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Article

Evaluation of quality in different electronic services: A multigroup analysis

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EVALUATION OF QUALITY IN DIFFERENT ELECTRONIC SERVICES: A MULTIGROUP ANALYSIS

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ABSTRACT

Most of articles that have recently appeared studying electronic service quality propose scales that are focused on measuring the quality of a particular service. However, could these scales be applied to measure the quality of other online services? In this situation, the main purpose of this study is to test the equivalence of a factor model to evaluate the quality of three services: online travel reservations, accommodation reservations and online ticketing. The results support the measurement equivalence of the measures. However, the importance of the dimensions varies across the services. In this sense, reliability is the most important factor in the evaluation of Websites of travel and accommodation reservations. Furthermore, in the evaluation of ticketing Websites, the higher weight factor is design.

KEY WORDS: electronic service quality, measurement invariance, multigroup, confirmatory factor analysis, Website.

1. INTRODUCTION

The Internet sector has grown exponentially in the past decade, increasing its diffusive power and cross-industry impact. Specifically, 40% of the population of the EU27 has purchased goods or services through the Internet (Eurostat, 2013). This volume of business generated by the B2C e-commerce accounts for 14% of the total turnover of companies in these countries. In addition, 70% of households and 85% of companies in the EU27 are connected to the Web (Eurostat, 2013). On the other hand, online services, unlike traditional services, are not constrained by distance and opening hours, and consequently they provide higher levels of



convenience to customers. Thereby, many companies, both virtual and brick-and-mortar organizations, use the Internet as a new platform to provide their services.

Typically, online customers can more easily compare alternatives than offline customers and a competing offer is just a few clicks away on the Internet (Shankar et al., 2003). Add to that, online consumers have a wider range of choices in selecting products and services, and highly competitive prices. As a result, competition between different Websites is high in order to attract the users' attention and make them repeat a visit. In this situation, it is generally not easy for online retailers to gain competitive advantages based solely on a cost leadership strategy (Jun et al., 2004). Many researchers point out that to deliver a superior service quality is one of the key determinants of online retailers' success (Zeithaml et al., 2002) and it is a major driving force on the route to long-term success (Fassnacht and Koese, 2006).

To set out which aspects must be evaluated in the service quality, many researchers have used the service encounter approach (e.g., Bitner, 1990; Bitner et al., 1990). Shostack (1985: p. 243) defines the term service encounter as "a period of time during which a consumer directly interacts with a service". This definition encompasses all aspects of the service firm with which the consumer may interact, including its personnel, its physical facilities and other tangible elements, during a given period of time. Shostack (1985) does not limit the encounter to the interpersonal interactions between the customer and the firm. In fact, she suggests that service encounters can occur without any human interaction element. This view of a service encounter is still valid in the online services context. In the evaluation of eservice quality, it is necessary to consider all the cues and encounters that occur before, during and after the transactions (Zeithaml et al., 2002). Specifically, two different service encounters can take place in the context of Internet: (1) service encounters with noninterpersonal interactions, during which customers get the service for themselves, without the presence of employees (service encounter without incidents) and (2) service encounters with interpersonal and non-interpersonal interactions. Generally, the interactions with a member of the organization take place when a customer needs to solve any problem or doubt that may arise during the service delivery (service encounter with incidents). However, in many works the dimensions proposed to measure the e-service quality does not consider how the problems or doubts are resolved when there are incidents in the service encounter (e.g., Aladwani and Palvia, 2002) or this aspect is valued by all the participants. In this sense, Parasuraman et al. (2005) criticize the work of Wolfinbarger and Gilly (2003), as the items of the customer

attention dimension are answered by all the respondents instead of only by those who had problems or doubts.

Many articles have recently appeared studying electronic service quality. However, the scales are focused on measuring the quality of a particular e-service: online retailing (Collier and Bienstock, 2006), electronic banking (Sohail and Shaikh, 2008), online travel agencies (Ho and Lee, 2007), etc. As a consequence, these scales may lose validity when applied in other different contexts. In this situation, the main objective of our research is to propose a reliable and valid measurement instrument to measure the quality of three services: online travel reservations, online accommodation reservations and online ticketing. We have chosen these services as they are the most requested Internet services in Spain (ONTSI, 2013). To test the invariance or equivalence of a factor model over different groups (factorial invariance or multiple-group invariance), we followed the sequence of test procedures recommended by the literature (e.g., Byrne 2008, 2009; Byrne et al., 2007; Byrne and van de Vijver, 2010; Cheung and Rensvold, 2002; Meredith, 1993). We have not found any study which has analyzed whether the scales proposed have a measurement validity for different electronic services. There is thus an important research gap in this sense.

To achieve the objectives proposed, the article is structured as follows. First, we review the most relevant research to help us identify the dimensions of e-service quality. We describe the sample and measures used in the study. Then, we show the results of the empirical research. Finally, we discuss the conclusions and implications for management, the limitations and future research lines.

2. THEORETICAL BACKGROUND

The application of technology in services provisions also means the appearance of a new concept: electronic services. The contributions which have been made in the literature about the study of electronic services originate in the areas of marketing services (e.g., Janda et al., 2002), of electronic commerce (e.g., Yoo and Donthu, 2001), of research about information systems (e.g., Aladwani and Palvia, 2002) or in works which are centered on the technology acceptation model (TAM) (e.g., Davis, 1989; Davis et al., 1989). Although there is not a commonly-accepted definition about the electronic services concept (Fassnacht and Koese, 2006), some have been proposed in the literature. For example, Rust (2001) defines the concept as "that service which is offered by an organization through an electronic system" (p. 283). Colby and Parasuraman (2003) suggest that "electronic services are services offered by



an electronic means –normally Internet – and which refer to transactions begun and to a great extent controlled by the consumer" (p. 28). Fassnacht and Koese (2006) state that they are "those services that are offered using information and communication technologies in which the consumer only interacts with a user's interface" (p. 23). In these definitions, two basic properties of electronic services stand out. Firstly, they are services which are offered through an electronic system–e.g., ATMs, telephonic banking, automatic billing in hotels through an interactive television, vending machines, etc. Secondly, electronic services are technological self-services or self-services based on technology (SSTs) (Dabholkar, 1996; Bitner et al., 2000; Dabholkar, 2000; Meuter et al., 2000). Customers begin and control the transaction performing active roles in the services provisions, in such a way that they are able to obtain the product or the service by themselves, even managing to get by without employees who attend the public. Nevertheless, some customers prefer interaction with employees, considering the service encounter as a social experience (Zeithaml and Gilly, 1987).

The delivery of these electronic services offers benefits for both firms and customers. The use of technology enables the service provider to have a standardized service delivery, reduced labor costs, to expand the delivery options (Curran and Meuter, 2005) and to improve productivity and convenience for their employees and customers (La and Kandampully, 2002). However, the infusion of technology can also raise concerns of privacy, confidentiality and the receipt of unsolicited communications (Bitner et al., 2000). Some studies have analyzed the factors that contribute to (or not) the use of an SST. For example, the ease of use and usefulness are critical constructs that influence an individual's attitude toward a technology (Davis, 1989). Curran and Meuter (2005) propose four antecedents for attitudes toward the SSTs: ease of use, usefulness, risk and need for interaction. Dabholkar (1996) also found control and waiting time to be important determinants for using an SST. More recently, Belanche et al. (2011) suggest that the use of online services is determined by the perceived usefulness, the attitude toward its use and the perceived control. Consumers will weigh up these advantages and disadvantages when deciding whether or not to use an SST. Internet has become one primary type of SST.

Since the pioneering work of Zeithaml et al. (2002), the quality of online services has been explored in some depth. Parasuraman et al. (1985) suggest that service quality is an abstract and elusive construct because of three features that are unique to services: the intangibility, heterogeneity and inseparability of production and consumption. The best-known approach for measuring service quality is the SERVQUAL model (Parasuraman et al., 1988). The original five dimensions of SERVQUAL are tangibles, reliability, responsiveness, assurance



and empathy. Some academic researchers have extended the SERVQUAL dimensions to the online context (Kaynama and Black, 2000; Sánchez-Franco and Villarejo-Ramos, 2004). However, traditional theories and concepts about service quality cannot be directly applied to the online context due to the important differences between the two settings. First, the service quality literature is dominated by people-delivered services, while in online services, humanto-human interactions are substituted by customer-to-Website interactions (Parasuraman et al., 2005). Therefore, responsiveness and empathy dimensions can be evaluated only when the online customer contacts a member of the organization. Second, although reliability and security dimensions may be useful, tangibles are irrelevant as the customer only interacts with the Website. Third, new dimensions are relevant, such as Website design or information quality. Fourth, if the evaluation of the quality of a traditional service is going to depend especially on the personnel in charge of the service provision, the quality of the services which are offered through Internet are going to largely depend on the consumers themselves and their interaction with the Website (Fassnacht and Koese, 2006). Fifth, compared to the traditional quality of service, the e-service quality is an evaluation which is more cognitive than emotional (Zeithaml et al., 2000). In this way, these authors state that negative emotions such as annoyance and frustration are less strongly shown than in the quality of the traditional service, while positive feelings of affection or attachment which exist in traditional services do not appear in the Internet context.

Various conclusions can be inferred from reviewing the literature: (1) the e-service quality is a multidimensional construct (Zeithaml et al., 2000) whose measurement must gather the evaluation of the interaction with the Website, the evaluation carried out by the customer of the product or service received and, if any problem arises, how the Website of the online firm handles it (Collier and Bienstock, 2006). Although most researchers are in favor of the evaluation of this latter aspect, Fassnacht and Koese (2006) state that we should not evaluate the human interaction which can take place in the electronic services provisions, given their self-service nature. (2) There are basically two approaches when tackling the conceptualization and measurement of e-service quality (Table 1). The epicenter of the first approach is the technical characteristics of the Website (technical quality). The first studies about Internet service quality belong to this first group. They centered uniquely on the interaction that takes place between the customer and the Website. None of these research works gathers all the aspects of the online purchasing process and therefore they do not carry out a complete evaluation of e-service quality. The main proposal of these measurement instruments is to generate information for the site designers, more than measuring the quality



of the service which customers perceive (Parasuraman et al., 2005). This weakness is the main motive for the appearance of the second approach (service quality) which offers a more complete vision of the field of the e-service quality construct. The dimensions and the measurement instruments gather not only the technical aspects of the Website, but also how the customers perceive the quality of the product or service received and how their problems or doubts were solved during the service provision. (3) The researchers do not agree when identifying the dimensions of the quality of an electronic service. Moreover, the meaning, the importance and the items of the same dimension vary from one study to another. These differences are partly due to the scales being focused on one service in particular. (4) The evaluation of e-service quality is carried out at different levels of abstraction depending on the study. Most researchers offer a set of dimensions (first order constructs) and a series of indicators to measure each of them (e.g., Ho and Lee, 2007). However, other authors propose second order hierarchical models (Wolfibarger and Gilly, 2003), or even third order models (Fassnacht and Koese, 2006). (5) Some authors propose scales in which problem solving does not appear (e.g., Liu et al., 2009) or is evaluated for the whole sample (e.g., Wolfinbarger and Gilly, 2003). However, this last aspect must only be evaluated by those people who had problems during the transaction (Parasuraman et al., 2005; Collier and Bienstock, 2006). Following the literature review, the dimensions proposed to evaluate e-service quality are: design, functionality, privacy, reliability and recovery. These dimensions are herewith defined and explained.

Design

The design of a Website plays an important role in attracting, sustaining and retaining the interest of a customer in a site (Ranganathan and Ganapathy, 2002). Numerous studies in the literature consider the Website design as a dimension of e-service quality (Aladwani and Palvia, 2002; Loiacono et al., 2002; Yoo and Donthu, 2001; Liu et al., 2009). The literature review about the key factors of a Website design highlights three important issues: attractiveness, proper fonts and proper colors. Although it has sometimes been regarded as a purely aesthetic element, prior studies have demonstrated the influence of Website design on site revisit intention (Yoo and Donthu, 2001), customer satisfaction (Tsang et al., 2010) and loyalty intentions (Wolfinbarger and Gilly, 2003).

 Table 1. Online service quality scales in previous studies

Focus: T	echnical quality	

NA

Article	Dimensions
Aladwani and Palvia (2002)	Appearance; specific content; content quality; technical adequacy
Bressolles and Nantel (2008)	Information; ease of use; site design; security/privacy
Duque-Oliva and Rodríquez-Romero (2012)	Efficiency; performance; privacy; system; variety
Liu and Arnett (2000)	Information and service quality; system use; playfulness; system design quality
Liu, Du, and Tsai (2009)	Adequacy of information; appearance; usability; privacy; security
Loiacono, Watson, and Goodhue (2002)	Ease of understanding; intuitive operation; information quality; interactivity; trust; response time; visual appeal; innovativeness; flow
Ranganathan and Ganapathy (2002)	Information content; design; security; privacy
Sabiote, Frías, and Castañeda (2012)	Ease of use; availability; efficacy; privacy; relevant information;
Sánchez-Franco and Villarejo-Ramos (2004)	Assurance; tangibles; reliability; empathy, ease of use, enjoyment; responsiveness
Yoo and Donthu (2001)	Ease of use; design; speed; security

Focus: Electronic service quality

Article	Dimensions
Barrera and Cepeda (2014)	Design; functionality; privacy; information; reliability; access/contact; responsiveness
Barrutia and Gilsanz (2012)	Process quality: efficiency; system availability; design; Information and Outcome quality
Bauer, Falk, and Hammerschmidt (2006)	Functionality / design; enjoyment; process; reliability; responsiveness
Collier and Bienstock (2006)	Process dimension: functionality; information; accuracy; design; privacy; ease of use; Outcome dimension: order accuracy; order condition; timeliness; Recovery dimension: interactive fairness; procedural fairness; outcome fairness
Fassnacht and Koese (2006)	Quality of the environment: graphics quality, clear presentation, quality of delivery: attractive assortment, quality of information, ease of use, technical quality, outcome quality: reliability, functional benefit; emotional benefit;
Ho and Lee (2007)	Information quality; security; functionality; customer relationships; responsiveness
Janda, Trocchia, and Gwinner (2002)	Performance; access; security; sensation; information
Kaynama and Black (2000)	Content; accessibility, navigation, design and presentation; responsiveness; environment; customization
Parasuraman, Zeithaml, and Malhotra (2005)	E-S-QUAL: efficiency; system availability; fulfillment; privacy; E-RecS-QUAL: responsiveness; compensation; contact
Rolland and Freeman (2010)	Ease of use; information content; fulfillment; reliability; security/privacy; post-purchase customer service
Sheng and Liu (2010)	Efficiency; fulfillment; system accessibility; privacy
Sohail and Shaikh (2008)	Efficiency and security; fulfillment; responsiveness
Tsang, Lai, and Law (2010)	Functionality; information quality and content; fulfillment and responsiveness; safety and security; appearance and presentation; customer relationship
Wolfinbarger and Gilly (2003)	service
Yen and Lu (2008)	Efficiency; privacy; protection; contact; fulfillment

Source: own elaboration

Functionality



Functionality refers to the correct technical functioning of the Website. It is one of the most basic requirements for any kind of Website and its meaning is closely related to the dimensions of the system availability (Parasuraman et al., 2005), or technical adequacy (Aladwani and Palvia, 2002). The five items of functionality that we considered were: always up and available, has valid links, loads quickly, enables us to get on to it quickly and makes it easy and fast to get anywhere on the site. Its impact on online customers' higher-order evaluations pertaining to Websites has also been observed. For example, Tsang et al. (2010) conducted an investigation in the travel online context in which functionality was found to be the most important dimension in increasing customer satisfaction.

Privacy

Websites are usually collecting and storing large amounts of data concerning their users' activities, user evaluations of online questionnaires or personal data (Hsu et al., 2014). As a result, one of the aspects that most concern online consumers is the privacy of personal information (ONTSI, 2013). In our study, privacy refers to the degree to which the customer believes that the site is safe from intrusion and personal information is protected (Parasuraman et al., 2005; p. 219). The privacy of a Website should be reflected through symbols and messages to ensure the security of payment and the customer's personal information not being shared with other companies or Internet sites. As such, there appears to be a high degree of support for privacy as an important e-service quality dimension and it was found to be one of the most significant dimensions in increasing customer satisfaction (Janda et al., 2002).

Reliability

The evaluation of service delivered quality has been carried out with the dimensions of: fulfillment/reliability (Wolfinbarger and Gilly, 2003), reliability (Yang and Jun, 2002), performance (Janda et al., 2002), fulfillment (Parasuraman et al., 2005), etc. Congruent with these articles, our study considers reliability as an important dimension of e-service quality. Moreover, in the context of online services, the information made available by the Websites is an important component of the service delivered. Therefore, reliability refers to the accuracy of the service delivered by the company, the billing process being correct and the information that appears on the Website being clear, current and complete. The service delivered quality or reliability has been empirically shown to have a strong impact on



customer satisfaction and quality, and the second strongest predictor of loyalty intentions and attitudes toward the Website (Wolfinbarger and Gilly, 2003).

Recovery

An essential aspect in the evaluation of the quality of an electronic service is the way in which the company solves problems or doubts which may arise during its provision. There is no doubt that errors in the electronic service provision cause the loss of customers in many cases and a negative word of mouth. What is more, the physical separation between the customer and the supplier and the fact that customers can choose another company with a simple click accentuates the importance of solving these mistakes even more (Collier and Bienstock, 2006). Different dimensions have been proposed in the literature to evaluate this aspect: responsiveness (Zeithaml et al., 2000), customer attention (Wolfinbarger and Gilly, 2003), communication (Cai and Jun, 2003), access (Yang and Jun, 2002), etc. In our study, service recovery refers to the customer's capacity to communicate with the organization and how any problem or doubt that may arise is solved. Thus, the Website should show its street, e-mail, phone or fax numbers, the customer service must be available 24 hours a day/7days a week and the response to the customer's inquiries must be quick and satisfactory. Moreover, this latter measure should only be evaluated by individuals who needed help or the solving of a problem.

3. METHODOLOGY

3.1 Data Collection

Data collection was obtained from a convenience sample of online customers. An invitation soliciting participants for this study was sent through emails. From these e-mail invitations, the respondents were able to access the Website where the online questionnaire (see Appendix) was posted and they were asked to forward this invitation to their friends and relatives. This approach was particularly appropriate for the e-service quality studies (Tsang et al., 2010). Previously, each respondent was asked if he or she had shopped on the Internet within the previous year. The field work took place from April to June 2012 and the responses are obtained from 1.163 online consumers of a wide variety of Websites that offer different online services. Of these, 267 respondents said that they had a problem or doubt during the online service delivery. Regarding the type of service, most of the participants choose the online travel reservations (693), followed by the reservations of accommodation

(261) and show tickets (209). The profile of the online shopper in our sample closely relates to the profile of the online shopper that appears in the "B2C e-commerce Survey – ONTSI (2013)", thus showing the adequacy of the sample (Table 2).

Table 2. Demographic profiles of the respondents								
	Online trave	Online travel reservations		ticketing	Online acc reser	commodation vations		
Gender								
Male	338	48.77%	92	44.02%	126	48.28%		
Female	355	51.23%	117	55.98%	135	51.72%		
Age group								
18-24 years	386	55.70%	102	48.80%	115	44.06%		
25-34 years	201	29.00%	63	30.14%	94	36.02%		
35-49 years	76	10.97%	30	14.35%	37	14.18%		
50-64 years	30	4.33%	14	6.70%	15	5.75%		
Education level								
Primary school	9	1.30%	11	5.26%	8	3.07%		
High school	78	11.26%	29	13.88%	37	14.18%		
College student	392	56.57%	116	55.50%	138	52.87%		
Postgraduate Degree	214	30.88%	53	25.36%	78	29.89%		
Population								
10.000 people or below	100	14.43%	33	15.79%	31	11.88%		
10.001-20.000 people	76	10.97%	39	18.66%	38	14.56%		
20.001-50.000 people	93	13.42%	28	13.40%	40	15.33%		
50.001-100.000 people	49	7.07%	17	8.13%	20	7.66%		
100.001 people or above	375	54.11%	92	44.02%	132	50.57%		
Social class								
Low	56	8.09%	14	6.70%	18	6.90%		
Medium-Low	498	71.86%	163	77.99%	195	74.71%		
Medium	139	20.06%	32	15.31%	48	18.39%		
Length of Internet use								
3 years or above	653	94.23%	198	94.74%	246	94.25%		
2 - 3 years old	23	3.32%	6	2.87%	8	3.07%		
1 - 2 years old	17	2.45%	5	2.40%	7	2.69%		
Frequency of Internet use								
Everyday	497	71.72%	135	64.59%	174	66.67%		
3 - 6 days per week	136	19.62%	52	24.88%	61	23.37%		
1 - 2 days per week	60	8.66%	22	10.53%	26	9.96%		

Source: own elaboration

3.2 Exploratory Factor Analysis

First, an exploratory factor analysis (EFA) was carried out to identify the dimensionality of the scales in each subsample. A principal component factor analysis with Varimax rotation was performed and the factors with eigenvalues greater than one were extracted. All items loaded on the factors that have been defined. The high alpha values ranging from 0.752 y 0.931 indicated good internal consistency among the items within each construct. The mean

value, standard deviation, factor loadings and reliabilities for each measurement statement and construct are presented in Table 3.

			Tabl	e 3. EFA res	ults					
Factors	Online tra	Online travel reservations			Online ticketing			Online accommodation reservations		
	Mean (S.D.)	Loading	α value	Mean (S.D.)	Loading	α value	Mean (S.D.)	Loading	α value	
Electronic Service	e Quality–eSQ									
Design			0.776			0.815			0.752	
DES1	4.551 (1.248)	0.829		4.785 (1.262)	0.838		4.950 (1.141)	0.809		
DES2	5.061 (1.186)	0.735		5.163 (1.260)	0.752		5.272 (1.140)	0.693		
DES3	4.817 (1.305)	0.832		4.837 (1.401)	0.858		5.027 (1.284)	0.783		
Functionality			0.876			0.866			0.859	
FUN1	5.466 (1.531)	0.768		5.775 (1.272)	0.774		5.736 (1.293)	0.733		
FUN2	5.291 (1.376)	0.834		5.469 (1.248)	0.800		5.605 (1.244)	0.783		
FUN3	4.994 (1.355)	0.825		5.158 (1.209)	0.819		5.192 (1.247)	0.774		
FUN4	5.134 (1.315)	0.826		5.182 (1.227)	0.825		5.318 (1.187)	0.832		
FUN5	5.160 (1.245)	0.557		5.344 (1.243)	0.547		5.387 (1.173)	0.642		
Privacy			0.767			0.755			0.780	
PRI1	4.625 (1.460)	0.774		4.852 (1.478)	0.664		4.605 (1.557)	0.756		
PRI2	5.339 (1.335)	0.804		5.483 (1.341)	0.839		5.364 (1.409)	0.798		
PRI3	4.853 (1.541)	0.780		5.201 (1.424)	0.812		4.858 (1.588)	0.851		
Reliability			0.823			0.839			0.838	
REL1	5.671 (1.351)	0.709		5.818 (1.195)	0.761		5.697 (1.311)	0.685		
REL2	5.489 (1.377)	0.639		5.713 (1.210)	0.607		5.655 (1.239)	0.650		
REL3	5.512 (1.191)	0.664		5.809 (1.106)	0.708		5.801 (1.033)	0.761		
REL4	5.769 (1.167)	0.710		5.890 (1.093)	0.828		5.782 (1.194)	0.828		
REL5	5.339 (1.216)	0.754		5.545 (1.156)	0.704		5.533 (1.101)	0.647		
Recovery-eSQ			0.918			0.931			0.922	
REC1	4.93 (1.729)	0.756		5.19 (1.687)	0.664		5.52 (1.452)	0.673		
REC2	4.66 (1.856)	0.822		4.81 (1.582)	0.804		5.04 (1.501)	0.839		
REC3	4.45 (1.786)	0.853		4.83 (1.540)	0.850		4.91 (1.576)	0.851		
REC4	3.93 (1.666)	0.813		4.50 (1.630)	0.898		4.38 (1.795)	0.743		
REC5	4.29 (1.709)	0.851		4.53 (1.521)	0.823		4.93 (1.650)	0.860		
REC6	4.04 (1.720)	0.785		4.69 (1.636)	0.916		4.82 (1.630)	0.909		
REC7	4.13 (1.749)	0.851		4.67 (1.656)	0.936		4.59 (1.682)	0.905		

Note: Mean = the average score for all items included in this measure; SD = standard deviation.

3.3. Assessment of the Measurement Model

To evaluate the scales proposed, we have followed the traditional procedures used in marketing research (Gerbing and Anderson, 1988). We tested a second-order factor model with the four factors obtained from the EFA in each service. In Table 4, we present the results of dimensionality, convergent validity and reliability assessment. We also offer the standardized loadings, the composite reliability and the average variance extracted (AVE). As can be seen, all the items significantly load in their respective dimensions. The AVE values obtained are all above the recommended value of 0.50. This indicates that each construct's items have convergent validity. What is more, each construct shows good internal consistency, with reliability coefficients which vary between 0.775 and 0.976. To measure



1.1

the model's fit some indices supplied by the AMOS statistical software were used. Values were recommended close to: 0.95 (CFI), 0.95 (TLI), 0.06 (RMSEA) and 0.08 (SRMR) (Hu and Bentler, 1999). Regarding the RMSEA index, there is also a confidence interval (LO90 and HI90), following the recommendation of Byrne (2009).

Factors	Online travel reservations			Online ticketing			Online accommodation			
			·unono	01			r	eservation	S	
eSQ	SL	CR	AVE	SL	CR	AVE	SL	CR	AVE	
Design		0.808	0.584		0.820	0.604		0.775	0.535	
DESI	0.761			0.782			0.708			
DES2	0 754			0 704			0 774			
DES3	0.778			0.839			0.710			
Functionality	0.770	0.884	0.608	0.057	0.863	0.561	0.710	0.881	0.600	
FUN1	0.689			0.63			0.674			
FUN2	0.753			0.65			0.758			
FUN3	0.860			0.831			0.799			
FUNA	0.887			0.885			0.889			
FUNS	0.686			0.005			0.005			
During and	0.080	07(7	0.529	0.717	0.946	0.640	0.750	0.77(0 5 4 7	
Plivacy	0.674	0.767	0.328	0.7/7	0.840	0.049	0.400	0.770	0.347	
PRII	0.6/4			0.767			0.499			
PRI2	0.857			0.911			0.837			
PRI3	0.628			0.728			0.832			
Reliability		0.842	0.516		0.857	0.547		0.881	0.600	
REL1	0.694			0.774			0.658			
REL2	0.678			0.714			0.659			
REL3	0.727			0.616			0.819			
REL4	0.771			0.743			0.862			
REL5	0.717			0.832			0.847			
Eit statistics										
Fit statistics	154004			100 100			1.11.600			
χ^2	156.926			182.466			141.628			
Df	90			92			90			
р	0			0			0			
CFI	0.926			0.887			0.929			
TLI	0.902			0.853			0.906			
SRMR	0.052			0.083			0.089			
RMSEA	0.033			0.069			0.047			
	0.024-			0.054-			0.031-			
L090 y 11190	0.041			0.083			0.061			
Recovery eSO		0 948	0.725		0 976	0.851		0.956	0 759	
REC1	0.811	0.9.10	0.720	0.823	0.970	0.001	0.692	0.900	0.709	
REC2	0.928			0.884			0.871			
REC3	0.920			0.004			0.850			
REC4	0.769			0.930			0.850			
REC4	0.709			0.944			0.804			
DEC6	0.855			0.890			0.074			
RECO DEC7	0.852			0.970			0.938			
KEC /	0.898			0.974			0.962			
Fit statistics										
χ^2	32.806			14.303			18.671			
Df	13			13			12			
Р	0.002			0.353			0.097			
CFI	0.881			0.985			0.934			
TLI	0.808			0.976			0.885			
SRMR	0.118			0.174			0.103			
RMSEA	0.094			0.054			0.101			
X 0.00 XW00	0.054-			0.000-			0.000-			
LO90 y HI90	0.134			0.18			0.185			

Table 4. CFA of the electronic the service quality scale

Note: SL = standardized loadings; CR = Composite Reliability; AVE = Average variance extracted; All factor loadings are statistically significant (p < 0.001).

Discriminant validity, which verifies that each factor represents a separate dimension, was analyzed examining whether inter-factor correlations are less than the square root of the



average variance extracted (AVE) (Fornell and Larcker, 1981). Table 5 shows that the square roots of each AVE are greater than the off-diagonal elements. With this result, it should therefore be understood that there is discriminant validity in the e-service quality measurement scale.

	Online travel reservations				Online ticketing			Onli	Online accommodation reservations			
eSQ Dimensions	Design	Reliability	Functionality	Privacy	Design	Reliability	Functionality	Privacy	Design	Reliability	Functionality	Privacy
Design	0.764				0.777				0.731			
Reliability	0.398	0.718			0.577	0.740			0.666	0.775		
Functionality	0.436	0.710	0.780		0.633	0.613	0.749		0.505	0.566	0.775	
Privacy	0.370	0.574	0.408	0.727	0.433	0.299	0.199	0.806	0.387	0.666	0.449	0.740

Table 5. Discriminant validity of 1	measures
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Note: The bold numbers on the diagonal are the square root of the AVE. Off-diagonal elements are correlations between constructs.

4. RESULTS

4.1. Testing for the Measurement Invariance

Measurement invariance is concerned with the extent to which parameters comprising the measurement instrument are similar across groups (Byrne, 2008). This author shows that testing for measurement invariance entails a hierarchical set of steps that typically begins with the determination of a well-fitting multigroup baseline model (configural model-Figure 1). The importance of this model is that it serves as the baseline against which all subsequent tests for equivalence are compared.

The first stage of the analysis is if the factor structure is similar across the different groups (test of invariance of the configural model). The parameters are estimated for all groups simultaneously. Given that the configural models M0A y M0B (Table 6) fit reasonably well, we can conclude that both the number of factors and the pattern of their item loadings of the electronic service quality and recovery electronic service quality scales are similar across the three services. Consequently, the results support the configural invariance of the measurement models and justify the evaluation of more restrictive invariant models.

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Figure 1: Configural models for the e-service quality and recovery e-service quality scales

In testing for measurement invariance, the research compares the equality of estimated parameters across different groups. This procedure involves testing the fit of a series of increasingly-restrictive models against a baseline model (the configural model in which no equality constraints are imposed). The models analyzed can be seen as nested models to which the constraints are progressively added. For the comparison of the nested models, previous research has employed the likelihood ratio test (also known as the chi square difference test). This χ^2 difference value ($\Delta \chi^2$) is distributed as χ^2 , with degrees of freedom equal to the difference in degrees of freedom (Δ df). If this value is statistically significant, in the comparison of two nested models, it suggests that the constraints specified in the more restrictive model do not hold (i.e., the two models are not equivalent across groups). However, due to the sensitivity of the χ^2 to sample size and non-normality (Hair et al., 1999), Cheung and Rensvold (2002) have proposed a more practical criterion, the CFI increment (Δ CFI), to determine if the models compared are equivalent. In this sense, when there is a change greater than 0.01 in the CFI between two nested models, the least constrained model is accepted and the other rejected, that is, the most restrictive model does not hold. If the change in CFI is equal or inferior to 0.01, it is considered that all specified equal constraints

are tenable, and, therefore, we can go on with the next step in the analysis of the measurement invariance.

After configural invariance is established, we continue with the testing for the measurement invariance. As can be observed, when the first factor loadings belonging to the electronic service quality scales are equally constrained, the difference in the Δ CFI between the configural model M0A and the constrained model M1A exceeds 0.01. This indicates that the factor loadings are not equivalent across the three services. To determine the non-invariant items, different analyses were carried out at the level of first-order factor loadings in order to reduce the Δ CFI. This process leads us to estimate the M2A model (model of partial measurement invariance) in which all the first-order factor loadings are fixed equally between the three services, while the factor loadings of the items PRI3 and FUN1 are freely estimated, giving rise to a $\Delta CFI = 0.01$. Given that the data fulfill the recommended conditions of partial measurement invariance (the freely estimated parameters do not surpass 20%) (Byrne et al., 1989), the following equivalence analyses can be carried out. Next, we estimate the M3A model (we add the restriction that the second-order factor loadings are the same). In this case, the ΔCFI value is over 0.01. This indicates a statistically significant deterioration of the model's fit. Therefore, the second-order factor loadings are not equivalent between the three services. Regarding the recovery electronic service quality scale, the results do not support either the invariance of the total measurement or the invariance of the partial measurement. Some fit indices even more away from the recommended values. The small sample size of those respondents who needed help may be the cause of this problem.

radie 6. resting for measurement invariance										
	χ^2	df	$\Delta\chi^2$	Δdf	CFI	ΔCFI	TLI	SRMR	RMSEA	RMSEA 90% CI
eSQ models										
M0A	767.611**	294			0.806		0.763	0.058	0.037	0.034-0.041
M1A	854.169**	318	86.558**	24	0.780	0.026	0.751	0.060	0.038	0.035-0.041
M2A	813.178**	314	45.567**	20	0.796	0.010	0.766	0.058	0.037	0.034-0.040
M3A	856.606**	320	88.995**	26	0.780	0.026	0.753	0.054	0.038	0.035-0.041
Recovery eSQ models										
M0B	109.513**	42			0.81		0.716	0.121	0.078	0.06-0.096
M1B	155 763**	54	46 25**	12	0 714	0.096	0.667	0.112	0.084	0.069-0.1

Table 6. Testing for measurement invariance

Note: M0A = configural model; M1A = first-order factor loadings invariant model; M2A = first-order factor loadings invariant model with FUN1 and PRI3 estimated freely; <math>M3A = first-order and second-order factor loadings invariant model with FUN1 and PRI3 estimated freely; <math>M0B = configural model; M1B = first-order factor loadings invariant model; **p < 0.01.

4.2. Evaluation of the Importance of the Dimensions of the Electronic Service Quality



The second-order factor loadings –which indicate the weights of the factorsor dimensions– are shown in Table 7. As can be seen, all the dimensions have statistically significant weights. In the case of the travel reservations Websites, the dimensions were, from greater to lesser importance: reliability, functionality, privacy and, finally, the design. On the other hand, the most important aspects in the ticketing Websites were: the design, reliability, functionality and privacy. Lastly, in the accommodation reservations Websites, the most valued factors were: reliability, the design, privacy and, finally, functionality. Moreover, as prior analyses have shown, the weights of the dimensions are not the same in the three services. In order to compare them, following the recommendations of Byrne (2009), we have used the critical ratio difference method offered by AMOS. These pairwise comparisons are shown in Table 8. If the critical ratios are over |1.96|, the parameter is significantly different between the two groups compared at a level of p < 0.05. We can see how the majority of the regression weights are - except for four - significantly different between the services compared.

Table 7. Standardized regression weights of eSQ second order model

	Online travel reservations	R ²	Online ticketing	R ²	Online accommodation reservations	R ²
eSQ→ Design	0.472***	0.223	0.699***	0.488	0.790***	0.624
$eSQ \rightarrow$ Functionality	0.797***	0.635	0.617***	0.380	0.702***	0.492
eSQ→Privacy	0.618***	0.382	0.333***	0.111	0.713***	0.509
eSQ→Reliability	0.899***	0.808	0.688***	0.473	0.926***	0.857

Note: ***p <0.01.

Table 8. Critical ratios for differences across the services

	Online travel	Online ticketing	Online accommodation
	reservations	Ollille ticketing	reservations
eSQ→ Design	2.152**	2.352**	-0.394 (n.s.)
$eSQ \rightarrow$ Functionality	-3.573**	-2.155**	1.559 (n.s.)
eSQ→Privacy	-4.499**	-0.354 (n.s.)	3.666**
eSQ→Reliability	-5.228**	0.385 (n.s.)	5.196**
NL + ** <0.07			

Note: ******p < 0.05; n.s. = not significance.

5. DISCUSSION AND IMPLICATIONS

The growth of the e-commerce requires a revision of the sites' perceived service quality. Although many studies have recently appeared, in most of them the evaluation of the electronic service quality is globally carried out for the entire sample. The use of these instruments as they have been proposed may not be valid in other services. However, this research shows that the development of scales which are valid for different services is possible. This paper contributes to the literature on electronic service quality in different ways.

Firstly, the results show that the scales proposed are valid and reliable for measuring quality in different electronic services. Therefore, it is possible to define a measurement standard which allows the evaluating of the electronic service quality in different contexts. As far as we know, prior research was limited to evaluating the validity and reliability of a scale for a specific service. Applying these measurement scales in other contexts may not be valid.

Secondly, although previous research has examined the importance of the dimensions of the electronic service quality, they have not taken into account how the importance of the dimensions can vary between different services. The results show that the second-order factor loadings or regression weights are not the same and their importance differs between the study's online services. In this way, this research shows that reliability is the most important factor in the evaluation of Websites which offer travel and accommodation reservations. These results coincide with the conclusions of previous studies, which also empirically demonstrated that reliability has a strong influence on the perceived quality of certain eservices (Bauer et al., 2005; Wolfinbarger and Gilly, 2003). As a result, the managers of online services must center themselves specifically on questions such as the exactitude of the service offered and correct billing, and offer clear, complete and error-free information. Moreover, in ticketing Websites, along with reliability, special attention must be paid to their design. This aspect may be valued more in these Websites given that they are frequently browsed by younger people.

This study's third contribution refers to the importance of privacy. Thus, in spite of there being a strong consensus about the fact that privacy is one of the most important in the evaluation of an online service quality (B2C-ONTSI study on e-commerce) and one of those that have the most influence on customer satisfaction (Janda et al., 2002), this research shows the slight importance of this dimension. This fact is possibly due to the technological advances of recent years concerning online purchase payment security (Udo et al., 2010) and there being a growing tendency in the number of customers who are familiar with this type of electronic transactions (B2C-ONTSI study on e-commerce). In our study, we ask the respondents to evaluate the Website which they use the most. Therefore, it seems that there is a certain familiarity and trust with the Websites chosen. In this line, previous studies point out that privacy may not be a critical factor in those who use Internet more often (Wolfinbarger and Gilly, 2003). For those users who do not carry out online purchases, privacy is probably not a factor of great importance. A third explanation may be the fact that



younger consumers perceive fewer risks in this type of purchases than older consumers (Udo et al., 2010; López and Monroy, 2013) (approximately 80% of our sample's purchasers were between 18 and 34 years old). The lesser effect of privacy appears in the evaluation of the ticketing Websites. This may be due to the low cost of these purchases and the buyers not needing to give too much personal information.

Fourthly, this article highlights the importance of recovery measures in the evaluation eservice quality. In our study, 22.95% of respondents reported having a problem or doubt. Online companies must identify the nature of these failures and if they fail to resolve them, the customer will perceive a poor quality of service, they will be dissatisfied and they will probably stop doing business with this organization. Therefore, in the context of electronic services, it is as important to offer a high service quality as to develop protocols for solving service delivery failures.

6. LIMITATIONS AND FUTURE RESEARCH LINES

Lastly, some limitations of this work must be recognized and certain future research lines proposed. The convenience samples do not allow the generalizing of the results to the rest of the population. Future studies must be carried out to try and validate and generalize the results of this study using a larger sample. Secondly, the conclusions obtained are linked to the three services chosen. Future research should be carried out in other online services to check the utility, validity and equivalence of the scales used. Finally, the results do not uphold the equivalence of the quality scale measurement of the electronic service recovery. This is due to the small sample size of the respondents who mentioned having had a problem with the service delivery. It is necessary to test the measurement equivalence of this scale in other contexts in which there is a greater rate of incidents.

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APPENDIX

Measurement Scale Electronic Service Quality



Design

DES1: The website looks attractive DIS2: The website uses fonts properly DIS3: The website uses colors properly Adapted from Liu et al. (2009)

Functionality

FUN1: This website is always up and available

FUN2: This website has valid links

FUN3: This website loads quickly

FUN4: This website enables me to get on to it quickly

FUN5: This website makes it easy and fast to get anywhere on the site

Adapted from Aladwani and Palvia (2002), Parasuraman et al. (2005) and Collier and Bienstock (2006)

Privacy

PRI1: In the website appear symbols and messages that signal the site is secure

PRI2: The website assures me that personal information is protected

PRI3: The website assures me that personal information will not be shared with other parties

Adapted from Janda et al. (2002), Collier and Bienstock (2006) and Parasuraman et al. (2005)

Reliability

REL1: The service received was exactly the same as what I ordered

REL2: The billing process was done without mistakes

REL3: Website information is clear

REL4: Website information is current

REL5: Website information is complete

Adapted from Parasuraman et al. (2005), Wolfinbarger and Gilly (2003) and Aladwani and Palvia (2002)

Recovery

REC1: The website shows its street, e-mail phone or fax numbers

REC2: The website has customer service representatives

REC3: If I wanted to, I could easily contact a customer service representative

REC4: The website responds to my inquiries

REC5: The website gives me a satisfactory response

REC6: When I have a problem the website shows a sincere interest in solving it

REC7: The website responds quickly to my inquiries

Adapted from Collier and Bienstock (2006) and Parasuraman et al. (2005)

Note: All items are measured with a seven-point Likert scale, anchored at 1 "strongly disagree" and 7 "strongly agree".