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ELECTRONIC SERVICE QUALITY: A COMPARISON OF THREE MEASUREMENT SCALES

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Electronic Service Quality: A Comparison of Three Measurement Scales

Abstract: There is currently a profusion of scales that measure perceptions of electronic service quality, designed by both practitioners and researchers. This article proposes to test three of the principal scales developed in the academic world: Sitequal (Yoo and Donthu, 2001); Webqual 4 (Barnes and Vidgen, 2003) and EtailQ (Wolfinbarger and Gilly, 2003). Based on 204 questionnaires administered online to clients of two Canadian commercial websites (travel agency and online insurance), Sitequal is best suited to the data, and offers the best predictive power. Nonetheless, the parsimony of this scale (9 items) fails to provide a reliable and global image of the complexity of the online purchasing process. Further research into evaluation of perceptions of electronic service quality is therefore necessary.

Key Words: Electronic service quality, Services marketing, Internet, electronic commerce.

Introduction

A relatively new phenomenon, online purchasing is increasingly becoming a commonplace purchasing mode. In 2002 electronic commerce (BtoB and BtoC) reached 12 billion Euros in France, equal to 50% growth over 2001, as shown by a study conducted by ICD (www.icd.fr, December 2002). Benchmark group (www.benchmark.fr) estimates that BtoC commerce represents 2.35 billion Euros, equal to a fifth of the total volume reported by ICD. While still low, this proportion should continue to grow steadily, as the main indicators are rising: increase in the proportion of online purchasers in the total population of Internet users (27% in 2002 versus 23% in 2001) and a 16% growth in the average shopping cart of domestic purchasers. Originally, having an online presence and proposing low prices seemed to be sufficient conditions for success. However, neither the simple fact of being online nor low prices guarantee service quality, and problems have inevitably arisen: the inability to carry out online transactions, non-compliance with delivery times, products not delivered, unanswered emails and inaccessible or inadequate information. As in traditional stores, the service quality of commercial Websites seems to play a vital role in the success and survival of Internet sites. However, the particular characteristics of Internet sales differentiate them from traditional sales modes. In consequence, measurement instruments are being developed by practitioners and researchers to evaluate the quality of service in the context of online commerce.

This article begins by presenting the concept of electronic service quality, both with regard to its definition, similarities and differences compared with traditional service quality and to the variables measured. Given the profusion of tools that measure electronic service quality proposed by practitioners and researchers alike, this article will then present the results of an empirical study that compares three evaluation scales of electronic service quality (EtailQ, Webqual4 and Sitequal) to determine which is the best adapted to the online commerce context. A discussion of the limitations and avenues of future research conclude the paper.

Electronic service quality

Definition, similarities and differences with traditional service quality

Whereas aspects of traditional service quality (dimensions, related variables, etc.) have been studied extensively over the past two decades, the study of the service quality of websites is a fledgling domain. Zeithaml and *al.*, (2002) defined electronic service quality as “*the extent to which a web site facilitates efficient and effective shopping, purchasing, and delivery of products and services*”. This transactional quality entails the evaluation of the pre - and post - service experience. Based on this definition, we can draw a parallel with traditional service quality to elucidate the similarities and differences between these two concepts.

The most important and probably the most evident difference between traditional service quality and electronic service quality is the replacement of interpersonal interaction with human-machine interaction. This simple distinction raises many questions concerning the type of dimensions that can or must be considered to assess service quality in the e-commerce context. Owing to the specific characteristics of online commerce, direct application of the dimensions of service quality developed in other environments is not appropriate, or at best, does not capture all of the subtleties of the evaluation of service quality of commercial websites. The classic dimensions of traditional service quality are tangible elements, reliability, reactivity, assurance and empathy of the service provider (Parasuraman *et al.*, 1988). To date, however, there is no consensus concerning the dimensions of electronic service quality. Although largely anecdotal, dimensions proposed recur fairly systematically: security/confidentiality, website design, efficacy, ease of use and the quality of the information contained in the site. Besides, positive feelings (warmth, attachment) expressed for traditional services are not present in the perceptions of electronic service quality. Similarly, negative feelings (anger, irritation, frustration) are apparently less intense on the Internet as when expressed during problems encountered with traditional services. Lastly, if classic evaluations of traditional service quality are based on the calculation of a gap between expectations and perceptions, it is difficult to apply this same model to the measurement of electronic service quality; respondents find it difficult to formulate their expectations concerning electronic service quality. A direct measure of the perceptions of electronic service quality, after the service has been delivered, therefore seems worthwhile.

Different ways of measuring electronic service quality

As in the physical world, there are different ways to measure the quality of a website (Cunliffe, 2000). Nonetheless, the methods all fall into one of two broad categorizes.

- **Behavioural measures** focus on the measurement of the commercial activity of the site: number of clicks, number of unique visitors or conversion rate of new visitors - (Totty, 2003), analysis of *log* files (Lynch & Ariely, 2000; Johnson and *al.*, 2001), analysis of navigation protocols or ongoing verbalization of consumers in a navigation situation (Ericsson & Simon, 1980), a behavioural measurement technique that has proven very useful for website analysis (Li *et al.*, 2001; Senecal, Gharbi & Nantel, 2002; Benbunan-Fich 2001).
- **Attitudinal measures**: traditional measurement scales that evaluate perceptions of consumers or that rely on professional experts to measure these perceptions. Under this category fall two approaches. The first one, generally based on experts' evaluation or interstitial surveys, seem more common among practitioners. The

second one, more grounded in psychometric theory, is more prevalent among scholars.

Measurement of electronic service quality by practitioners

Practitioners have adopted various approaches to measure perceptions of quality or efficacy of commercial websites: questioning consumers after their purchase (Bizrate.com, Directpanel.com), or using professional experts to evaluate sites (Gomez.com). Despite the diversity of approaches applied, none of the initiatives taken in isolation envisions the entire online transaction, from the search for information to order placing, including problems with delivery and after-sales service. Even if a picture of the important attributes of online shopping is beginning to emerge, practitioners' studies do not resolve problems of conceptualization of constructs or the validity and reliability of the measures used. To fill this gap, scholars of marketing and computer science have attempted to put in place valid instruments to measure the quality of electronic service, in order to better understand what consumers want during their online purchasing experience.

Measurement of online service quality by researchers

Three of the principal studies that examine the measurement of perceptions of the quality of electronic services reported in the academic literature have been retained for this study to determine which scale is best suited to measuring the perceptions of electronic service quality.

- **EtailQ**, developed by Wolfinbarger & Gilly (2003). This scale includes 14 items divided into 4 dimensions (design, customer service, reliability/compliance with commitments and security/privacy)
- **Webqual 4** developed by Barnes & Vidgen (2003), composed of 22 items on 3 dimensions (quality of information, quality of interactivity /confidence and empathy, and usability of the site / usability and design).
- **Sitequal** developed by Yoo & Donthu (2001), including 9 items distributed over 4 dimensions (ease of use, design, processing speed and security).

Empirical study

Methodology

To determine which of the three scales selected (EtailQ, Webqual 4 and Sitequal) best measures perceptions of electronic service quality, an online questionnaire that integrates the three scales was produced. 204 consumers were recruited from a link on two sites that were partners of the study (travel agency and online insurance) Consumers recruited were asked to participate in a laboratory experiment. For each site studied, the respondents were instructed, after a warm-up phase, to navigate on the site in order to complete a specific task (reserving and purchasing a trip for the holiday season on the travel site or purchasing an auto insurance policy on the online insurance site). Respondents were asked to verbalize their impressions aloud during navigation (protocol analysis), and the sequence of pages viewed was recorded. After completing this task, respondents were asked to fill out the online questionnaire. Finally, their impressions were gathered in the form of a semi-guided interview with the project coordinator. The sample population was 67% male, and 78% of respondents were under the age of 35. For the first site, 91% of respondents had never made a purchase on the travel site while 90% were not clients of the online insurer concerned.

Analyses and results

To verify the internal coherence of the measures for each of the dimensions of the scales compared, Cronbach's alpha coefficients were calculated, and are presented below.

Sitequal	α	Webqual 4	α	EtailQ	α
Ease of use	.94	Usability	.93	Design	.83
Design	.79	Information	.93	Customer service	.80
Speed	.63	Interaction	.81	Reliability	.77
Security	.85			Security	.89

Table 1: Internal reliability of measures, Cronbach's alpha coefficient

The coefficients obtained satisfy the criteria that Nunnally (1978) sets forth for confirmatory research ($> .70 / .80$). The internal reliability of all the dimensions of each of the three scales retained is thus verified. The only dimension whose reliability coefficient is low is Sitequal's "Processing speed" (Yoo & Donthu, 2001) which is most likely due to the fact that it is composed of only two items.

Confirmatory factorial analysis was performed on each of the three scales retained with EQS6 software (Bentler & Wu, 2002). The principal adjustment indices (absolute, incremental and parsimony) were calculated to verify the reliability of the measures.

	Parsimony indices		Absolute indices			Incremental indices	
	AIC	Chi² / ddl	RMSEA	GFI	AGFI	NFI	NNFI
Sitequal	15,58	57,58 / 21 = 2,74	.09	.94	.87	.95	.94
Webqual 4	277,28	649,28 / 186 = 3,5	.11	.75	.69	.82	.84
EtailQ	93,50	235,50 / 71 = 3,32	.11	.85	.78	.86	.87
Critical values	< to the AIC of the saturated model	the lowest as possible (< 3 to 5)	< .05 satisfactory < .08 tolerable < .10 at least tolerable	> .9	> .9	> .9	> .9

Table 2: Indices of scale adjustment

As shown on table 2, the scale whose adjustment indices best satisfied the commonly admitted criteria is Sitequal. It has the lowest RMSEA (.09). An increase in the sample size could improve this index by augmenting the precision of the results. Other indices (absolute and incremental) are superior to those of other scales (Webqual 4 and EtailQ) and to the critical values. Thus we can conclude that, given the commonly admitted criteria, Sitequal is the model best adapted to the data.

To verify the superiority of Sitequal over the two other scales, the mean of the R^2 coefficients (based on the standardized solution) was calculated. This mean provides an indication of the predictive power of the scale (identical to the R^2 coefficient of multiple determination of the regression).

mean of the R ²		
Sitequal	Webqual 4	EtailQ
.67	.58	.57

Table 3: Predictive power of scales

Here again, Sitequal appears to have the strongest predictive power of perceptions of electronic service quality in the sample studied.

Conclusion, limits and avenues of future research

Based on the results of this study, we can conclude that Sitequal (Yoo and Donthu, 2001) is superior to the two other scales considered (Webqual 4 and EtailQ) in predicting the perceptions of electronic service quality. In effect, this scale is best adjusted to the data, and has the strongest predictive power. Nonetheless, to validate these results, this study should be replicated for other categories of sites, and it is worth verifying whether the category of site (products, services, information, etc.) plays a role in evaluating perceptions of electronic service quality. Similarly, the impact of Sitequal on related variables such as satisfaction following the purchase on the site, revisiting intentions, positive word of mouth, or more generally the attitude toward the site (Chen and Wells, 1999; Chen *et al.*, 2002), should be investigated. The role of certain individual or situational variables (expertise of the Internet user, purpose of the visit, etc.) should also be explored.

Lastly, if the principal strength of Sitequal is its parsimony (9 items), it is difficult to imagine that this scale could grasp all the subtleties of online purchasing behaviour and evaluation of the perceived quality of the purchase. The most common dimensions related to perceptions of electronic service quality refer to the quality of the offering, information, design, navigation, reliability of procedures and security/respect for privacy. Sitequal therefore appears to be an interesting albeit incomplete starting point to grasp the online purchasing process as a whole, from the search for information to order placing, by way of payment, delivery, and after-sales service. Studies on this theme are therefore still necessary.

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