e.g. transaction/operation failure) before scale evaluation. Besides, this study investigates loyalty and its antecedents for a specific period in time. Since loyalty is a non-spatial notion, it would be interesting for further research to extend the present Loyalty model to different sectors and with a longitudinal data (time based) that can assist in scrupulously understand customers' behaviour and attitude alteration with time.

References

Akinci, S., Atilgan-Ina, E. and Aksoy, S. (2010) "Re-assessment of E-S-Qual and E-RecS-Qual in a pure service setting" Journal of Business Research, 63, pp. 232–240

Anderson, R., & Srinivasan, S. (2003). E-satisfaction and e-loyalty: A contingency framework. Psychology & Marketing, 20(2), 123–138.

Barclay. D.; Higgins. C.; Thompson. R. (1995): "The Partial Least Squares (PLS) Approach to Causal Modelling: Personal Computer Adoption and Use as an Illustration". Technology Studies. (Special Issue on Research Methodology). Vol. 2. Nº 2. pp. 285-309.

Barnes, S. and Vidgen, R. (2002), "An integrative approach to the assessment of e-commerce quality", *Journal of Electronic Commerce Research*, Vol. 3, No. 3, pp. 114-127.

Berry, L.L. and Parasuraman, A. (1991), Marketing Services: Competing through Quality, The Free Press, New York, NY.

Boshoff, C. (2007). A psychometric assessment of E-S-QUAL: A scale to measure electronic service quality. Journal of Electronic Commerce Research, 8(1), 101–115.

Byrne, B. M. (1994), Structural Equation Modeling with EQS and EQS/Windows. Basic Concepts, Applications and Programming. Sage Publications, Thousand Oaks, CA.

Carmines. E.G.; Zeller. R.A. (1979): Reliability and Validity Assesment. (Stage University Paper Series on Quantitative Applications in the Social Sciences. nº. 7010). Beverly Hills. CA: Sage.

Chen, Q. and Wells, W.D. (1999), "Attitude toward the site", Journal of Advertising Research, Vol. 39 No. 5, pp. 27-38.

Compeau. D.H. and Higgins. C.A. (1995). "Application on social cognitive theory to training for computer skills". Information Systems Research. Vol. 6. pp. 118-143.

Cristobal, E., Flavian, C., Guinaliu, M. (2007), "Perceived e-service quality (PeSQ): measurement validation and effects on consumer satisfaction and web site loyalty", *Managing Service Quality*, Vol. 17 No.3, pp.317-40.

Davidow, Moshe. 2003. Organizational responses to customer complaints: What works and what doesn't. /. *Service Res.* 5(3) 225-250.

Fisk, R.P., Brown, S.W. and Bitner, M.J. (1993), "Tracking the evolution of the services marketing literature", Journal of Retailing, Vol. 57, Fall, pp. 124-36.

Fornell. C. & Larcker. D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research. 28(1). 39–50.

Fuentes-Blasco, M.; Gil-Saura, I.; Berenguer-Contrí, G. & Moliner-Velázquez, B. (2010). "Measuring the antecedents of e-loyalty and the effect of switching costs on website", The Service Industries Journal, *in press*, DOI: 10.1080/02642060802626774.

Fundacion Orange, Informe Annual 2008;

http://fundacionorange.es/areas/25_publicaciones/e2008.pdf

Grönroos, C. (1988), "Service quality: the six criteria of good perceived service", Review of Business, Vol. 9, Winter, pp. 10-30.

Hair. J. F., Anderson. R. E., Tatham. R. L. and Black. W. C. (1998), *Multivariate data analysis*. 5th ed., Ed. Prentice Hall International. Inc., Upper Saddle River. NJ.

Hu, L. and Bentler, P. (1999), "Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives", Structural Equation Modeling, Vol. 6, No. 1, pp. 1-55.

Huang, Leo (2008): "Exploring the determinants of E-loyalty among travel agencies", The Service Industries Journal, Vol. 28, No. 2, pp. 239–254

Instituto Nacional de Estadı́stica's, 2011;

http://www.ine.es/jaxiBD/tabla.do?per=01&type=db&divi=EPOB&idtab=2#nogo

Internet World Stats, April 2011; http://www.internetworldstats.com/stats4.htm

John, G. and Reve, T. (1982), "The reliability and validity of key informant data from Dyadic relationship in marketing channels", *Journal of Marketing Research*, Vol. 19, pp. 517-524.

Kim, M., Kim, J-H., & Lennon, S.J. (2006). Online service attributes available on apparel retail web sites: An E-S-QUAL approach. Managing Service Quality, 16(1), 51–77.

Kumar, M, Kee, F. and Charles, V. (2010) "Comparative evaluation of critical factors in delivering service quality of Banks: An application of dominance analysis in modified SERVQUAL model", International Journal of Quality & Reliability Management, Vol. 27 No. 3, 2010, pp. 352-378

Ladhari, R (2009): "A review of twenty years of SERVQUAL research", International Journal of Quality and Service Sciences Vol. 1 No. 2, pp. 172-198

Laffey, Des & Gandy, Anthony (2009): "Comparison websites in UK retail financial services", Journal of Financial Services Marketing, Vol. 14, 2, 173–186

Lin, W-B (2010): "Service recovery expectation model – from the perspectives of consumers", The Service Industries Journal, Vol. 30, No. 6, June 2010, 873–889

Loiacono, E., Watson, R. and Goodhue, D. (2002), "WEBQUAL: a measure of web site quality", in Evans, K. and Scheer, L. (Eds), Marketing Educators' Conference: Marketing Theory and Applications, No. 13, pp. 432-7.

Marimon, F.; Vidgen, R.; Barnes, S.; Cristobal, E. (2010), "*Purchasing behaviour in an online supermarket: the applicability of E-S-QUAL",* International Journal of Market Research, 2010, Vol. 52, nº 1, pp. 111-129

McCollough, Michael A., Leonard L. Berry, Manjit Yadav (2000) "An empirical investigation of customer satisfaction after service failure and recovery" Service Research Vol. 3, n. 2. Pp. 121-137.

Meng, Juan, (2010): "Measurement Equivalency of Web Service Quality Instruments: A Test on Chinese and African American Consumers" Journal of International Consumer Marketing, 1528-7068, Volume 22, Issue 3, 2010, Pages 259 – 269

Meuter. M.L., Ostrom. A.L., Roundtree. R.I. & Bitner. M.J. (2000). Self-service technologies: Understanding customer satisfaction with technology-based service encounters. Journal of Marketing. 64(3). 50–64.

Nunnally, J. C. and Bernstein, I. H. (1994), *Psychometric Theory*, McGraw-Hill. New York.

Osman M. Karatepe, Ugur Yavas, Emin Babakus (2005): "*Measuring service quality of banks: Scale development and validation*", Journal of Retailing and Consumer Services, Vol. 12, pp. 373–383

Parasuraman, A. (2006): "Modeling Opportunities in Service Recovery and Customer-Managed Interactions" Marketing Science, Vol. 25, No. 6, November-December 2006, pp. 590-593

Parasuraman, A., & Grewal, D. (2000). The impact of technology on the quality-value-loyalty chain: A research agenda. Journal of the Academy of Marketing Science, 28(1), 168–174.

Parasuraman, A., Zeithaml, V.A., & Berry, L.L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64(1), 12–40.

Parasuraman, A., Zeithaml, V.A., & Malhotra, A. (2005). A multiple-item scale for assessing electronic service quality. Journal of Service Research, 7(3), 213–233.

Petnji, Y.L.H., Marimon, F., Casadesus, M. (2011), Customer's loyalty and perception of ISO 9001 in online banking. Industrial Management & Data System, 111(8), 1194–1213.

Reichheld, F.F., & Schefter, P. (2000). E-loyalty: Your secret weapon on the web. Harvard Business Review, 87(4), 105–113.

Ribbink, D., van Riel, A., Veronica Liljander and Streukens, S. (2004) "Comfort your online customer: quality, trust and loyalty on the internet", Managing Service Quality Vol. 14, Num. 6, pp. 446-456

Ringle. C.M.. Wende. S. and Will. A. (2005). *SmartPLS 2.0 (beta)*. Retrieved from http://www.smartpls.de (on 20 July of 2009).

Rui Sousa, Christopher A. Voss, (2009) "The effects of service failures and recovery on customer loyalty in e-services: An empirical investigation", International Journal of Operations & Production Management, Vol. 29 Iss: 8, pp.834 - 864

Sanzo. M.J.. Santos. M.L.. Vázquez. R.. and Álvarez. L.I. (2003) "The effect of market orientation on buyer-beller relationship satisfaction". Industrial Marketing Management. Vol. 32. No. 4. pp. 327-345.

Semeijn, J., Van Riel, C.R., Van Birgelen, M., & Streukens, S. (2005). E-services and offline fulfilment: How e-loyalty is created. Managing Service Quality, 15(2), 182–194.

Sherry, A. (2002). Changing the Banks, AFR BOSS The Club – Seminar , *Reinventing Leadership Financial Review*, 12 August 2002. http://www.afrboss.com/events/transcript.asp?eventid=316

Sigala, M. and Sakellaridis, O. (2004) Web users' cultural profiles and e-service quality: internationalization implications for tourism web sites, Information Technology and Tourism, 7(1), pp.13–22.

Srinivasan, S., Anderson, R., & Ponnavolu, K. (2002). Customer loyalty in e-commerce: An exploration of its antecedents and consequences. Journal of Retailing, 78(1), 41–50.

Tax, Stephen Saul, Stephen W. Brown, Murali Chandrashekaran. 1998. Customer evaluations of service complaint experiences: Implications for relationship marketing. /. Marketing 62(2) 60-76.

Tenenhaus. M.; Amato. S. and Esposito. V. (2004). A global goodness-of-fit index for PLS structural equation modeling. Proceedings of the Italian Statistical Society meeting in 2004 (Bari on June 9-11. 2004).

Trout, P. (2006). The customer's dilemma. *Australian Banking and Finance, 15, 12*.

Yen, C.-H., & Lu, P. (2008). Effects of e-service quality on loyalty intention: An empirical study in online auction. Managing Service Quality, 18(2), 127–146.

Yoo, B. and Donthu, N. (2001), "Developing a scale to measure perceived quality of an internet shopping site (SITEQUAL)", Quarterly Journal of Electronic Commerce, Vol. 2 No. 1, pp. 31-46.

Zeithaml, V.A., Parasuraman, A., & Malhotra, A. (2000). A conceptual framework for understanding e-service quality: Implications for future research and managerial practice. Cambridge, MA: Marketing Science Institute.

Zeithaml. V.A.. Parasuraman. A. & Malhotra. A. (2002). Service quality delivery through web sites: A critical review of extant knowledge. Journal of the Academy of Marketing Science. 30(4). 362–375.

Zhilin Yang, Minjoon Jun and Robin T. Peterson,(2004) "*Measuring customer perceived online service quality. Scale development and managerial implications*" International Journal of Operations & Production Management, Vol. 24 No. 11, pp. 1149-1174

Table 1: Demographic characteristics of sample

	Complete sample		Subsample of respondents who have reported a problem	
	Number	%	Number	%
Age				
Between 17 and 24 years	106	24.8	15	12.2
Between 25 and 34 years	150	35.0	48	39.0
Between 35 and 44 years	102	23.8	40	32.5
Between 45 and 54 years	47	11.0	14	11.4
Between 55 and 64 years	16	3.7	5	4.1
>65 years	7	1.6	1	.8
Total	428	100.0	123	100.0
Gender				
Male	203	47.4	61	49.6
Female	225	52.6	62	50.4
Total	428	100.0	123	100.0
Educational level				
High School	39	9.1	15	12.2
College	63	14.7	20	16.3
Bachelor's degree	196	45.8	48	39.0
Master's degree	91	21.3	32	26.0
Others	39	9.1	8	6.5
Total	428	100.0	123	100.0
Annual income (euros)				
<12,000	134	31.3	27	22.0
Between 12,000 and 24,000	148	34.6	44	35.8
Between 24,000 and 35,000	79	18.5	32	26.0
Between 35,000 and 50,000	49	11.4	15	12.2
>50,000	18	4.2	5	4.1
Total	428	100.0	123	100

Table 2: Reliability analysis of adapted E-S-Qual and E-RecS-Qual scales

Factor	Items	Cronbach's alpha	Range for Cronbach's alpha removing one item	Range for correlations of the items and the sum of the subscale
Efficiency	EFF1, EFF2, EFF3, EFF4, EFF6, EFF7, EFF8	.906	.884 - .904	.624 - .801
System availability	SYA1, SYA2, SYA3, SYA4, FUL1, FUL2, EFF5	.887	.857 - .884	.574 - .794
Privacy	PRI1, PRI2, PRI3	.890	.819 - .871	.752 - .813
Responsiveness	RES1, RES2, RES3, COM1	.835	.747 - .835	.573 - .763
Contact	CON1, CON2, CON3	.771	.647 - .741	.559 - .643

Figure 1: Hypothesised relationships among the constructs of the model

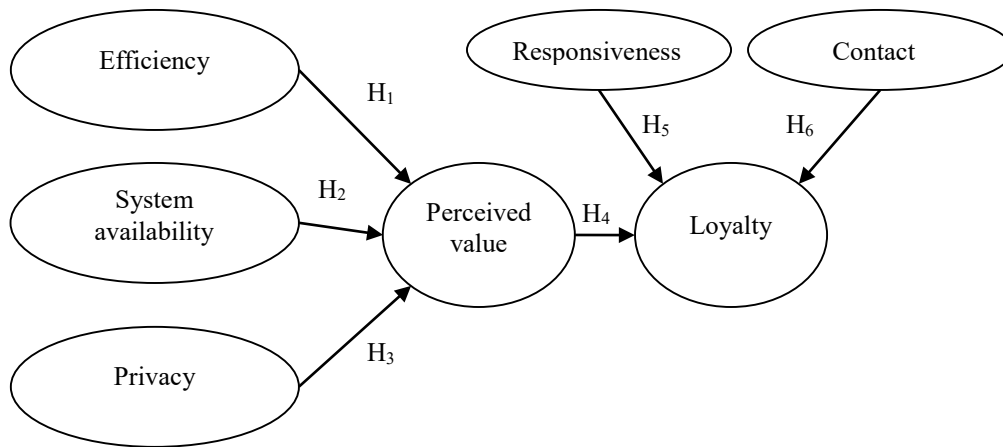**Table 3: Reliability analysis of constructs of 'perceived value' and 'loyalty'**

Factor	Items	Cronbach's alpha	Range for Cronbach's alpha removing one item	Range for correlations of the items and the sum of the subscale
Perceived value	PEV1, PEV2, PEV3, PEV4	.821	.736 -.815	.552 -744
Loyalty	LOY1, LOY2, LOY3, LOY4, LOY5	.896	.861 - 895	.652 - .809

Table 4: Loads on the exterior model.

	Efficiency	System availability	Privacy	Responsiveness	Contact	Perceived Value	Loyalty
EFF1	0.812063						
EFF2	0.812364						
EFF3	0.717951						
EFF4	0.826923						
EFF5		0.680024					
EFF6	0.815190						
EFF7	0.757975						
EFF8	0.865621						
SAV1		0.723327					
SAV2		0.858264					
SAV3		0.789935					
SAV4		0.782267					
FUL1		0.760149					
FUL2		0.828507					
PRI1			0.889038				
PRI2			0.906067				
PRI3			0.921392				
PVA1						0.758754	
PVA2						0.876352	
PVA3						0.740985	
PVA4						0.883334	
LOY1							0.871878
LOY2							0.892892
LOY3							0.861781
LOY4							0.827068
LOY5							0.756804
RES1				0.831769			
RES2				0.819125			
RES3				0.899204			
CPS1				0.721768			
CON1					0.710759		
CON2					0.839194		
CON3					0.904663		
PVA1						0.758754	
PVA2						0.876352	
PVA3						0.740985	
PVA4						0.883334	
LOY1							0.871878
LOY2							0.892892
LOY3							0.861781
LOY4							0.827068
LOY5							0.756804

Table 5: Discriminant validity.

	Efficiency	System availability	Privacy	Responsiveness	Contact	Perceived Value	Loyalty
Efficiency	*0.82024*						
System availability	0.685571	*0.77666*					
Privacy	0.483266	0.532644	*.90559*				
Responsiveness	0.323561	0.282561	0.221888	*0.82041*			
Contact	0.223523	0.162847	0.212933	0.542431	*0.82216*		
Perceived Value	0.642428	0.614633	0.561749	0.374284	0.294245	*0.81747*	
Loyalty	0.604303	0.548655	0.497310	0.443064	0.276656	0.710634	*0.84343*

Note: Correlations between latent variables under the main diagonal. On the diagonal the square roots of AVE in italics.

Table 6: Model fitness

	AVE	Composite Reliability	R Square	Cronbachs Alpha	Communality	Redundancy
Efficiency	0.643857	0.926555		0.907080	0.643857	
System availability	0.603206	0.913689		0.889404	0.603206	
Privacy	0.820103	0.931849		0.890220	0.820103	
Responsiveness	0.673080	0.891143		0.837356	0.673080	
Contact	0.675946	0.861066		0.770603	0.675946	
Perceived Value	0.668260	0.888965	0.519635	0.832446	0.668260	0.220516
Loyalty	0.711377	0.924723	0.542131	0.897872	0.711377	0.352135

Table 7: Path coefficients and t-statistics

Hypothesis	Path coefficient (t-statistic) (*)	Hypothesis testing
H1: Efficiency→ Perceived value	0.357304 (3.346563) (*)	Accepted
H2: System availability→ Perceived value	0.226775 (2.192262) (*)	Accepted
H3: Privacy→ Perceived value	0.268287 (3.026427) (*)	Accepted
H4: Perceived Value→ Loyalty	0.636828 (9.646206) (*)	Accepted
H5: Responsiveness→ Loyalty	0.221439 (2.251563) (*)	Accepted
H6: Contact→ Loyalty	-0.030843 (0.310610)	Refused

(*) t-statistics are significant (p-value > 1.96)

Table 8: Total effects of the constructs on loyalty

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
Efficiency → Loyalty	0.227541	0.238881	0.074162	0.074162	3.068182
System availability → Loyalty	0.144417	0.146547	0.068715	0.068715	2.101684
Privacy → Loyalty	0.170852	0.166722	0.061565	0.061565	2.775152
Responsiveness → Loyalty	0.221439	0.222499	0.098349	0.098349	2.251563
Contact → Loyalty	-0.030843	-0.021293	0.099297	0.099297	0.310610

Acknowledgment