

# The Effects of Service Quality on Customer Trust and Satisfaction in Internet Banking

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## Abstract

**Purpose** - This study contributes a multidimensional measure of service quality impacting on the trust and satisfaction of customers using internet banking.

**Design/methodology/approach** - Unlike previous studies reporting on independent factors of service quality affecting customer trust

and satisfaction, this study elaborates and tests a multidimensional measure of service quality in the context of internet banking services. In addition, this study tests a proposed model and rival models showing how service quality impacts on customer trust and satisfaction.

**Findings** - Service quality is a second-order factor with 6 dimensions revealing 6 important characteristics of the service quality that is expected in Internet banking. They are not separate characteristics of service quality but dimensions of a construct. The proposed model showing a direct impact of service quality on satisfaction and an indirect one on trust is the best tested model using structural equations.

**Research limitations/practical implications:** The research limitations and practical implications of the results are discussed.

**Originality/value** - The study elaborates and tests a multidimensional measure that is a comprehensive, and at the same time, parsimonious, approach to service quality when explaining customer trust and satisfaction in internet banking services.

Keywords: Internet banking, Multidimensional service quality, Customer trust, Satisfaction.

## Resumen

**Objetivo** – Este estudio muestra el impacto de una medida multidimensional de la calidad del servicio respecto de la confianza y la satisfacción de los clientes que usan servicios de banca por internet.

**Diseño/metodología** – De manera distinta a estudios previos que se basan en los efectos independientes de los factores de la calidad del servicio acerca de la confianza y la satisfacción, este estudio presenta y prueba una medida multidimensional de calidad del servicio en la banca por internet. Además, se prueban modelos alternativos rivales que muestran cómo la calidad del servicio genera un impacto en la confianza y la satisfacción.

**Resultados** – La calidad del servicio es un factor de segundo orden con seis dimensiones que revelan seis importantes características para la gestión en la banca por internet. Estas no son características independientes, sino dimensiones de un constructo. El modelo propuesto que muestra un impacto directo de la calidad del servicio

en la satisfacción y uno indirecto en la confianza, es el mejor modelo probado mediante ecuaciones estructurales.

**Valor** – El estudio propone y prueba una medida de calidad del servicio que es comprensiva, pero al mismo tiempo parsimoniosa, que permite entender el efecto conjunto de las dimensiones que la componen respecto de la confianza y la satisfacción en el contexto de la banca por internet.

Palabras clave: Banca por internet, calidad del servicio, confianza, satisfacción.

## **1. Introduction**

This research focuses on the role of service quality in customer trust and satisfaction in the context of Internet bank services. Internet banking is increasingly used to adapt selling and servicing to new and changing customer needs. Indeed, the Internet is pivotal in recent changes in the banking industry. Banks use the Internet to operate outside their physical locale (Howcroft and Durkin, 2000; Mols, 1999), cut costs (Humphreys, 2000), offer highly customized services (Dannenberg and Kellner, 1998), innovate (Prescott and van Slyke, 1997), foster greater understanding of the customer (Yiu *et al.*, 2007), and/or develop side businesses and increase the customer base (Sohail and Shaikh, 2008).

Such benefits to the business, however, have been neither free nor cheap to banks and customers. The implementation of services online has increased the service complexity for bank administration while simultaneously introducing greater uncertainty and risk for the users. In fact, some current deficiencies in the banking system belong to the new process, such as the lack of personal interaction between the bank and its customers and the twilight zone created in the use of customer information, particularly the information considered private and sensitive (Casaló *et al.*, 2007).

Consequently, there is a need to reduce bank complexity and reduce customer risk in the Internet banking environment. There is a need to increase trust between the parties. A greater trust between the bank and its customers may contribute toward diminishing the impact of drawbacks of Internet banking by offsetting the effect of customer perceived risk in an atmosphere that is more vulnerable than traditional banking (Pavlou, 2003). Logically, banks are interested in knowing and using the drivers of customer trust in Internet banking so that they can be more effective in reaching customers and gaining their loyalty. Panel data research shows that customers become more loyal, in terms of repeated purchase, after they adopt online banking (Hitt *et al.*, 2008).

Service quality and its influence in customer trust has been studied in the contexts of transactional relationships (Sharma and Patterson, 1999; Zaichkowsky, 1985) and e-Commerce (Harris and Goode, 2004; Hwan and Kim, 2007; Zeithaml *et al.*, 1996), but it has received little attention in the context of Internet banking (Cha *et al.*, 2005). Studies in e-Commerce, for instance, identify a number of variables that constitute service quality and that influence customer trust: structural assurance (Gefen *et al.*, 2003; McKnight and Chervany, 2001; McKnight *et al.*, 2002), usability (Casaló *et al.*, 2007; Flavián *et al.*, 2006), perceived ease of use (Suh and Han, 2002), access (Liu *et al.*, 2005), information quality (Kim *et al.*, 2008), and content quality (Liao *et al.*, 2006). A logical question follows: can the aforementioned variables form part of a multidimensional construct of service quality (Cox and Dale, 2001; Liu and Arnet, 2000; Walczuch and Lundgren, 2004; Yiu *et al.*, 2007) which in turn may influence trust? If so, it is expected that such variables, interacting with other components of service quality, would influence customer trust differently than when considered separately.

A final concern is how both variables, service quality and trust, are related, directly or indirectly. Existing studies support both relationships. However, if the relationship is indirect, the question is

what mediates the relationship. Some authors have already concluded that it is mediated by customer satisfaction (Cáceres and Paparoidamis, 2007).

A literature review on customer trust, service quality, and customer satisfaction precedes the formulation of key hypotheses for the study. A methodology section addresses the instruments, data collection and the important issues of validity, reliability, and dimensionality of the constructs. The results section provides an account of hypotheses testing using structural equation modeling. The tested model is compared to rival models to probe the robustness of the proposed model. The conclusions and the managerial implications of the outcomes are presented last.

## **2. Literature review**

### *A. Customer trust in online services*

Trust is a key concept in relational marketing (Crosby *et al.*, 1990; Doney and Cannon, 1997; Macintosh and Lockshin, 1997) and has been studied from several perspectives (Gefen *et al.*, 2003). A definition of trust widely accepted and used underscores the willingness of the trusted counterpart in the exchange relationship to reciprocate (Moorman *et al.*, 1992).

Trust in an online service context may not be essentially different from trust in a traditional service context (Kracher *et al.*, 2005) despite the fact that an online service context involves a distant relationship between the user and the provider and lacks human intermediaries (Yoon, 2002). A distant relationship limits the user's ability to provide immediate feedback and to adequately learn and manage the use of an online system (Nohria and Eccles, 1992). Understandably, the web site is the seller in e-Commerce (Jarvenpaa and Tractinsky, 1999), whereas in a normal relationship, people trust people, not machines (Solomon and Flores, 2001). In addition,

eCommerce customers may feel vulnerable to the service provider's proposition (Pavlou, 2003) and/or to the technologically driven information on the web (Kato *et al.*, 2008). Information and communications technology increases credibility risk and requires effective management of information-credibility risk (Hirose and Sonehara, 2008). Thus, obtaining customer trust in e-Commerce is more challenging than getting it in traditional exchanges.

Trust in eCommerce or e-Trust is defined as the degree of trust customers experience in online exchanges or online channel exchanges (Ribbink *et al.*, 2004). More specifically, e-Trust rests on three customer perceptions of the provider (Suh and Han, 2002): 1) integrity, the user's belief that the provider acts out of good will, acts ethically (such as being truthful) and keeps his promises; 2) benevolence, the user's belief that the provider seeks the user's benefit beyond his own interests or egocentric motives; and 3) ability, the user's belief that the provider has the power to bring about what the user needs.

Trust has a more important role in online exchanges than in traditional exchanges (Ratnasingham, 1998) mainly because it takes place in a more uncertain environment (Pavlou, 2003), it lacks human interface in online transactions (Papadopoulou *et al.*, 2001; Torres *et al.*, 2008), and it represents greater customer risk due to the absence or complexity of contracts and guarantees (Crosby *et al.*, 1990; Grazioli and Jarvenpaa, 2000). Reasonably, users of online transactions have more difficulty in evaluating provider commitments and the provider's use of customer personal information (McKnight *et al.*, 2002). Yet, the rational expectation is that trust in online transactions can reduce customer perceived risk (Pavlou, 2003) and influence customer loyalty (Macintosh and Lockshin, 1997), resulting in repeated purchase in the near future.

### *B. Service quality in online services*

Quality, in general, is conceived as a bundle of proprieties, circumstances, characters, attributes, traits, and other human valuations, inherent or acquired, that are valued distinctively from other evaluations (Maqueda and Llaguno, 1995). Service quality relates to quality in service exchanges or, more specifically, to customer conformity with the service as specified by the user (Parasuraman *et al.*, 1988).

Measuring service quality has become relevant in marketing since the 1980's. One of the first proposals was SERVQUAL (Parasuraman *et al.*, 1988). Using five dimensions and 22 items, this instrument became quite useful in various industries and, with some adaptations, in some services (Carman, 1990). In turn, SERVPERF was introduced by Cronin and Taylor (1992) with three dimensions (functional quality, technical quality, and corporate image). Later, in the context of information systems, IS-SERVQUAL (Kettinger and Lee, 1999) was developed to measure service quality in this area. However, none of these instruments is considered appropriate for electronic or Internet services mainly because some of the measures used require a direct human exchange, such as empathy (Janda *et al.*, 2002).

Thus, new instruments were developed for electronic services. The first one used five dimensions: service, information quality, system, degree of enjoyment, and web design (Janda, Trocchia and Gwinner, 2002). WebQual is based on 12 dimensions and centered on the technical quality of web sites (Loiacono *et al.*, 2007). SiteQual consists of nine items grouped in four dimensions: easy use, design, accessibility, and interaction (Yoo and Donthu, 2001), but ignores the customer's perceptions of the buying process (Sohail and Shaikh, 2008). eTailQ used focus groups to develop service quality both online and offline, and propose 14 items grouped in four dimensions: web site design, reliability, privacy/security, and customer service (Wolfenbarger and Gilly,

2003). In addition, van Riel *et al.* (2001) propose scales centered on web medical information and three factors: central service, support service, and user interface, and Barnes and Vidgen (2002) put forth WEBQUAL 4.0 with three dimensions: web site usability, information quality, and service interaction.

More specifically, there are instruments that measure service quality in online shopping sites. Madu and Madu (2002) propose one with 15 dimensions; Zeithaml *et al.* (2000) set forth E-SERVQUAL with 11 dimensions; Cox and Dale (2001) offer an instrument with six constructs (accessibility, communication, credibility, understanding, appearance, and availability); Yang *et al.* (2005) study perceived quality in various web sites and arrive at five dimensions: usability, utility, information adequacy, accessibility, and interaction; Parasuraman *et al.*, (2005) put forward E-S-QUAL with 22 items (similar to SERVQUAL) grouped in four dimensions: efficiency, availability, privacy and actualization; Parasuraman *et al.*, (2005) also introduce E-RecS-QUAL with three dimensions (response capability, compensation and contact) to include customers that are in the process of service recovery.

The following characteristics of service quality in electronic commerce are common ground in previous literature (Sohail and Shaikh, 2008): privacy/security, web availability and content, web design, usability, and reliability. Yet, such common ground can only be suggestive of potential characteristics of Internet banking. Thus, a specific construct of service quality for Internet banking has to be developed on the basis of the more generic measures applied in electronic commerce.

From this perspective, when measuring the influence that service quality might have on the other variables, it is imperative to consider service quality as a multidimensional construct rather than considering its dimensions separately. Several studies have done the latter in the context of e-commerce, relating some variable components of service quality directly with trust, for example, structural assurance (Gefen *et al.*, 2003; McKnight and Chervany,

2001; McKnight *et al.*, 2002), usability (Casaló *et al.*, 2007; Flavián *et al.*, 2006), access (Liu *et al.*, 2005) and content quality (Liao *et al.*, 2006).

### *C. Customer satisfaction in online services*

Customer satisfaction generally refers to consumers' affective state resulting from the long-term evolution of their relationship with a provider (Sanzo *et al.*, 2003). Such a state can be seen in two ways, an affective predisposition linked to an economic process or a psychological view of how promises are fulfilled (Geyskens *et al.*, 1999).

A measure of customer satisfaction in services requires a comparison between consumer's expectations, before a service is used, and the effective performance in the service delivery which is evaluated a posteriori (Oliver, 1999). Thus, it can also be said that satisfaction is the evaluation of a gap between two stimuli, a result and a referent for comparison (Oliver, 1997).

In an offline context, customer satisfaction is produced in the personal interaction between the consumer and the provider while service is performed (Bitner *et al.*, 1990). In an online context, however, services are provided without personal interactions (Szymanski and Hise, 2000). From this perspective, e-satisfaction may result from the comparison between users' experience with Internet service and their experiences with traditional commerce (Szymanski and Hise, 2000).

Internet has some advantages when used as self-service technology: convenience, saving time and money, avoiding interpersonal interaction, and being in control. These are advantages that can become drivers of satisfaction in an online context or e-satisfaction (van Riel *et al.*, 2001). E-satisfaction can switch users from traditional to online services in addition to lengthening

customer Internet usage and increasing customer references and recommendations for Internet usage (Bansal *et al.*, 2004).

E-satisfaction in Internet banking seems to be influenced not only by the compatibility between the technologies used by the customer and the provider (Torres *et al.*, 2008), but also the availability of information and security in the transactions at the bank (Bansal *et al.*, 2004). The latter factors pertain to service quality as well.

### 3. Key relationships

As evident by reviewing the literature, service quality is a multidimensional construct comprised of interdependent variables. From this perspective, the effect that each of the variables has on trust does not occur in an isolated manner, but rather is influenced by all other variables in the construct. Considering this interrelationship, the effect of the components of service quality on trust should not be measured independently but rather measured within service quality as a multidimensional construct.

From this point of view, the effect of service quality on trust is not direct; it should be mediated by satisfaction, in line with the considerations presented in the specialized literature. Consequently, this study considers the following hypothesis.

#### A. *Customer satisfaction and customer trust*

Customer satisfaction is a key antecedent of various outcomes in relational marketing, such as trust (Selnes, 1998), commitment (Dimitriadis, 2006), and reputation (Selnes, 1993). Similar relationships seem to take place in e-Commerce (Evanschitzky *et al.*, 2004), where satisfaction seems to also influence customer loyalty in terms of re-use intention and positive mouth-to-mouth

communication (Bansal *et al.*, 2004; Anderson and Srinivasan, 2003). In an online context, satisfaction may also generate better relationships between the firm and its customers (Rust and Lemon, 2001).

Several studies have shown that customer satisfaction influences customer trust in electronic commerce (Harris and Goode, 2004; Hwan and Kim, 2007). In addition, Walczuch and Lundgren (2004) found that both satisfaction and communication positively affect trust in online services, and Pavlou (2003) found a similar result in the context of e-tailer, which was corroborated by Ribbink *et al.*, (2004). Thus, we present the following hypothesis:

**H1:** The greater the user satisfaction with his/her Internet bank, the greater the user trust in his/her Internet bank.

### *B. Service quality and customer satisfaction*

The first task in this examination is whether service quality and customer satisfaction are different concepts. Some researchers doubt that they are different (Grönroos, 1984), but others consider them clearly different (Carman, 1990; de Ruyter and Bloemer, 1997; Lee *et al.*, 2000). Service quality and perceived service quality are fundamentally cognitive evaluation, whereas, customer satisfaction is fundamentally an affective evaluation on the basis of personal experiences and sentiments (Floh and Treiblmaier, 2006). Similarly, high quality is related to the customer high expectations, whereas satisfaction is related to experiences in virtual environments (Bauer *et al.*, 2005).

In traditional commerce, it is widely accepted that service quality is an antecedent of customer satisfaction and loyalty (Cronin and Taylor, 1992). Szymanski and Hise (2000) and van Riel *et al.* (2004) agree that service quality has a direct effect on customer satisfaction in online environments. Additional empirical research

shows that service quality is also related to customer satisfaction and lower prices in e-Commerce transactions (Mahajan *et al.*, 2002; Reibstein, 2002; Shankar *et al.*, 2003). The relationship of service quality-customer satisfaction has also been ascertained in both conventional banking (Al-Hawari and Ward, 2006) and Internet banking (Sohail and Shaikh, 2008). Thus, we present the following hypothesis:

**H2:** The higher the service quality of Internet bank services, the greater the user satisfaction with his/her Internet bank.

## 4. Methodology

### A. Measures

The measures for customer trust and customer satisfaction are based on previous research. The measures for e-trust were adapted from Kumar *et al.* (1995), Doney and Cannon (1997) and Roy *et al.* (2001). The measures for satisfaction were adapted from Sharma and Patterson (2000), Brockman (1998), Smith and Barclay (1997) and Veloutsou *et al.* (2004).

The measures for service quality were developed on the basis of the pilot study and the contributions reviewed above (see Appendix). This work resulted in six dimensions for a multidimensional construct of service quality in Internet banking: accessibility/availability, accuracy, product/service quality, responsiveness, security/privacy, and usability. A brief definition of each follows:

- **Accessibility/Availability (AA):** It refers to the availability and correct functioning of the web site when accessed.

- Accuracy (AC): It requires that the contents, interfaces and transactions in the web site can be done without errors.
- Product/Service Quality (PQ): It refers to the quality and variety of products offered by the bank through the internet.
- Responsiveness (RE): It relates to the banks' effective capability to respond to customers' requests, and to handle users' problems through the internet.
- Security/Privacy (SP): It relates to a user's perception of how personal information is protected and how structurally safe is the web site.
- Usability (US): It represents the effort that must be made to navigate through the bank's web site or the easy of navigation when using Internet banking.

All six dimensions measure service quality in Internet banking and are supported in part in Wolfinbarger and Gilly (2003), Kim and Pradhakar (2004), Ranganathan and Ganapathy (2002), Parasuraman *et al.* (2005), Roy *et al.* (2001), Lin *et al.* (1997), Brown and Buys (2005) and Gounaris *et al.* (2003). Usability and security have been often reported in other studies. The other dimensions are backed by lower levels of empirical research. Previous research also shows that some dimensions are independently linked to customer trust, such as usability (Casaló *et al.*, 2007; Flavián *et al.*, 2006), access (Liu *et al.*, 2005), content quality (Liao *et al.*, 2006), and structural assurance (McKnight *et al.*, 2002; McKnight and Chervany, 2001; Gefen *et al.*, 2003).

The items were written as assertions to be evaluated by the respondent using a seven-point Likert scale (anchored at 1 = completely disagree and 7 = completely agree), and organized in a questionnaire format (see Appendix).

### *B. Pilot study*

Scale development and/or adoption required a pilot study. On the basis of 124 in-depth interviews, feedback was obtained using the Critical Incident Technique (CIT) and following the suggested requirements by Bitner *et al.* (1990). The technique was instrumental to identifying relevant dimensions and traits in service quality in conditions of positive and negative customer experiences with services provided by Internet banking. Because some interviewees indicated more than an incident, the unit of analysis became the incident, not the interviewee (Jun and Cai, 2001). Each incident had to fulfill the following requirements: (a) Involve an interaction between the bank web and the customer; (b) Obtain service satisfaction or dissatisfaction from the customer perspective; (c) Be a discrete episode; (d) Offer enough detail to be detected and described by the interviewee.

The scale items for each dimension were developed and analyzed using the criteria and procedures recommended by De Wulf and Odekerken-Schröder (2003) as follows:

- 1) Unidimensionality is tested using factorial analysis of principal components with loadings greater than 0.65.
- 2) Convergent validity is tested using fit indices that are statistically significant at a 0.05 confidence level and  $R^2$  coefficients that are greater than 0.50.
- 3) Construct reliability is measured using Cronbach Alpha with a minimum value of 0.70 and a composite reliability coefficient above 0.60.
- 4) Discriminant validity is tested comparing the Chi-squared differences and the AVE index with a value above 0.50. Each

construct variance must be greater than the corresponding variance of measurement error.

Current users (organized in focus groups) and executives from selected banks offering Internet banking provided feedback to accomplish two objectives: add items that reflect the concept more clearly and eliminate the items that do not fit in the dimension or construct. Following a method recommended by Zaichkowsky (1985), each expert classified each item in a dimension using three levels of representation: clearly representative, somewhat representative or not representative.

The chosen items reflected a high level of consensus among the participants (Lichtenstein *et al.*, 1990). To make a final decision on the dimensions, Internet bank executives were consulted, and the results of the discussions with them taken into account. Finally, the questionnaire was pre-tested for comprehension, possible ambiguities, and easy evaluation of the scale items with a group of 15 customers.

### *C. Sample and data collection*

The sample frame includes users of both virtual banks, those without physical offices for their customers, and conventional banks that offer Internet services as recommended by López (2001). A probabilistic sampling generated a total of 640 complete responses from bank users who have Internet banking at their disposal, who accepted a telephone interview, and who answered the questionnaires administered during the last two months of 2007 in Santiago, the capital city of Chile. Specialized software allowed a random selection of the telephone numbers and the order of the questions, so as to count on a probabilistic sample of bank users.

A brief description of the sample follows. More than half (55.8%) have used bank services for four years or less, whereas less

than half (44.2%) for more than four years. Most users (72.3%) prefer access to bank services from home, whereas 46.3% enjoy access from work, 5.9% get access from leased facilities like Internet cafes, and 3.2% conduct Internet transactions from other facilities (house of a relative or university) or using a cellular phone. Demographically, 50.2% are women, 51.5% are young adults (18-34 years old), 79.1% have college education whereas 19.5% have technical education and 10.8% have not attended college. Finally, about 52% earn more than \$20,000 annually whereas 48%, up to \$20,000 only.

## 5. Results

### A. *Measurement validity, reliability, and dimensionality*

This section examines the dimensionality, reliability and validity of a multidimensional construct for service quality and unidimensional constructs for both customer trust and customer satisfaction and evaluates the same requirements for the entire model.

#### a. SERVICE QUALITY: MULTIDIMENSIONAL CONSTRUCT

Exploratory factor analysis using principal components, varimax rotation, eigenvalues greater than one, significant explained variance and factor weights greater than 0.5 (Hair *et al.*, 2005) resulted in six factors for service quality, each factor representing an expected dimension: responsiveness, security/privacy, accessibility/vailability, usability, accuracy, and product quality.

Confirmatory factor analysis using structural equation modeling and software EQS 6.1 considered strengthening the factors and improving the model (Hair *et al.*, 2005) by applying the three criteria recommended by Jöreskog and Sörbom (2001). Yet, the

resulting factors did not need improvement because they already showed high reliability, strong convergence with the corresponding latent variable, and an  $R^2$  greater than 0.3. The resulting measurement model shows good fit to the data:  $\chi^2(120) = 307.68$ ,  $p \leq 0.001$ , IFI = 0.97, CFI = 0.97, TLI = 0.96, RMSEA = 0.05, and Normed  $\chi^2 = 2.56$ .

We also tested the multidimensionality of service quality using a Rival Model Strategy, (Hair *et al.*, 2005), which compares two alternative models, a first-order model and a second-order model (Steenkamp and van Trijp, 1991). All items of a construct load into a factor (first order); whereas all six factors reflect the six dimensions of the service quality construct (second order). The second-order model offers a better fitting in support of the multidimensionality of service quality.

In assessing reliability, we examined coefficient Alpha (Cronbach) and the Coefficient of Composite Reliability for each construct (Jöreskog, 1971). Both coefficients are above the minimum threshold of 0.70 required by Nunnally (1978) for hypothesis testing, indicating that our measures are reliable (see Table I).

**Table I**  
*Reliability Analysis*

VARIABLES / DIMENSIONS	CRONBACH ALPHA	COMPOSITE RELIABILITY COEFFICIENT
Trust	0.81	0.75
Satisfaction	0.80	0.72
Service Quality:		
Responsiveness	0.85	0.76
Security/privacy	0.81	0.72
Accessibility/availability	0.71	0.69
Usability	0.88	0.80
Accuracy	0.72	0.70
Product quality	0.73	0.71

We also investigate construct validity in terms of convergent validity and discriminant validity. For convergent validity, Table II shows that all measure standardized coefficients resulting from confirmatory analysis are statistically significant at  $p < 0.01$ ) and above the recommended level of 0.50 (Bagozzi and Yi, 1988; Anderson and Gerbing, 1988). Discriminant validity was assessed using two procedures, Chi-squared differences and confidence interval tests (Bagozzi, 1981; Anderson and Gerbing, 1988). Table II shows that the tested-model (see Figure 1) Chi-square is significantly different from all alternative models where two dimensions are perfectly correlated (Janssens *et al.*, 1995). Table II also shows discriminant validity in any pair of latent variables. When estimating each pair's correlations, value "1" is excluded from all confidence intervals and the correlation coefficients are much below value "1" in support of model discriminant validity.

**Table II**  
*Validity analysis*

CONSTRUCT PAIRS	CORRELATION COEFFICIENT	CHI-SQUARED DIFFERENCES	CONFIDENCE INTERVALS
TRUST-SAT	0.75*	148.89 (1)*	0.70; 0.81
TRUST-SQ	0.83*	155.49 (1)*	0.79; 0.87
SAT-SQ	0.85*	100.01 (1)*	0.82; 0.89
RESP-SECUR	0.83*	60.35 (1)*	0.79; 0.89
RESP-AC&AV	0.90*	24.69 (1)*	0.84; 0.93
RESP-USAB	0.65*	285.76 (1)*	0.59; 0.72
RESP-ACCUR	0.87*	48.38 (1)*	0.78; 0.89
RESP-P QUAL	0.84*	29.49 (1)*	0.83; 0.93
SECUR-AC&AV	0.74*	71.46 (1)*	0.69; 0.83
SECUR-USAB	0.64*	195.92 (1)*	0.60; 0.74
SECUR-ACCUR	0.82*	43.29 (1)*	0.77; 0.89
SECUR-P QUAL	0.81*	58.32 (1)*	0.73; 0.86
AC&AV-USAB	0.76*	71.19 (1)*	0.73; 0.85
AC&AV-ACCUR	0.82*	47.68 (1)*	0.73; 0.86
AC&AV-P QUAL	0.78*	45.23 (1)*	0.71; 0.85
USAB-ACCUR	0.72*	123.75 (1)*	0.55; 0.70
USAB-P QUAL	0.61*	165.88 (1)*	0.73; 0.87
ACCUR-P QUAL	0.79*	45.23 (1)*	0.64; 0.77

\* Significant at level 0.01

b. MODEL: SERVICE QUALITY, CUSTOMER SATISFACTION AND CUSTOMER TRUST

Exploratory factor analysis (Hair *et al.*, 2005) and confirmatory factor analysis (Jöreskog and Sörbom, 1993) resulted in two unidimensional constructs for customer satisfaction and customer trust with reliability coefficients above 0.70 (Nunnally, 1978) (See Table III).

**Table III**  
*Confirmatory factor analysis*

ITEMS	STANDARDIZED COEFFICIENT (FIRST ORDER)	STANDARDIZED COEFFICIENT (SECOND ORDER)
Trust 1	0.66*	
Trust 2	0.80*	
Trust 3	0.67*	
Trust 4	0.72*	
Satisfaction 1	0.79*	
Satisfaction 2	0.71*	
Satisfaction 3	0.76*	
SERVICE QUALITY		
Responsiveness 1	0.71*	0.75*
Responsiveness 2	0.83*	
Responsiveness 3	0.85*	
Security/privacy 1	0.75*	0.89*
Security/privacy 2	0.77*	
Security/privacy 3	0.77*	
Accessibility/availability 1	0.70*	0.94*
Accessibility/availability 2	0.84*	
Accessibility/availability 3	0.55*	
Usability 1	0.83*	0.89*
Usability 2	0.89*	
Usability 3	0.80*	
Accuracy 1	0.78*	0.93*
Accuracy 2	0.51*	
Accuracy 3	0.70*	
Product Quality 1	0.78*	0.90*
Product Quality 2	0.76*	
Product Quality 3	0.55*	

\* Significant at level 0.01

Confirmatory factor analysis applied to the entire measurement model shows good fit to the data:  $\chi^2(266) = 760.11$ ,  $p \leq 0.001$ ; NFI = 0.92; IFI = 0.94; CFI = 0.94; GFI = 0.91; RMSEA = 0.05; Normed  $\chi^2 = 3.13$ .

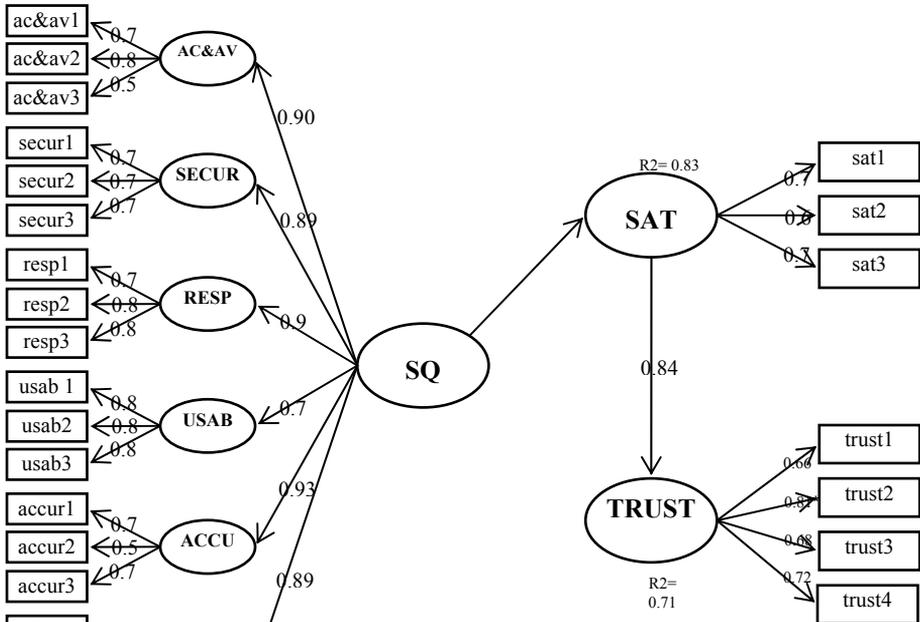
Convergent validity applied to the model shows that all measure standardized coefficients are statistically significant at  $p < 0.01$ ) and above the recommended level of 0.50 (Bagozzi and Yi, 1988; Anderson and Gerbing, 1988). Similarly, discriminant validity procedures show that the theoretical model is significantly different from all alternative models and that the correlation coefficients are much below value "1" in support of model discriminant validity (See Table II).

### *B. Hypothesis Testing*

Hypotheses tests using structural equation modeling are based on a measurement model with good fit to the data:  $\chi^2(267) = 805.55$ ,  $p \leq 0.001$ ; NFI = 0.91; IFI = 0.94; CFI = 0.94; GFI = 0.91; RMSEA = 0.06; and Normed  $\chi^2 = 3.02$ . Figure 1 depicts the model relationships according to which service quality positively and significantly affects customer satisfaction with Internet services in support of hypothesis 2. In turn, customer satisfaction positively and significantly affects customer trust corroborating hypothesis 1.

From a broader perspective, the model tests also show that customer satisfaction is a mediating variable between service quality and customer trust. Service quality has an indirect effect on customer trust as hypothesized and tested.

**Figure 1**  
Structural model: customer trust in Internet banking



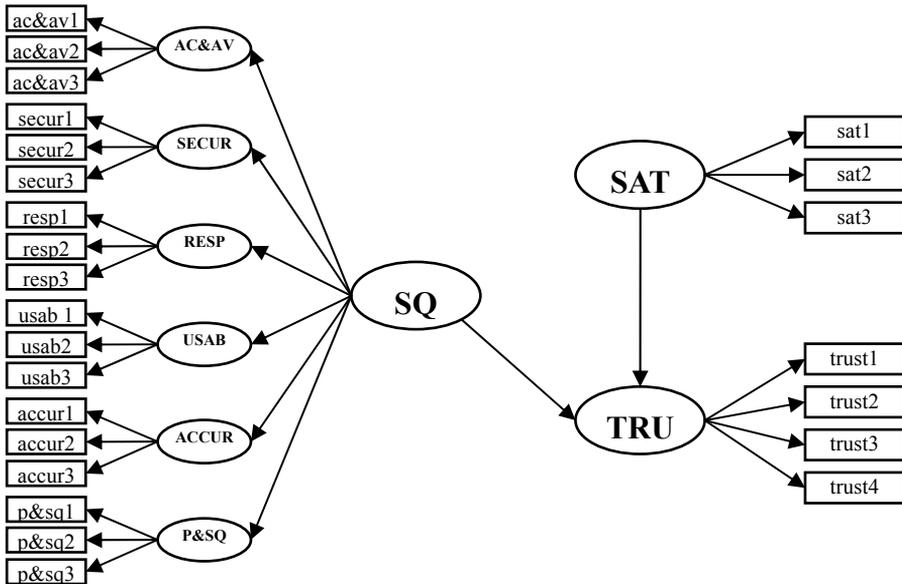
\* Significant at level 0.01

*C. Analyses of Rival Models*

An analysis of rival models probes the robustness of the proposed model (Bloemer and Odekerken-Schröder, 2003). Two rival models are used: (a) the first model probes if in fact customer satisfaction mediates the relationship between service quality and customer trust in Internet banking; (b) the second model probes the robustness of a second-order service quality in its impact on the outcomes versus the impact of each dimension separately.

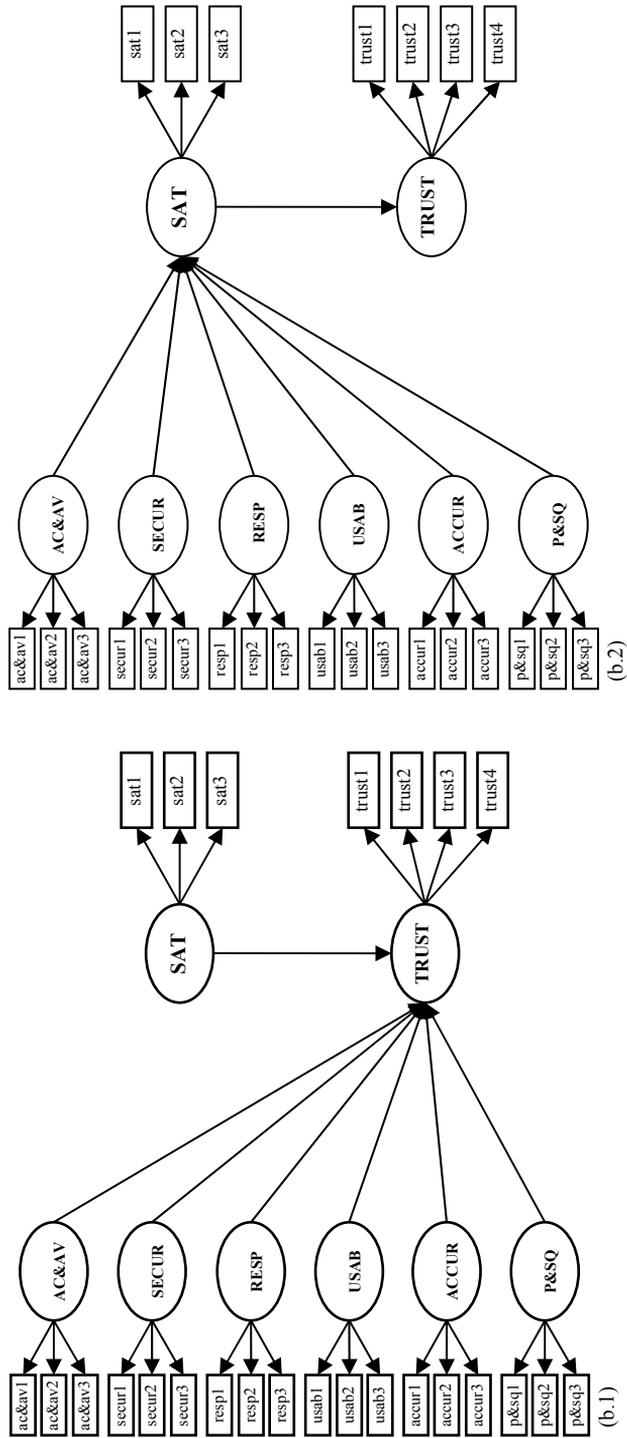
**Figure 2**  
*Rival Models*

(a) Rival model: Service quality as a multidimensional construct



(a) Regarding the first rival model, structural equation results applied to both models show that the tested model is superior to this rival model because it better fulfills the requirements proposed by Morgan and Hunt (1994) and shows higher values of CFI (0.94 versus 0.89 for the rival model, where only the first value is above the threshold of 0.90 (Bansal and Boyer, 2000), greater explanatory power ( $R^2 = 0.71$  for the tested model versus  $R^2 = 0.62$  for the rival model), and a smaller Normed  $\chi^2$  (3.02 versus 4.66). The tested model is a better fit for the data than the rival model and is more parsimonious. Thus, it is concluded that the relationship between service quality and customer trust in Internet banking is mediated by the customer satisfaction with the Internet offerings.

(b) Rivals models: Service quality factors as independent variables



(b) Regarding the second rival model, the CFI from the alternative models b.1 and b.2 are 0.64 y 0.69 respectively, lower than the CFI from the proposed model (0.94) and much lower than the required value. Similarly, the resulting R2 are 0.54 and 0.51 for the alternative models b.1 and b.2, respectively, which are lower than the R2 (0.71) for the proposed model. Finally, the values from the Normed  $\chi^2$  test are 12.94 and 11.28, respectively, which are outside the required range ([1; 5]). Thus, it is concluded that the proposed model fits the data better, explains more, and is parsimonious. The proposed model establishes a significant and positive relationship between customer satisfaction and customer trust, and examines the significant and positive impact of a second-order service quality on customer satisfaction.

## **6. Conclusions and managerial implications**

This study explored the role that service quality plays in the generation of customer trust in online banks. The results of this study demonstrate that service quality plays a vital role in the generation of trust, and that the effect of service quality is direct on customer satisfaction and indirect on customer trust. The indirect effect on trust is mediated by customer satisfaction. More importantly, the findings point to service quality's role in this context as being a multidimensional construct, not a group of isolated, independent influences, as previous studies have shown.

Service quality is a latent variable (a second-order construct), where each of its dimensions interacts with the others. Therefore, the potential effect of each dimension on trust is influenced by the other components of service quality. This study contributes with findings and evaluations supporting a six-dimension construct of service quality: security/privacy, accessibility/availability, usability, respon-seveness, accuracy, and product quality.

These results have important implications for the management of online banks. In accordance with the results of this study, management of consumer trust in this type of banking must treat different factors of service quality as interrelated whole, not as separate and unrelated, as other studies have proposed.

The implications for the practice are straight forward. Banks may not only appreciate the importance of customer trust in the generation and sustenance of Internet services, they can also trace the origin of trust back to its sources, fundamentally customer satisfaction and service quality. In addition, they can follow a path that allows them to place their resources appropriately by, first, securing service quality in tandem in order to produce customer satisfaction and, then, using customer satisfaction as leverage to attain customer trust. In securing service quality in tandem, banks should pay attention not only to the products and services offered via Internet, but also to the delivery process and the potential problems created when not reaching customer expectations. Once customer satisfaction is secured, banks can reasonably expect to obtain the derived benefit of satisfaction, customer trust.

More specifically, banks have to work on the elements that make service quality appreciated by the customer, as reflected in the six quality dimensions identified and corroborated in the study. A key element is structural security of the web site, including protection of customers' personal information (Casaló *et al.*, 2007; McKnight *et al.*, 2002). Another customer-driven element is web accessibility and availability, including useful content and dynamic interfaces. Internet bank users expect to experience an errorless registration process for transactions (accuracy) and to easily understand the structure of the web site, its functions, interfaces, and the contents offered (responsiveness). They also favor usability or perceived ease of site navigation involving both time required and action necessary to obtain the desired results, and speed in finding what they are looking for on the web site.

Bank managers should understand that Internet banking is not only a technological tool, it is a path to reach and secure customers, who in turn expect service quality, as characterized in this study, and satisfaction, as preconditions to customer's trust in e-banking.

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