



Customer perceptions of e-service quality in online shopping

Customer
perceptions of
e-service

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161

Abstract

Purpose – This paper develops a research model to examine the relationship among e-service quality dimensions and overall service quality, customer satisfaction and purchase intentions.

Design/methodology/approach – Data from a survey of 297 online consumers were used to test the research model. Confirmatory factor analysis was conducted to examine the reliability and validity of the measurement model, and the structural equation modelling technique was used to test the research model.

Findings – The analytical results showed that the dimensions of web site design, reliability, responsiveness, and trust affect overall service quality and customer satisfaction. Moreover, the latter in turn are significantly related to customer purchase intentions. However, the personalization dimension is not significantly related to overall service quality and customer satisfaction.

Research limitations/implications – Future research can use different methodologies, such as longitudinal studies, focus groups and interviews, to examine the relationship between service quality and customer purchase behaviour in online shopping contexts.

Practical implications – This study suggests that to enhance customer purchase intentions, online stores should develop marketing strategies to better address the trustworthiness, reliability, and responsiveness of web-based services. Online stores can devote valuable corporate resources to the important e-service quality attributes identified by this study.

Originality/value – This study developed the instrument dimensions of e-service quality by modifying the SERVQUAL model to consider online shopping context. Moreover, the results of this study provide a valuable reference for managers of online stores, as well as for researchers interested in internet marketing.

Keywords Electronic commerce, Service quality assurance, Customer satisfaction, Purchasing, Shopping, Structural analysis

Paper type Research paper

1. Introduction

With the rapid global growth in electronic commerce (e-commerce), businesses are attempting to gain a competitive advantage by using e-commerce to interact with customers. Businesses with the most experience and success in using e-commerce are beginning to realize that the key determinants of success or failure are not merely web site presence and low price but also include the electronic service quality (e-service quality) (Yang, 2001; Zeithaml, 2002). Santos (2003) defined e-service quality as overall customer assessment and judgment of e-service delivery in the virtual marketplace.

Service quality is an elusive and abstract construct that is difficult to explain and measure (Cronin and Taylor, 1992). The SERVQUAL model, first developed by



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Parasuraman *et al.* (1988) has been widely tested as a means of measuring customer perceptions of service quality. The SERVQUAL model contains five dimensions, namely tangibles, reliability, responsiveness, assurance and empathy. Furthermore, during the past decade, SERVQUAL model has been tested for measuring service quality in e-commerce settings (Devaraj *et al.*, 2002; Kim and Lee, 2002; Li *et al.*, 2002; Kuo, 2003; Negash *et al.*, 2003). Previous studies on the measurement of e-service quality focused only on the application of the SERVQUAL model by rewording the original scale items. However, in the service quality field, service researchers need to pay more attention to customer evaluations of e-services, because methods of measuring service quality differ between e-commerce and physical marketplace service (Parasuraman and Grewal, 2000). Additionally, van Riel *et al.* (2001) proposed that the SERVQUAL scale items would have to be reformulated before they could be used meaningfully in the online shopping context. Thus, this study aims to identify the main influence on online shopping service quality, using a modified version of the SERVQUAL model.

Research is required on the influence of e-services on all customer responses, such as perceived service quality, customer satisfaction and purchase intentions (Parasuraman and Grewal, 2000; Jeong *et al.*, 2003). Understanding the determinants of service quality, customer satisfaction and purchase intentions for online shopping is important for both marketing researchers and online stores managers. Moreover, previous studies have revealed that service quality in online environments is an important determinant of the effectiveness of e-commerce (Yang, 2001; Janda *et al.*, 2002). However, few studies have examined the relation among different dimensions of e-service quality in predicting overall service quality, customer satisfaction, and purchase intentions for online shopping.

This study attempts to derive the instrument dimensions of e-service quality through modifying the SERVQUAL model to consider the online shopping context, and develops a research model to examine how e-service quality dimensions affect overall service quality, customer satisfaction and purchase intentions. To prove the usefulness of the research model, data were collected from 297 online consumers. Confirmatory factor analysis (CFA) was conducted to examine the reliability and validity of the measurement model, and the structural equation modeling (SEM) technique was used to test the research model, which was supported by LISREL 8.3 software. The test results provide a valuable reference for managers of online stores, as well as for researchers interested in internet marketing.

2. Literature review

2.1 E-service quality

E-service quality can be defined as overall customer evaluations and judgments regarding the excellence and quality of e-service delivery in the virtual marketplace (Santos, 2003). Research over the past two decades has demonstrated that service quality influences consumption decisions, but only recently these findings have been applied to e-commerce (Yang and Jun, 2002; Wolfinbarger and Gilly, 2003). For example, service quality measures have been applied to assess the quality of virtual community web sites (Kuo, 2003), satisfaction with e-commerce channels (Devaraj *et al.*, 2002), and determinants of web site success (Liu and Arnett, 2000).

Online shopping is a complex process that can be divided into various sub-processes such as navigation, searching for information, online transactions, or

customer interactions. Customers are unlikely to evaluate each sub-process in detail during a single visit to an online store, but rather will perceive the service as an overall process and outcome (van Riel *et al.*, 2001). Furthermore, for online customers, high standard e-service quality is the means by which the potential benefits of the internet can be realized (Yang, 2001). Because it is much easier to compare product technical features and prices online than through traditional channels, e-service quality becomes a key factor for customers (Santos, 2003). Online customers thus expect equal or higher levels of service quality than traditional channels customers.

2.2 Service quality dimensions

Parasuraman *et al.* (1988) conceptualize service quality as the relative perceptual distance between customer expectations and evaluations of service experiences and service quality using a multi-item scale called the SERVQUAL model. The SERVQUAL model includes the five dimensions of tangibles (physical facilities and the appearance of personnel), reliability (ability to perform the promised service dependably and accurately), responsiveness (willingness to help customers and provide prompt service), assurance (employee knowledge base which induces customer trust and confidence), and empathy (caring and individualized attention provided to customers by the service provider).

The SERVQUAL scale recently has been widely used to measure information system service quality (Pitt *et al.*, 1997; van Dyke *et al.*, 1999; Carr, 2002; Jiang *et al.*, 2002). The SERVQUAL scale also was employed to measure e-commerce system service quality (Devaraj *et al.*, 2002; Kim and Lee, 2002). Related studies on e-service quality have tested the SERVQUAL scale and used it to measure service in various contexts, including web-based service (Kuo, 2003; Negash *et al.*, 2003), internet retail (Kaynama and Black, 2000; Barnes and Vidgen, 2001), and electronic banking (Zhu *et al.*, 2002). Most research on e-service quality measurement has focused on rewording the SERVQUAL scale items. However, challenges in measuring web-based service quality exist due to the differences between web-based and traditional customer service (Li *et al.*, 2002).

Parasuraman and Grewal (2000) suggested that research is needed on whether “the definitions and relative importance of the SERVQUAL dimensions change when customers interact with technology rather than with service personnel” (p. 171). Moreover, several studies have proposed that the SERVQUAL scale items must be reformulated before they can be meaningfully used in the online shopping context (van Riel *et al.*, 2001; Santos, 2003). Thus, based on the SERVQUAL model with consideration of the characteristics of the online shopping context should be partly reformulated. Additionally, previous studies have suggested that perceived service quality positively influences customer satisfaction and purchase intentions (Rust and Zahorik, 1993; Martensen *et al.*, 2000). Nevertheless, in the context of online shopping, few studies have examined the usefulness of relative service quality dimensions in predicting overall service quality, customer satisfaction and purchase intentions.

This study aims to:

- (1) derive the instrument dimensions of e-service quality based on the SERVQUAL model and modify them following reference to the related literature on the online shopping context; and
- (2) determine how the e-service quality dimensions affect overall service quality, customer satisfaction and purchase intentions.

3. Research model and hypotheses

Because the existing literature remains insufficient to provide a conceptual model of e-service quality, empirical research is required to clarify the detailed determinants of e-service quality and their influence on customer perceptions of online stores (Janda *et al.*, 2002; Yang and Jun, 2002; Santos, 2003). This study proposed that e-service quality dimensions include web site design, reliability, responsiveness, trust and personalization, and moreover developed a research model for understanding the perceptions of rational customers regarding online shopping. The model proposed that e-service quality dimensions are casually linked to the two performance measures of overall service quality and customer satisfaction, and in turn influence customer purchase intentions (see Figure 1).

3.1 E-service quality dimensions

This study used the revised SERVQUAL scale items to establish dimensions of e-service quality through web site design, reliability, responsiveness, trust, and personalization. The relationship among the e-service quality dimensions, overall service quality and customer satisfaction is hypothesized and discussed below.

3.1.1 Web site design. Web site design quality is crucial for online stores (Than and Grandon, 2002). Web site design describes the appeal that user interface design presents to customers (Kim and Lee, 2002). The influence of web site design on e-service performance has been studied extensively. For instance, Cho and Park (2001) conducted an empirical research of a sample of 435 internet users to examine the e-commerce user-consumer satisfaction index (ECUSI) for internet shopping. They found that the customer satisfaction is assessed using the quality of web site design. A recent empirical study found that web site design factors are strong predictors of customer quality judgments, satisfaction, and loyalty for internet retailers (Wolfenbarger and Gilly, 2003). Hence, the following hypotheses are proposed.

H1a. Web site design in an online store positively influences overall service quality.

H1b. Web site design in an online store positively influences customer satisfaction.

3.1.2 Reliability. Reliability represents the ability of the web site to fulfill orders correctly, deliver promptly, and keep personal information secure (Parasuraman *et al.*, 1988; Janda *et al.*, 2002; Kim and Lee, 2002). The importance of

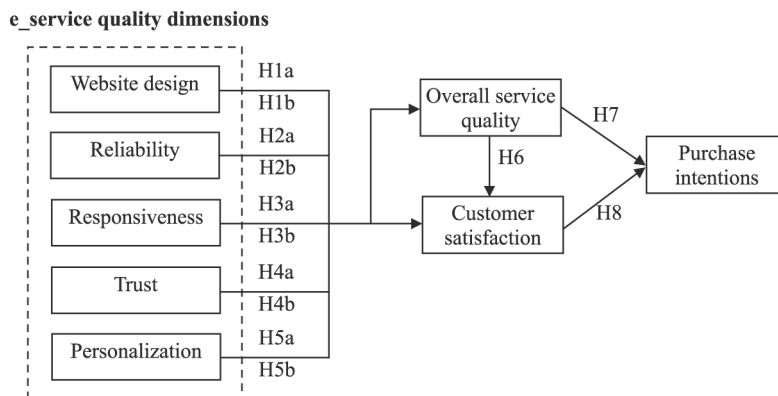


Figure 1.
Research model

reliability has been emphasized by the information technology-based service. Moreover, Zhu *et al.* (2002) argued that reliability dimension has a direct positive effect on perceived service quality and customer satisfaction by electronic banking systems. Online stores must provide mistake-free service and secure online transactions to make customers feel comfortable using online shopping. The following hypotheses thus are proposed.

H2a. Reliability in an online store positively influences overall service quality.

H2b. Reliability in an online store positively influences customer satisfaction.

3.1.3 Responsiveness. Customers expect online stores to respond to their inquiries promptly (Liao and Cheung, 2002). Responsiveness describes how often an online store voluntarily provides services (e.g. customer inquiries, information retrieval and navigation speed) that are important to its customers (Parasuraman *et al.*, 1988; Yang, 2001; Kim and Lee, 2002). Researchers examining the responsiveness of web-based services have highlighted the importance of perceived service quality and customer satisfaction (Yang and Jun, 2002; Zhu *et al.*, 2002). The following hypotheses thus are proposed.

H3a. Responsiveness design in an online store positively influences overall service quality.

H3b. Responsiveness in an online store positively influences customer satisfaction.

3.1.4 Trust. Online shopping context comprises the interaction customers and online stores (Bakos, 1991). Numerous studies have emphasized the importance of online trust between customers and online stores (McKnight *et al.*, 2002; Krauter and Kaluscha, 2003). Trust is a significant antecedent of participation in commerce generally, and especially in online settings because of the increased ease with which online stores can behave opportunistically (Reichheld and Scheffer, 2000). Moreover, trust is defined as customer willingness to accept vulnerability in an online transaction based on their positive expectations regarding future online store behaviours (Kimery and McCard, 2002). That is, trust encourages online customer purchasing activity and affects customer attitudes toward purchasing from an online store (Gefen, 2000; Gefen *et al.*, 2003). Consequently, the following hypotheses are proposed.

H4a. Trust in an online store positively influences overall service quality.

H4b. Trust in an online store positively influences customer satisfaction.

3.1.5 Personalization. The lack of real-time interaction tends to prevent potential customers from purchasing through online shopping (Yang and Jun, 2002). Personalization involves individualized attention, personal thank you notes from online stores, and the availability of a message area for customer questions or comments (Yang, 2001). Previous studies have examined the influence of the customer service provided by internet retailers on customer perceptions of service quality and satisfaction (Wolfenbarger and Gilly, 2003). The following hypotheses are proposed.

H5a. Personalization in an online store positively influences overall service quality.

H5b. Personalization in an online store positively influences customer satisfaction.

3.1.6 Purchase intentions. As the internet has spread it has become a popular marketing channel (Cho and Park, 2001). Analyzing customer evaluations of online shopping is particularly interesting to academics and practitioners, especially in the field of e-commerce (Wu, 2003). Previous studies have found that service provider perceptions of customer satisfaction are a function of perceived service quality of technological services (Martensen *et al.*, 2000; Zhu *et al.*, 2002).

The theory of reasoned action proposes that behaviour can be predicted from intentions that correspond directly (in terms of action, target and context) to that behaviour (Ajzen and Fishbein, 1980). This study thus postulated that consumer purchase intentions provide an acceptable proxy for actual online purchase behaviour. Additionally, previous studies have suggested that customer perceptions of service quality and satisfaction positively influence purchasing intentions. For instance, Rust and Zahorik (1993) noted that overall service quality and customer satisfaction significantly influence customer retention, market share, and profitability. More recently, Llusar *et al.* (2001) considered customer satisfaction as a mediator of the relationship between firm perceived quality and customer purchase intentions. Based on the above literature review, the following hypotheses are proposed.

- H6.* Overall service quality in an online store positively influences customer satisfaction.
- H7.* Overall service quality in an online store positively influences customer purchase intentions.
- H8.* Customer satisfaction with an online store positively influences purchase intentions.

4. Research methodology

4.1 Measures

Table I lists all of the construct definitions of the instruments and the related literature. This study adapted the measures used to operationalize the constructs included in the investigated model from relevant previous studies, making minor wording changes to tailor these measures to the online shopping context. Items for measuring web site design, reliability, responsiveness, and personalization employed several dimensions of the SERVQUAL model (Parasuraman *et al.*, 1988; Kim and Lee, 2002; Yang and Jun, 2002), items for trust were revised from Kimery and McCard (2002), and items for overall service quality, customer satisfaction and purchase intentions were modified from Zhu *et al.* (2002) and Jeong *et al.* (2003). All 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, the questionnaire was refined through rigorous pretesting. The pretesting focused on instrument clarity, question wording and validity. During the pretesting, 15 experienced online shoppers were taken as subjects and invited to comment on the questions and wordings. The comments of these 15 individuals then provided a basis for revisions to the construct measures. Several items were removed from the instrument based on the feedback from the pretesting subjects. Table II lists the final questionnaire items used to measure each construct.

4.2 Subjects and procedure

A total of 305 questionnaires were distributed to senior year undergraduate students taking the course on e-commerce at St. John's and St. Mary's Institute of Technology,

Construct	Definition	References
Web site design	Customer perception of degree of user friendliness in using an online store	Parasuraman <i>et al.</i> (1988) and Kim and Lee (2002)
Reliability	Customer perception of the reliability and security of the service provided by an online store	Parasuraman <i>et al.</i> (1988) and Kim and Lee (2002)
Responsiveness	Customer perception of the responsiveness and helpfulness of the service provided by an online store	Parasuraman <i>et al.</i> (1988) and Kim and Lee (2002)
Trust	Customer perception of the level of trust mechanisms provided by an online store	Kimery and McCard (2002)
Personalization	Customer perception of the degree to which an online store provides differentiated services to satisfy specific individual needs	Parasuraman <i>et al.</i> (1988) and Yang and Jun (2002)
Overall service quality	Customer perceptions of service quality provided by an online store	Zhu <i>et al.</i> (2002)
Customer satisfaction	Customer satisfaction with an online store	Zhu <i>et al.</i> (2002)
Purchase intentions	Customer likelihood of buying from a particular online store	Jeong <i>et al.</i> (2003)

Table I.
Constructs definition

Taipei, Taiwan in the spring of 2003. The student subjects were selected in this study for three reasons. First, according to the 2003 Taiwan internet users survey report (<http://survey.yam.com/survey/2003/index.htm>, 2004), about 40 percent of internet users in Taiwan are college students. Moreover, college students are greatest proportion of internet users. Second, online customers generally are younger and better educated than conventional customers, meaning that the student subjects closely resemble the online customer population (Mcknight *et al.*, 2002). Finally, the use of students as subjects in this study can decrease the effect of variance in web-based literacy.

The study was conducted in the following stages. First, the subjects were instructed to navigate online bookstores (such as www.amazon.com, www.books.com.tw, and www.silkbook.com.tw) and search for books related to e-commerce course they were taking. Next, the subjects were asked to select a textbook or reference book related for the course that they would like to buy from an online bookstore, and fulfillment time cannot be over 30 days. The subjects were given two tasks representing the online transaction process. The first task was to register with an online bookstore, search for the book selected by the participants and place it in the shopping cart. The second task involved filling out certain payment and delivery data. After completing these two tasks, all the 305 students completed the task successfully and the questionnaires were distributed in class. The response rate was 100 percent, but since eight questionnaires later were discarded because of missing data, the effective response rate was approximately 97 percent.

Of the 297 usable respondents, 68.4 percent were less than 25 years of age ($n = 203$), 26.9 percent were 26-35 ($n = 80$), and 4.7 percent were over 35 years old ($n = 14$). About 44 percent of the respondents had previously bought from online

Construct/measure	Mean	S.D.	Factor loading	Construct reliability
<i>Web site design</i>				0.77
The online bookstore is visually appealing	5.44	0.78	0.80	
The user interface of the online bookstore has a well-organized appearance	5.25	0.78	0.77	
It is quick and easy to complete a transaction at the online bookstore	5.45	0.71	0.75	
<i>Reliability</i>				0.85
The online bookstore delivers on its undertaking to do certain things by a certain time	5.63	0.74	0.76	
The online bookstore shows a sincere interest in solving customer problems	5.45	0.82	0.78	
Transactions with the online bookstore are error-free	5.70	0.84	0.72	
The online bookstore has adequate security	5.39	0.82	0.84	
<i>Responsiveness</i>				0.80
I think the online bookstore gives prompt service	5.16	0.73	0.78	
I believe the online bookstore is always willing to help customers	5.62	0.82	0.85	
I believe the online bookstore is never too busy to respond to customer requests	5.64	0.72	0.77	
<i>Trust</i>				0.81
I believe the online bookstore is trustworthy	5.54	0.77	0.73	
The online bookstore instills confidence in customers	5.49	0.78	0.89	
<i>Personalization</i>				0.74
The online bookstore provides the targeting e-mail to customers	4.28	0.59	0.86	
The online bookstore provides the recommendation of books by customers' preferences	5.18	0.64	0.75	
The online bookstore provides customers free personal homepage	4.60	0.72	0.70	
<i>Overall service quality</i>				–
My overall opinion of the services provided by online bookstore is very good	5.34	0.56	1.00	
<i>Customer satisfaction</i>				
Overall, I am satisfied with online bookstore online experience	5.48	0.61	1.00	
<i>Purchase intentions</i>				0.80
If I purchase books in the next 30 days, I will use the online bookstore	5.11	0.79	0.93	
I strongly recommend that others use the online bookstore	5.30	0.82	0.73	

Table II.
Summary of
measurement scales

bookstores ($n = 131$). Finally, about 54 percent of the respondents were male ($n = 159$) and 46 percent were female ($n = 138$).

4.3 Statistical analysis

The research model shown in Figure 1 was analyzed primarily using SEM, supported by LISREL 8.3 software. Numerous researchers have proposed a two-stage model-building process for applying SEM (Hoyle, 1995; Joreskog and Sorbom, 1996;

Hair *et al.*, 1998). Confirmatory factor analysis (CFA) was conducted to examine the reliability and validity of the measurement model, and the structural model also was analyzed to test the associations hypothesized in the present research model.

5. Results

5.1 Measurement model

The measurement model was first assessed by CFA. Previous research has noted that the normed χ^2 (the ratio between χ^2 and the degree of freedom) provides direct statistical evidence for the test of model goodness of fit (GFI) (Joreskog and Sorbom, 1996). The observed normed χ^2 for this model was 2.04 ($\chi^2 = 373.99$, $df = 183$), smaller than the three recommended by Bagozzi and Yi (1988). Other fit indexes also show good fit for the measurement model. The GFI is 0.93, greater than the 0.9 recommended (Joreskog and Sorbom, 1996). Moreover, the adjusted goodness of fit index (AGFI) is 0.88, which is slightly low, but still acceptable (Bagozzi and Yi, 1988). Furthermore, the nonincremental fit index, such as the comparative fit index (CFI) is 0.91, exceeding the recommended cut-off level of 0.9 (Bagozzi and Yi, 1988). Finally, the root mean square error of approximation (RMSEA) is 0.049, which also suggests a good fit to the data (Bagozzi and Yi, 1988). In sum, the measurement model exhibited a fairly good fit with the data collected.

The measurement model was further assessed for construct reliability and validity. Construct reliability can be calculated as follows: (square of the summation of the factor loadings)/{(square of the summation of the factor loadings)+(summation of error variances)}. The interpretation of the resultant coefficient is similar to that of Cronach's alpha, except that it also takes into account the actual factor loadings rather than assuming each item to be equally weighted in the composite load determination. From Table II, construct reliability for all factors in the measurement model exceeded 0.7, which Nunnally and Bernstein (1994) identified as an acceptable threshold.

Bagozzi and Yi (1988) defined a factor loading exceeding 0.7 as evidence of convergent validity. From Table II, the factor loadings for all constructs exceed the recommended level of 0.7, indicating acceptable item convergence on the intended constructs. Additionally, from Table III, correlation between constructs ranged from 0.05 to 0.67, with the correlations of no pair of measures exceeding the criterion (0.9 and above) (Hair *et al.*, 1998). Empirical support thus exists for the discriminant validity of the measures.

	1	2	3	4	5	6	7	8
Web site design	1.00							
Reliability	0.67	1.00						
Responsiveness	0.50	0.62	1.00					
Trust	0.05	0.30	0.31	1.00				
Personalization	0.46	0.54	0.11	0.10	1.00			
Overall service quality	0.29	0.55	0.40	0.11	0.24	1.00		
Customer satisfaction	0.59	0.34	0.51	0.65	0.49	0.32	1.00	
Purchase intentions	0.46	0.42	0.57	0.41	0.22	0.25	0.30	1.00

Table III.
Constructs correlations

5.2 Structural model

The hypothesized research model was tested using the structural model. The over all fit statistics suggest that the model has adequate model fit ($\chi^2 = 423.92$, $df = 193$, $\chi^2/df = 2.21$, $GFI = 0.93$, $AGFI = 0.90$, $CFI = 0.91$, $RMSEA = 0.044$). The model fit indexes all exceed their respective common acceptance levels, indicating that the displayed fitted the data well.

The statistical significance of all the structural parameter estimates was examined to determine the validity of the hypothesized paths. Table IV lists the structural parameter estimates and the hypothesis testing results. This study examines the relationships between the dimensions of e-service quality and customer purchase intentions mediated by overall service quality and customer satisfaction in the online shopping context. The analytical results showed that online store web site design positively affects overall service quality ($\beta = 0.21$, $p < 0.01$) and customer satisfaction ($\beta = 0.22$, $p < 0.01$), providing support for *H1a* and *H1b*. Moreover, online store reliability significantly and positively affects overall service quality ($\beta = 0.35$, $p < 0.001$) and customer satisfaction ($\beta = 0.39$, $p < 0.001$), supporting *H2a* and *H2b*. Furthermore, responsiveness in the online store positively affects overall service quality ($\beta = 0.19$, $p < 0.01$) and customer satisfaction ($\beta = 0.25$, $p < 0.01$), so *H3a* and *H3b* are supported. From *H4a* and *H4b*, trust in the online store shows a strong positive relationship with overall service quality ($\beta = 0.44$, $p < 0.001$), and a positive relationship with customer satisfaction ($\beta = 0.30$, $p < 0.001$). Thus, *H4a* and *H4b* are supported. However, *H5a* and *H5b* were not supported, indicating that personalization in the online store was not significantly related to overall service quality ($\beta = 0.11$, $p > 0.01$) or customer satisfaction ($\beta = 0.09$, $p > 0.01$).

H6-H8 relate to the links among overall service quality, customer satisfaction and customer purchase intentions. Overall service quality has a strong positive effect on customer satisfaction ($\beta = 0.42$, $p < 0.001$), therefore, *H6* was supported. Additionally, overall service quality and customer satisfaction were found to significantly affect online store purchase intentions, so *H7* ($\beta = 0.28$, $p < 0.01$) and *H8* ($\beta = 0.34$, $p < 0.001$) are supported.

Path to	Path from	Hypothesis	Structural coefficients	t-value
Overall service quality	Web site design	<i>H1a</i>	0.21	2.05*
	Reliability	<i>H2a</i>	0.35	4.47**
	Responsiveness	<i>H3a</i>	0.19	2.21*
	Trust	<i>H4a</i>	0.44	5.10**
	Personalization	<i>H5a</i>	0.11	1.06
Customer satisfaction	Web site design	<i>H1b</i>	0.22	2.47*
	Reliability	<i>H2b</i>	0.39	4.93**
	Responsiveness	<i>H3b</i>	0.25	2.86*
	Trust	<i>H4b</i>	0.30	3.70**
	Personalization	<i>H5b</i>	0.09	0.84
Purchase intentions	Overall service quality	<i>H6</i>	0.42	4.79**
	Overall service quality	<i>H7</i>	0.28	2.63*
	Customer satisfaction	<i>H8</i>	0.34	3.90**

Table IV.
Results of estimation
structural model

Notes: * $p < 0.01$; and ** $p < 0.001$

6. Discussion

This study developed instrument dimensions of e-service quality through modifying the SERVQUAL model in the online shopping context. The dimensions of e-service quality included web site design, reliability, responsiveness, trust and personalization. Moreover, this study developed a research model to examine how e-service quality dimensions affect overall service quality, customer satisfaction, and purchase intentions. The analytical results of this study are discussed below.

First, the analytical results showed that trust most strongly affected overall service quality and customer satisfaction for online stores. This analytical result is consistent with that of Gefen (2000), who found that trust is a strong determinant of e-service performance that identified trust as key drivers of perceived service quality and customer satisfaction. Online stores thus must act honestly and in the best interests of customers during the transaction processes.

Second, the reliability dimension is a significant predictor of overall service quality, customer satisfaction and purchase intentions in online shopping. Other studies also found reliability to be an effective determinant of web-based service quality (Kuo, 2003; Wolfmbarger and Gilly, 2003). Therefore, to enhance customer satisfaction and purchase intentions, online stores should start improving the dimensions of reliability, such as capability of delivering products as promised, providing up-to-date and accurate information, and strengthening the security of online transactions.

Third, the dimension of responsiveness mildly affects overall service quality and customer satisfaction for online stores. This finding might be caused by the fact that customers expect high responsiveness from the prompt delivery of products, but might tolerate slower financial transactions if such transactions have increased security (van Riel *et al.*, 2001).

Next, although web site design had only a minor effect on overall service quality and customer satisfaction in this study, its importance should not be underestimated. Online stores should pay careful attention to this aspect. Particularly, web site design should be readable, and the user interface should be visually appealing and tidy, allowing customers to use the web site easily.

However, perhaps most surprising is the dimension of personalization, which is not a significant predictor of overall service quality and customer satisfaction for online stores. This finding might indicate that customers are afraid that the online stores will sell personal information to other organizations without their knowledge or permission. Notably, increasing numbers of online customers have expressed concern regarding potential misuses of personal information and abuses of privacy (Than and Grandon, 2002).

Additionally, consistent with previous studies (Baker and Crompton, 2000; Sivadas and Prewitt, 2000; Zhu *et al.*, 2002), this study found a positive relationship among overall service quality, customer satisfaction and purchase intentions in an online store.

7. Conclusions

The conclusions drawn from this study make contributions in two main areas. First, this study developed the instrument dimensions of e-service quality by modifying the SERVQUAL model to consider online shopping context. Second, this study identified e-service quality dimensions that affect overall service quality and customer satisfaction, which in turn are significantly related to customer purchase intentions.

The implications for practitioners and researchers and the limitations of this study are discussed below.

7.1 Implications for practitioners

This study has the following implications for practitioners initiating or currently conducting internet commerce. First, this study suggests that to enhance customer purchase intentions, online stores should develop marketing strategies to better address the trustworthy, reliability, and responsiveness of web-based services. Online stores can devote valuable corporate resources to the important e-service quality attributes identified by this study. For example, improvement of the level of credibility, security, and prompt services is necessity for both attracting and retaining online customers, since these factors significantly affect customer satisfaction and purchase intentions. Second, web site design cannot be ignored. Web site design is an important means to provide customer usefulness and ease of use during online transaction processes.

Another important implication of this study relates to personalization and online customer privacy. As internet technologies become increasingly sophisticated and web sites can deliver more targeted content, demand for personalization continues to grow (Gurau *et al.*, 2003). On the other hand, studies have indicated that many online customers are very concerned about threats to their personal privacy (Graeff and Harmon, 2002). Online stores thus must try to ensure that customers receive relevant information while simultaneously protecting their privacy, because personalization should not be intrusive. Moreover, online stores should carefully consider the extent to which actively providing members with personal services is necessary given limited human and material resources.

7.2 Implications for researchers

Several future research directions exist. First, future research can use different methodologies, such as longitudinal studies, focus groups and interviews to examine the relationship between service quality and customer purchase behaviour in online shopping contexts. Second, the growth of the internet and online shopping will continue, and future research can replicate similar studies solely involving online shoppers, measuring actual purchase behaviours instead of intentions. This procedure is designed to understand if there are any significant difference in the perceptions of e-service quality of internet users and internet purchasers. Third, although the scales used for measuring dimensions of e-service quality are similar to existing scales, further research might consider developing more elaborate measures to allow for richer coverage of e-service quality scales. Finally, evidence exists that the relative importance and possible meaning of web site quality may differ across cultures (Gefen, 2000; Tsikriktsis, 2002). Thus, the study can be replicated in different cultures to provide cross-cultural comparisons.

7.3 Limitations

This study suffers four main limitations. First, the sample employed student subjects, which may not be representative of the general population of online shoppers. The analytical results presented here thus may have limited generalizability. Second, since this study only considered online bookstores, it is unclear whether the analytical

results can be generalized to other online marketplaces. Further research can apply the research model to examine other types of online stores, because online customer perceptions of service quality are context-dependent and thus their detailed effects on purchase intentions may be related to specific products and services. Third, this study did not incorporate actual purchase behaviour into the proposed research model. However, this shortcoming does not represent a serious limitation since substantial empirical support exists for the causal link between intention and behaviour (Venkatesh and Davis, 2000). Finally, since the sample was collected in Taiwan, generalizability to other countries might be limited due to cultural differences in purchase behaviours.

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