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# Developing an Instrument for Measuring Electronic Shopping Service Quality: E-SQUAL

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## ABSTRACT

In contrast to service quality in traditional facilities (e.g., stores, restaurants, clinics) that enjoyed an extensive research during the last 20 years and resulted in a solid base for service quality measurement and management, service quality that is delivered via the web, termed here electronic service quality, lacks maturity. The present study develops and validates an instrument for measuring electronic service quality of online shopping sites. Using two independent datasets, a conceptual framework of e-service quality is proposed and empirically tested. This research develops an E-SQUAL scale consisting of six dimensions: information quality, web usability, reliability, responsiveness, assurance and personalization. The developed scale demonstrates strong psychometric properties in terms of reliability and validity. Conclusion, implications and limitations of the study are presented.

## Keywords

Online shopping, e-service quality, SERVQUAL, structural analysis

## INTRODUCTION

Phenomenal growth has been observed in electronic retailing (e-retailing) in the last decade. However, at least two thirds of all e-stores were unable to produce profitability (Huang, 2002). A careful investigation of the reasons behind this sizable percentage of unsuccessful experiences indicates that online shoppers experience a widespread lack of an adequate electronic service (e-service) quality that affects firms' profitability (Parasuraman et al., 2005). This is mainly because e-service quality still lacks the maturity in conceptualization and measurement (Parasuraman et al., 2005). In contrast to service quality in e-stores, traditional service quality has received extensive research attention providing a strong basis for defining and measuring service quality (e.g., Parasuraman et al., 1988). A combination of theoretical and empirical research resulted in developing the SERVQUAL model for measuring service quality. The SERVQUAL instrument demonstrates a wide acceptance and high reliability across the spectrum of different industries. The SERVQUAL model has five dimensions: tangibles (appearance of physical facilities, equipment, personnel and communication materials), reliability (ability to perform the promised service dependably and accurately), responsiveness (willingness to help customers and provide prompt services), assurance (knowledge and courtesy of employees and their ability to convey trust and confidence) and empathy (the caring and individualized attention provided to the customers) (Parasuraman et al. 1988). The SERVQUAL model has been employed in settings of traditional stores, restaurants, museums, clinics, information systems and e-commerce. A number of studies have employed the SERVQUAL model to measure service quality in e-stores by rewording, adding items or dropping items from its existing generic dimensions. However, some studies called for re-structuring the dimensions of the SERVQUAL model to suit the e-stores setting (e.g., Lee and Lin, 2005). Therefore, this research re-formulates the generic dimensions of SERVQUAL to be used effectively in the context e-service quality. The current study follows a systematic framework suggested by Churchill (1979) to develop an instrument for measuring e-service quality for online shopping. The rest of this paper consists of three sections. The first section provides a literature review of e-service quality and related work. Next, research methodology is discussed. Finally, analysis work and findings are provided.

## BACKGROUND AND LITERATURE REVIEW

Electronic service quality is defined as the extent the website facilitates efficient and effective shopping, purchasing and delivery of products and services (Zeithaml et al., 2000). Previous research on e-service quality has employed SERVQUAL

model by rewording scale's original items, adding new items or dropping existing items (Lee and Lin, 2005). For example, Iwwarden et al. (2004) used SERVQUAL by rewording the items of the scale to identify dimensions of e-service quality. This resulted in identifying five dimensions: fast access, ease of navigation, presentation of complete offer, order's overview before final purchase decision, assurance and simple registration process. Similarly, Barnes and Vidgen (2002) carefully reworded the SERVQUAL model. This led in developing WebQual scale that includes five factors: usability, design, information, trust and empathy. Another study focused on online traveling websites resulted in having service quality, navigation, design, accessibility, reliability and customization as the dimensions of e-service quality (van Riel et al., 2004). However, this procedure of employing SERVQUAL model by rewording its items has been found to be insufficient in e-stores (Parasuraman et al., 2005). The next section presents research methodology in identifying dimensions of e-service quality for online shopping.

## RESEARCH METHODOLOGY

Several procedural models have been proposed to develop psychometric scales. This study follows the framework described by Churchill (1979) for developing dimensional measures of complex research variables.

### Scale Development Process

There are three generic steps in a scale developing models: (1) scale conceptualization; (2) scale design; and (3) validity and reliability testing (Churchill, 1979). Conceptualization focuses on identifying the domain of the proposed dimension and generating a battery of items to represent each dimension. Next, items should be purified using analytical methods (e.g., reliability analysis and factor analysis). The final step in scale development is reliability and validity assessment.

### Subjects and Procedure

According to Jupiter (2004), student populations (i.e., young adult population) conduct more personal businesses online than the overall web audience. In addition, eighty-one percent of college students have made online purchases for tangible products. Therefore, college students of a mid-size school in the South were invited to participate in our research. Data collection was conducted in two phases. The first phase of data collection aims onto scale design and data purification, while the second phase of data collection was performed to test reliability and validity of the scale.

## INSTRUMENTATION

The present research develops an instrument following the three steps of conceptualization, design and psychometric properties assessment using two independents dataset, as it is described next.

### Conceptualization

Construct conceptualization refers to defining the construct's domain and operationalizing it by generating a pool of items (Churchill, 1979). Validated and reliable scales were adopted from the existing literature. Dimensions were operationalized with service-specific items to increase the scale's validity. Items were measured using a seven-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree). With the establishment of content validity, Parasuraman et al.'s recommendations (2005) of using experienced online shoppers whom used the Internet at least 12 times during the past three months and made at least one online purchase transaction within that the last six months have been followed. The instrument was pretested using 25 experienced online shoppers. Based on instrument's pretesting, several items were dropped and a number of items were reworded due to duplications and ambiguous meaning.

### Scale design

Several analytical techniques are suggested to be used in scale design. This study uses Exploratory Factor Analysis (EFA) and reliability analysis to perform scale design and data purification (Churchill, 1979). We started by inviting students of mid-size university in the South to participate in our research. A total of 225 usable responses were obtained from first phase of data collection. Age profile of participants represents most age groups, with the majority (45 %) being in the 21 to 30 age range and sixty-eight percent of the respondents were men. Typical products and purchases were books (24 %), computer

hardware and accessories (21%). Scale purification was performed by conducting reliability analysis (Churchill, 1979). Items were pruned within each dimension by examining their coefficient alpha as a reliability test and item-to-total correlation (Parasuraman et al., 2005). Next, Exploratory Factor Analysis (EFA) was conducted to identify the key dimensions of e-service quality. Appropriateness of conducting EFA was tested using the Bartlett test of sphericity and Measure of Sampling Adequacy (Hair et al., 1998). The significance of the Bartlett test is .000 and the KMO measure is 0.897 implying the appropriateness of conducting EFA (Hair et al., 1998). Analytical work of EFA resulted in a 28-item multidimensional scale (E-SQUAL) explaining 82.52 % of the variance and consisting of six dimensions: web usability, information quality, reliability, responsiveness, assurance, and personalization. Internal consistency was evaluated by calculating Cronbach's alpha exceeding the conventional minimum of 0.8 (Hair et al., 1998) and demonstrating a high reliability for each dimension (see Table 1).

Construct/ Measure	Mean	S.D.	Factor loading (a)	Construct reliability
<b>Information quality(IQ)</b>				.915
IQ1: Accurate and relevant information	4.56	1.75	.921	
IQ2: Current and timely information	4.43	1.61	.821	
IQ5: Appropriate format of information	4.66	1.63	.867	
IQ6: Easy to understand information	4.81	1.78	.862	
IQ3: Rich in detail	4.34	1.50	.851	
IQ4: Fit-to-task information	4.72	1.76	.820	
<b>Reliability (REL)</b>				.869
REL1: promises fulfillment	4.45	1.51	.883	
REL2: Sending order confirmation emails	4.56	1.40	.876	
REL3: Sending order cancellation and returns	4.43	1.43	.862	
REL4: Performing service right the first time	4.57	1.48	.760	
REL5: Availability of order tracking details	4.50	1.39	.718	
REL6: Availability of the website	5.05	1.41	.702	
<b>Responsiveness (RES)</b>				.889
RES1: Providing prompt customer service	4.56	1.42	.835	
RES2: Dealing with customer complaints	4.53	1.32	.801	
RES3: Website addresses are included in all existing documentation, publicity and advertising channel	4.46	1.44	.788	
RES4: Relevant, accurate, and appropriate email responses to customer requirements	4.52	1.29	.745	
RES5: Showing sincere interest in resolving problems	5.17	1.28	.733	
<b>Assurance (ASS)</b>				.894
ASS1: Availability of security policy	4.76	1.74	.921	
ASS2: Availability of privacy policy	5.04	1.56	.884	
ASS3: External validation of trustworthiness	4.88	1.51	.797	
ASS4: Good reputation of e-retailer	4.91	1.63	.782	
<b>Website usability(USE)</b>				.881
US1: Attractiveness of website	5.12	1.45	.779	
US2: Consistent and standardized navigation	4.78	1.46	.787	
US3: Scrolling through pages is kept to minimum.	4.51	1.54	.765	
US4: Appropriate use of graphics and animation	4.81	1.42	.742	
<b>Personalization (PER)</b>				.862
PERS1: Providing personal attention	4.23	1.52	.912	
PERS2: Enabling ordering personalized products	4.45	1.48	.888	
PERS3 Understanding customers needs	4.60	1.53	.879	

Table 1. Electronic Service Quality Factor Solution

a. Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in six iterations.

These values together with factor loadings exceeding the 0.70 support the convergent validity of each dimension (Parasuraman et al., 2005). Obtained results from this phase of exploratory research revealed that our developed scale is ready for normalization (Churchill, 1979). In addition, we examined the relationship between the identified dimensions of e-service quality and overall quality ratings. Online shoppers were asked to rate overall service quality using a seven-point Likert-type scale (ranging from = 1 extremely poor to 7 = extremely excellent).

The developed instrument exhibits good reliability and validity. Reliability scores (Cronbach's alpha) were 0.91, 0.86, 0.88, 0.89, 0.88 and 0.86 for information quality, reliability, responsiveness, assurance, web usability and personalization respectively. The overall reliability of the 28-item scale was 0.87. Reliability scores were above the reliability cut-off points suggested by Hair et al. (1998). The instrument was further tested for convergent and discriminant validity to assess the constructs validity (Churchill, 1979). Convergent validity was evaluated based on the item's loading on the corresponding factor. According Bagozzi and Yi (1988), having high reliability coefficients with factor loadings exceeding the 0.70 supports the convergent validity of construct. As shown in table 1, items loaded strongly on its corresponding factors with loadings more than 0.70. Discriminant validity was tested by screening correlations among constructs (Hair et al., 1998). Based on the correlation matrix between the constructs, no correlation exceeded the cut-off of 0.90 (Hatcher, 1994). As further evidence of the validity of the instrument, the relationship among constructs of e-service quality and the overall quality index (Churchill, 1979). The highest correlation was between service reliability and overall service quality (Pearson  $r = 0.76$ ), while the lowest correlation was between website usability and overall service quality (Pearson  $r = 0.41$ ) (see Table 2 below). The results clearly provide further credence to the sound psychometric properties of the scale.

	USE	IQ	REL	RES	ASS	PER
IQ	0.25**					
REL	0.43**	0.75**				
RES	0.20**	0.26**	0.53**			
ASS	0.34**	0.72**	0.74**	0.28**		
PER	0.22**	0.68**	0.53**	0.21**	0.24**	
Overall Quality	0.41**	0.57**	0.76**	0.68**	0.74**	0.54**

Table 2. Correlations Among Constructs of E-Service Quality and Overall Service Quality Rating  
\*\*  $p < 0.001$

Our purpose is to develop a better understanding and thereby measurement instrument of e-service quality. Following a systematic process in scale development using two independent samples, the present study developed an instrument that captures the full range of quality of online servicing systems. A variety of reliability and validity indices indicated high reliability and strong validity of the developed tool.

## CONCLUSION AND IMPLICATIONS

Previous research has shown that the widespread consumer experiences of inadequate e-service quality stall the growth of the emerging economy (Santos, 2003). Therefore, it is important to develop an appropriate instrument to measure e-service quality. The current study develops a comprehensive instrument by reformulating the SERVQUAL model to be used meaningfully in the context of e-shopping sites. The resulting instrument measures e-service quality on six dimensions: website usability, information quality, reliability, responsiveness, assurance and personalization. The developed instrument helps managers of online firms in identifying potential problematic issues in their e-service delivery systems that need taking corrective actions. Managers of online firms need to consider that employing advanced web technologies is not a guarantee of successful e-service systems. Online customers value human interaction of e-service systems especially, when questions arise and problems occur. Moreover, websites should be developed considering the average skills of online users by designing an

easy to use website, including understandable information, offering help through different channels (e.g., callback centers, chat windows, and emails), inspiring trust and providing individualized attention.

## LIMITATIONS

The study involves a number of limitations that need to be addressed. Acknowledgement of these limitations suggests directions for future research. First, as all survey-based studies, the study suffers from methodological limitations. Thus, it is recommended to replicate the study using different national and international samples. Second, adopting different research methods (e.g., qualitative research methods) may result in additional findings on how customers measure and perceive e-service quality. Finally, the study focused on the perception of e-service quality considering tangible and complex products. Understand how e-service quality is evaluated in the context of pure service products such as insurance and mortgage e-commerce websites is potentially fruitful avenue of research.

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