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The effect of channel quality inconsistency on the association between e-service quality and customer relationships

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Abstract

Purpose – Based on prior studies, the performance of customer relationships depends highly on the characteristics of the e-service. However, the strength of this association can be impacted when businesses employ multichannel services (e.g. offering online and offline services). With multichannel services, any inconsistency in perceived quality across channels may result in customer distrust toward a service provider. The purpose of this study is to investigate the effect of inconsistent quality on the association between e-service quality and customer relationships in a university context.

Design/methodology/approach – This study conducted a web survey and 318 respondents who have both physical and e-service experiences were collected. The inconsistent quality across channels was divided into three groups by k-means clustering approach. Next, the hypothesized associations were analyzed using regression analysis based on three groups.

Findings – The results show that inconsistent quality has different impacts on the association between e-service quality and customer relationships across the three groups. Especially in the positive disconfirmation group, the investment in e-services will be in vain because certain e-service sub-constructs lose their impact on customer relationships.

Practical implications – The findings of this study provide implications for improving customer relationships under different cross-channel quality inconsistency conditions for managers.

Originality/value – This study extends the concept of expectancy disconfirmation theory to the multichannel service context and pioneers the exploration of the moderating effect of cross-channel quality inconsistency in customer relationships, contributing to the understanding of the literature about the impacts of inconsistent quality on customer relationships.

Keywords E-service, Quality inconsistency, Quality management, Supply chain management, Channel management, SERVQUAL, Customer relationship, Taiwan

Paper type Research paper



Introduction

While traditional marketing activities have focused primarily on increasing market shares through mass marketing, recent trends exhibit a paradigmatic switch toward

relationship marketing. The emphasis of marketing interests shifted from looking into a company's market share to focusing on its share of customers (Bauer *et al.*, 2002). Indeed, studies have shown that customer relationship management enables businesses to identify, attract, and increase retention of profitable customers by enhancing their relationships with them (Payne and Frow, 2005). Better customer relationships can improve word-of-mouth, reduce retention cost, and ultimately bring long-term success in marketing efficiency and effectiveness (Payne and Frow, 2005; Sharma *et al.*, 1999; Storbacka *et al.*, 1994). Storbacka *et al.* (1994) show that satisfactory customer relationships lead to customer retention, which, in turn, increases long-term profitability.

To maintain a good relationship with customers, more and more firms are using electronic channels such as Internet to complement their core businesses. A good example is Amazon.com whose core business are selling books. Each time an Amazon customer accesses the company's web site, the on-line bookseller provides recommendations based not only on the customer's previous purchases but also on the purchases of other people who have bought similar books. As its customers' tastes and preferences evolve, Amazon's engagement with them reflects those changes (Prahalad and Ramaswamy, 2000). Indeed, the Internet has become a critical channel for selling goods and services (Frost *et al.*, 2010; Parasuraman *et al.*, 2005), satisfying the customer needs (Weis, 2010), and maintaining customer relationships (Bauer *et al.*, 2002). In fact, the successful management of customer relationships is highly dependent on the characteristics of e-service (Lin and Ding, 2005; Parasuraman *et al.*, 2005; Wolfenbarger and Gilly, 2003). For instance, the characteristics of interactive structure and constant availability of information have significant influence on customer relationships (Bauer *et al.*, 2002).

Despite the association between e-service characteristics and customer relationships, which has been supported in the literature, the strength of this association can be impacted when businesses employ multichannel service. In the multichannel context, each respective channel influences the attitudes of users toward the service provider (Kwon and Lennon, 2009). Users who interact with a service provider through multiple channels will compare their experiences across these different channels. This comparative process forms the user's judgment of quality.

More importantly, any cross-channel quality inconsistency (CCQI) may result in customer disappointment and frustration toward the service provider (Payne and Frow, 2005; Van Birgelen *et al.*, 2006). CCQI is similar to disconfirmation between expectation and perceived performance in the service experience of customers (Oliver, 1980). CCQI may affect the association between e-service quality and customer relationships. Indeed, Rangaswamy and Bruggen (2005) mention that one challenge in pursuing multichannel marketing is inconsistency across channels, such as inconsistent information and responses. In the current research, however, there is limited understanding of the effects of inconsistent e-service across channels on customer relationships.

The challenge of inconsistency could exist in non-profit organizations, which also attempt to enhance relationships with customers through e-services. Surprisingly, the extant literature rarely looks into the issue of CCQI in the context of non-profit organizations, such as institutions of higher education. To combat the challenge and fill a void in the literature, this study aims to investigate the influence of CCQI on the

Background*Customer relationship*

Managing customer relationships works to create, develop, and enhance relationships with targeted customers to maximize customer value, corporate profitability, and shareholder value (Payne and Frow, 2005). Relationship quality is a general assessment of relationship strength and the extent to which a relationship meets the needs of the customer (Henning-Thurau and Klee, 1997; Lin and Ding, 2005). From an interpersonal perspective, high relationship quality implies that one person can rely on another person's integrity and has confidence in future performance because of consistently satisfactory past performances (Crosby *et al.*, 1990).

Prior studies have treated trust and commitment as key indicators of relationship quality between users and service providers (Crosby *et al.*, 1990; Garbarino and Johnson, 1999; Moorman *et al.*, 1992; Morgan and Hunt, 1994; Roberts *et al.*, 2003). Trust is defined as a willingness to rely on a partner in whom one has confidence and regard (Moorman *et al.*, 1992). Commitment refers to an enduring desire to maintain a valued relationship (Moorman *et al.*, 1992). Specifically, Morgan and Hunt (1994) explore the nature of relationship marketing and the key characteristics required for relationship marketing success. They theorize that successful customer relationships require commitment and trust. Additionally, Roberts *et al.* (2003) summarize the dimensions of relationship quality that have been proposed since 1970 and suggest that trust and commitment are key variables representing relationship quality.

Maintaining positive customer relationships could also be vital in the context of higher education. McClung and Werner (2008) provide a marketing-oriented paradigm to help university and college administrators understand the critical aspects of identifying, managing, and delivering superior value to all stakeholders of the institution. From a marketing perspective, alumni are regarded as stakeholders, and they have a significant impact on the finances of the institution. Indeed, previous studies show that donations from alumni are important sources of working capital for all universities (Monks, 2003; Tucker, 2004). Educational institutions may also regard alumni as the objects of providing lifelong service to fulfill its social responsibility. In particular, the university should provide valuable services for maintaining relationships with alumni (McClung and Werner, 2008, p. 109). In this study, we examine how customer relationships are affected by the quality of e-service provided by the university to its alumni and explore the effect of multi-channel quality inconsistency on customer relationships.

E-service quality

In this study, the quality of e-service is defined as a customer's experience with the service provider through a given electronic channel without human intervention. Because the Internet is regarded as a primary channel for delivering e-service (Lu *et al.*, 2010; Sousa and Voss, 2006; Parasuraman *et al.*, 2005), we thus anchor our discussion in the Internet-based environment. So far, several instruments have been developed to assess the quality of an Internet portal, such as E-S-QUAL (Zeithaml *et al.*, 2000), SiteQUAL (Yoo and Donthu, 2001), UPWQ (user-perceived web quality: Aladwani and

Palvia, 2002), and QES (Fassnacht and Koese, 2006). However, with the exception of UPWQ, most of these instruments were developed primarily for the online shopping context, e.g. E-S-QUAL and SiteQUAL (Gummerus *et al.*, 2004). In particular, UPWQ measures perceived quality of general purpose Internet-based service from the user perspective (Aladwani and Palvia, 2002). As such, this instrument is suitable for measuring the e-service quality of Internet-based applications for web sites not involving online shopping.

UPWQ measures four sub-constructs of web quality (Aladwani and Palvia, 2002):

- (1) content quality;
- (2) appearance;
- (3) technical adequacy; and
- (4) specific content.

Content quality consists of information usefulness, completeness, accuracy, and conciseness. Appearance means the proper use of fonts, colors, multimedia, and other web site attractive factors. Technical adequacy consists of security, system availability, customization, and other technical abilities. Specific content reflects concerns related to finding specific details about products and services, including contact information (e.g. e-mail address and phone number) and detailed information related to customer service.

Expectancy disconfirmation theory

The expectancy disconfirmation theory (EDT) implies a distinct cognitive state resulting from the comparison process and preceding a judgment of satisfaction (Oliver, 1980). More specifically, expectations are thought to create a frame of reference upon which one makes a comparative judgment. Expectancy disconfirmation is the difference obtained from a cognitive comparison between expected and perceived outcomes (Oliver, 1980; Oliver and DeSarbo, 1988; O'Neill *et al.*, 2003). Outcomes that are below expected level lead to a negative disconfirmation, whereas outcomes above expectation result in a positive disconfirmation. According to EDT, discrepancies between expectation and perception will influence the feeling of users (Cadotte *et al.*, 1987) and their satisfaction (Davis and Heineke, 1998; Oliver, 1980; Prenshaw *et al.*, 2006), which further affects loyalty and re-purchase intention (Ha and Janda, 2008).

Conceptual model and hypothesis development

E-service quality and customer relationship

Prior studies generally support a positive relationship between e-service quality and customer outcomes, such as channel satisfaction (Fassnacht and Koese, 2006), user loyalty and positive word-of-mouth (Devaraj *et al.*, 2002; Taylor and Hunter, 2002). Given the university context of this study, we adopted the e-service quality dimensions originally proposed by Aladwani and Palvia (2002) for assessing user-perceived web quality. To reflect the nature of the e-service examined in this study, we further propose a dimension "web site navigation" to replace "specific content". The latter was originally proposed to assess web content in terms of helping customers find specific information (Aladwani and Palvia, 2002).

Although allowing customers to find detailed information about service (i.e. specific content) is essential for assuring e-service quality, providing web site navigation or real-time support is a more proactive service approach. Indeed, Roy *et al.* (2001) suggest that the ease of navigation and user guidance establish trust. Also, Muylle *et al.* (2004) posit that entry guidance pertains to web site user satisfaction, leading customers to easily find the information they need. Similarly, Childers *et al.* (2001) regard network navigation as the process of self-directed movement through media involving retrieval methods. In the online context, navigation includes the process of “exploring” the interactive environment in alternative ways to find related information. We anticipate the inclusion of web site navigation will not only address the customer’s concern for finding specific information but will also address the customer’s concern for finding the information efficiently.

Table I summarizes prior findings regarding the relationship between the four e-service quality dimensions and customer relationship outcomes. As shown in Table I, prior studies support a positive correlation between each of the dimensions, such as availability or network quality (Technical adequacy), information relevance or information accuracy (Content quality), ease of navigation (Web site navigation), web site design (Appearance), and customer relationships (e.g. Bauer *et al.*, 2002; Lin and Ding, 2005; Parasuraman *et al.*, 2005; Wolfinbarger and Gilly, 2003). In other words, these characteristics will attract users to visit web site or use e-services, further influencing their trust (Bauer *et al.*, 2002) and loyalty intentions (Cyr *et al.*, 2008; Parasuraman *et al.*, 2005; Srinivasan *et al.*, 2002). Therefore, we hypothesize that e-service quality positively affects customer relationships, which is reflected by trust and commitment.

- H1.* The technical adequacy of an e-service is positively related to customer relationships.
- H1a.* The technical adequacy of an e-service is positively related to trust.
- H1b.* The technical adequacy of an e-service is positively related to commitment.
- H2.* The content quality of an e-service is positively related to customer relationships.
- H2a.* The content quality of an e-service is positively related to trust.
- H2b.* The content quality of an e-service is positively related to commitment.
- H3.* The appearance of an e-service is positively related to customer relationships.
- H3a.* The appearance of an e-service is positively related to trust.
- H3b.* The appearance of an e-service is positively related to commitment.
- H4.* The navigation of an e-service is positively related to customer relationships.
- H4a.* The navigation of an e-service is positively related to trust.
- H4b.* The navigation of an e-service is positively related to commitment.

Articles	Independent variable(s) Technical adequacy	Content quality	Appearance	Web site navigation	Dependent variable(s)
Bauer <i>et al.</i> (2002)	Availability				Trust(+); Commitment(+)
Liang and Chen (2009)	Individuality System quality (availability)	Information quality (info relevance, info completeness)			Trust(+); Commitment(+)
Lin and Ding (2005)	Network quality				Trust(+)
Nicolaou and McKnight (2006)		Info quality (info accuracy; info relevance)		Efficiency (including ease to navigate)	Trust (n.s.) Relationship quality (+) (including trust)
Parasuraman <i>et al.</i> (2005)					Trust(+)
Srinivasan <i>et al.</i> (2002)	Customization		Character (web site design)		Loyalty intention(+)
Wolfenbarger and Gilly (2003)					Customer loyalty(+)
Yoo and Donthu (2001)	Security		Web site design	Convenience (including ease to navigate, ease to search info)	Customer loyalty(+)
					Loyalty intention(+)
					Site loyalty(+)

Notes: +: Positive association, -: Negative association, n.s.: Non-support

Table I.
UPWQ characteristics
and customer
relationship

Moderation of quality inconsistency

According to media richness theory, the characteristics of an effective medium match the information requirement of the task (Straub and Karahanna, 1998). In the context of multichannel services, users may shift between different channels depending on which one best fulfills their goals and task requirements (Daft and Lengel, 1986; Daft *et al.*, 1987; Straub and Karahanna, 1998; Weisberg *et al.*, 2011). Media of low richness are appropriate for efficient communication (e.g. electronic media) to support simple and routine tasks. On the other hand, personal service, which usually involves rich media, is used for problem solving of higher importance (Daft *et al.*, 1987; Selnes and Hansen, 2001). That is, users choose between physical or e-service channels based on their task requirements. As such, user experiences of physical and electronic service channels are likely to relate to each other, thereby influencing user attitude toward the service provider (Homburg and Stock, 2004; Van Birgelen *et al.*, 2006).

As an increasing number of organizations transform from personal service to a mix of personal and e-service, a user's previous service experience with a physical channel may play an important role in shaping the perception of e-service quality. CCQI might occur as users sense a discrepancy between the service quality they received from different channels. Accordingly, we conceptualize CCQI as a form of expectancy disconfirmation. Users refer to their service experience with the physical channel as a reference point while evaluating the service they receive from the electronic channel.

The comparative judgments of CCQI are similar to the disconfirmation process of EDT. First, both CCQI and EDT have an expected base or standard as an initial reference point, although the reference point of inconsistent quality refers to the experience of the physical service and the reference point of EDT refers to the expected satisfaction. Second, both CCQI and EDT make the comparison between the actual experience and the reference point. Third, both CCQI and EDT play a major role in shaping user attitude and behavior intention.

Building on the EDT concept, we propose that CCQI moderates the impact of e-service on customer relationships. In their study of 579 multichannel customers, Madaleno *et al.* (2007) found a positive relationship between consistent cross-channel experience and customer satisfaction. Also, Simons and Bouwman (2006) suggest that a seamless and consistent customer experience across channels will evoke customer trust, which, in turn, reinforces customer relationships. In contrast, inconsistent multichannel services may result in customer disappointment and frustration (Payne and Frow, 2005; Van Birgelen *et al.*, 2006). That is to say, if users perceive high CCQI, they may see it as a signal of the organization's inability to deliver quality service and satisfy customers. Such a negative impression may, as a result, weaken the favorable influence on customer relationships that might derive from positive e-service quality. In other words, the positive influence of e-service quality on customer relationships will decrease if the quality of e-service quality is inconsistent with the quality of personal service. As such, we propose the following hypotheses. Figure 1 illustrates the whole research framework in this study.

- H5.* The impact of technical adequacy of e-service quality on customer relationships is negatively moderated by CCQI. That is, the impact of technical adequacy of e-service quality on customer relationships will diminish while CCQI exists.

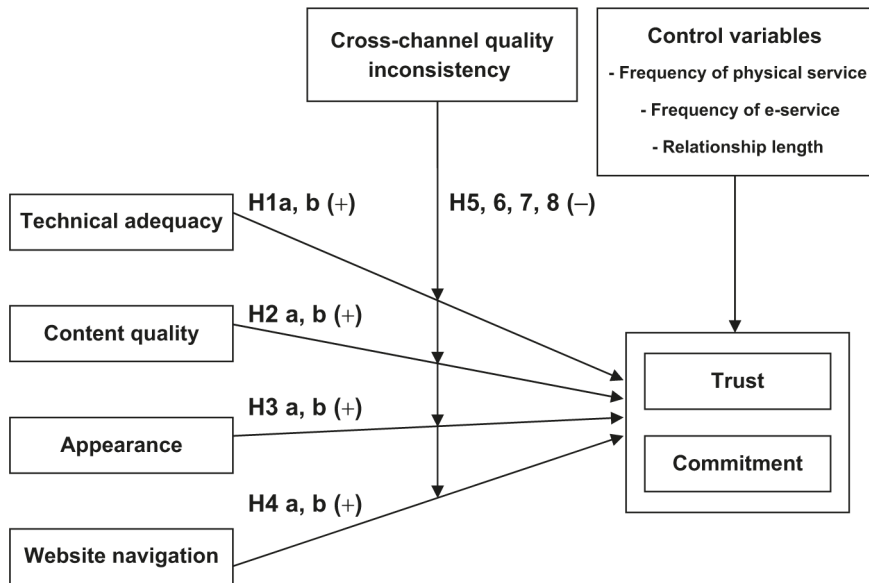


Figure 1.
The research framework
and hypotheses

- H6.* The impact of content quality of e-service quality on customer relationships is negatively moderated by CCQI. That is, the impact of content quality of e-service quality on customer relationships will diminish while CCQI exists.
- H7.* The impact of appearance of e-service quality on customer relationships is negatively moderated by CCQI. That is, the impact of appearance of e-service quality on customer relationships will diminish while CCQI exists.
- H8.* The impact of navigation of e-service quality on customer relationships is negatively moderated by CCQI. That is, the impact of navigation of e-service quality on customer relationships will diminish while CCQI exists.

Control variables

To exclude the possible influences (covariance) of extrinsic factors on customer relationships, we take several control variables into account in our research model.

Frequency of participation in university activities. This factor refers to the willingness to keep in touch with the university. In our research context, alumni might have a strong tendency toward loyalty and commitment toward the university. Specifically, these alumni might be enthusiastic about keeping a relationship with the university regardless of the quality of the channel services. This condition might affect customer relationships and thus needs to be controlled.

Frequency of e-service use. Previous study has found a high correlation between customer satisfaction and the frequency of interactions with a salesperson (Homburg and Stock, 2004). That is, the higher the frequency of interaction, the stronger the customer satisfaction. In our study, the interaction frequency corresponds to the frequency of e-service use within a particular period (e.g. one year in this study); thus, the latter is used as a control variable.

Relationship length. This factor refers to the duration of the relationship with the service provider. Relationship length can be treated as the number of years the buyer has been dealing with the supplier (Liu *et al.*, 2008). Leisen and Hyman (2004) examine the antecedents and consequences of patient trust in physicians and found that the relationship length between patient and physician is associated with patient trust. Similarly, this association is supported by buyer-supplier relationships (Liu *et al.*, 2008). Moreover, the length of relationship has also proven to be associated with user satisfaction (Ricard and Perrien, 1999) and commitment (Pressey and Mathews, 2000). Therefore, relationship length is also a control variable in our research model.

Method

Data collection

Data were collected from a university in Taiwan where the Public Affairs Office (PAO), had recently introduced a web service to its growing alumni population in addition to its incumbent physical service. This context of multichannel service is suitable for our research purposes and enables us to use alumni as our research participants. To reduce missing values and double-entry problems, we used web survey to collect data because it can effectively avoid these problems by using information technology (Luce *et al.*, 2007). The survey was administered to the alumni using the services of the PAO. Every respondent was authenticated with his or her ID number and student code to enter the online survey. The data collection period lasted for three months, and 862 questionnaires were collected. The questionnaire is provided in the Appendix. Because the qualified respondents must have both physical and e-service experiences with PAO, we excluded inappropriate respondents, characterized by low frequency of use with e-service or physical service, leaving 318 participants as our final sample.

Measures

Construct variables

- *Quality of e-service (QES).* For this construct, we adapted the UPWQ instrument (Aladwani and Palvia, 2002) as the measure because it is suitable for the non-profit web-based context. We used a total of 10 original items to measure the sub-constructs of UPWQ; specifically, three items for technical adequacy (TA), three items for content quality (CON), and four items for web site appearance (APP). In addition, we used two items to measure web site navigation (NAV), which we adapted from the definition provided by Zeithaml *et al.* (2000). Each item contains six anchor points, ranging from 1 “strongly disagree” to 6 “strongly agree”.
- *Relationship quality (RQ).* To measure this construct, we adopted two sub-constructs: trust and commitment, as described in the previous section. Particularly, we used two items to measure trust and three items to measure commitment, as provided by Roberts *et al.* (2003). The response scale ranged from 1 to 6 (1 means “strongly disagree”; 6 means “strongly agree”).
- *Cross-channel quality inconsistency (CCQI).* The CCQI represents the discrepancy in quality between physical and e-service channels. To measure the quality of physical service (QPS), we adopted SERVQUAL (Parasuraman *et al.*, 1988, 1991), which is one of the most commonly used measures of service quality (Shemwell

et al., 1998; Tam, 2004). However, we only included seven items measuring four sub-constructs: reliability, responsiveness, assurance, and empathy. The tangibles sub-construct was excluded from this study because its items are not important attributes in overall service quality, as suggested by De Carvalho and Leite (1999).

Next, we calculated the means of QES and QPS for each alumnus and used the difference between QES and QPS to represent the CCQI concept, which corresponds to the level of disconfirmation in EDT. Such difference (QES minus QPS) could be positive, equal, or even negative. Under each condition, the degree of impact on customer relationships might be different. In order to gain insight into the difference, CCQI was treated as a category factor using the k-means cluster analysis. Cluster analysis classifies objects (e.g. respondents or entities) into groups so that objects are very similar to each other in each group with respect to some predetermined selection criterion (Hair *et al.*, 1998, p. 473). The k-means clustering approach yields three distinct groups (see Figure 2). Group 1, namely “consistency”, consists of 183 respondents who perceived QES as close to QPS. Group 2, namely “positive disconfirmation”, consists of 54 respondents who perceived QES as better than QPS, while group 3, namely “negative disconfirmation”, includes 81 respondents who perceived QES as worse than QPS. The group centroids of CCQI are 0.06, 1.03, - 0.99, respectively, for the three groups. The descriptive statistics of these groups is illustrated in Table II.

Control variables

- *Frequency of participation in university activities (FRE_P)*. To measure the original willingness of alumni to maintain a relationship with the university, we

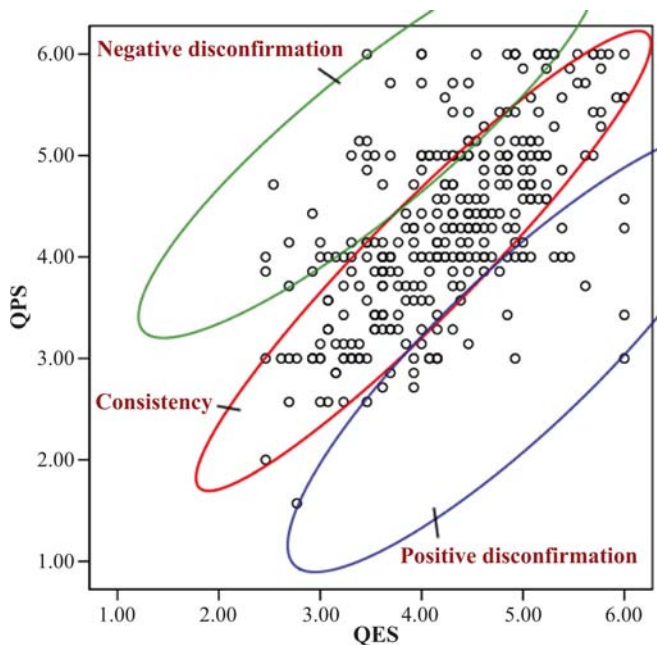


Figure 2.
The scatter plot of QES and QPS

used “the frequency of participation in campus activities after graduation from the university”. The rationale is that alumni who participated in campus activities frequently should be enthusiastic about keeping a relationship with the university, even after graduation.

- *Frequency of e-service use (FRE_E)*. We asked the respondents, “How many times did you use e-services per year?” The scale ranged from 1 to 6 (1 means never used before; 6 means used more than three times per year).
- *Relationship length (RL)*. In this study, relationship length is defined as the length of time that alumni keep a relationship with a university. We treated it as “the number of years that alumni have been in contact with the university”, adapted from Liu *et al.* (2008).

Results

Reliability and validity

The majority of the 318 respondents are males (53 percent), younger than 35 years of age (81 percent), having graduated over six years ago (60 percent). Next, we computed reliability coefficients using Cronbach’s alpha (Peterson, 1994), composite reliability, and average variances extracted (AVE) of sub-constructs. Table III provides the means, standard deviations, correlations, composite reliability and AVE for the key variables used in our framework. For adequate requirements of reliability, both Cronbach’s alpha and composite reliabilities are greater than 0.70; for adequate discriminant validity, all the diagonal elements are greater than the corresponding off-diagonal elements.

Table II.
The descriptive statistics of cross-channel quality groups

Variables	Consistency N = 183		Positive disconfirmation N = 54		Negative disconfirmation N = 81	
	Mean	SD	Mean	SD	Mean	SD
NAV	4.41	0.98	4.72	0.93	4.13	1.04
CON	4.26	0.90	4.65	0.89	3.88	0.91
APP	4.27	0.89	4.66	0.83	3.84	0.86
TA	4.32	0.92	4.74	0.79	4.23	0.92
Trust	5.11	0.91	5.02	0.97	5.10	1.09
Commitment	4.95	0.86	4.90	0.84	5.01	0.97

Table III.
Reliabilities and discriminant validity

Variables	Mean	SD	Cronbach’s α	CR ^a	1	2	3	4	5	6
1. TA	4.37	0.91	0.79	0.88	0.84 ^b					
2. CON	4.23	0.93	0.87	0.92	0.61**	0.89 ^b				
3. APP	4.23	0.91	0.85	0.90	0.64**	0.71**	0.84 ^b			
4. NAV	4.39	1	0.83	0.92	0.67**	0.69**	0.68**	0.93 ^b		
5. Trust	5.09	0.97	0.92	0.96	0.56**	0.49**	0.51**	0.53**	0.96 ^b	
6. Commitment	4.95	0.88	0.87	0.92	0.58**	0.53**	0.54**	0.59**	0.85**	0.89 ^b

Notes: ^aComposite reliability; ^bThe square root of AVE; **p* < 0.05; ***p* < 0.01

Mediation test

In our research model, CCQI is regarded as a moderator construct. To further validate this model, we conducted the mediation test to make sure that mediation effects were not significant. Baron and Kenny (1986) described a four-step process:

- (1) the initial variable should be correlated with the outcome variable;
- (2) the initial variable should be correlated with the mediator;
- (3) the mediator should be related to the outcome variable when the initial variable is controlled for; and
- (4) the effect of the initial variable on the outcome once the mediator is taken into account should reduce to non-significance if there is complete mediation.

If the fourth step is not met, there is partial mediation. Following this process, we tested the mediation effects of CCQI and found the correlations in the second and the third steps not significant and the effect in the fourth step not reduced. Such results indicate that CCQI does not mediate the associations between e-service quality and customer relationships, supporting CCQI as a moderator.

Hypothesis test

To test the hypotheses, we performed hierarchical regression analyses using SPSS. The results were analyzed based on different groups (full group, consistency, positive disconfirmation, and negative disconfirmation), so that hypothesized associations could be easily compared (see Table IV). The full group data tested *H1* to *H4*. As shown in Table IV, NAV and TA are positively related to customer relationships, which support *H1* and *H4*. However, CON and APP are not significant predictors of customer relationship, showing that *H2* and *H3* are not supported.

The results pattern for the consistency group is similar to that of the full group. For the positive disconfirmation group (i.e. while positive CCQI exists), the associations of e-service sub-constructs and customer relationships are all insignificant, confirming our expectation of the diminishing effect of CCQI. The results found in the negative disconfirmation group (i.e. while negative CCQI exists), however, are largely contrary to our expectation. Although the effect of NAV on customer relationships diminished due to CCQI, the predicted negative moderation effect did not appear for the other three e-service sub-constructs. In particular, the effects of CON and TA on trust and commitment remain similar across different groups, while APP becomes a significant and positive predictor of customer relationships in the negative disconfirmation group. Thus, only *H5* is fully supported. Detailed discussion is presented below.

Discussion

The impact of APP is insignificant for predicting direct effects of e-service sub-constructs in customer relationships. This result, though unexpected, is in line with previous findings that web site appearance or aesthetics is not an important determinant of customer loyalty (Otim and Grover, 2006). A plausible explanation is that users weigh web site appearance differently depending on the type of product or service. That is, the important quality factors differ from one web domain to another. For example, users tend to place high importance on the visual design for web sites in the entertainment domain but are disinclined to emphasize appearance in other

Table IV.
Results of regression
analysis

Variables	Full group <i>N</i> = 318		Consistency <i>N</i> = 183		Positive disconfirmation <i>N</i> = 54		Negative disconfirmation <i>N</i> = 81	
	Trust	Commitment	Trust	Commitment	Trust	Commitment	Trust	Commitment
Control variables								
FRE_P	-0.003	0.030	0.077	0.120*	-0.145	-0.203	0.053	0.112
FRE_E	0.117*	0.086	0.057	-0.001	0.298*	0.293*	0.122	0.075
RL	0.103**	0.103	0.027	0.041	-0.036	0.002	0.086	-0.005
<i>Independent variables</i>								
NAV	0.170*	0.256***	0.203*	0.363**	0.204	0.238	0.044	0.079
CON	0.101	0.116	0.143	0.141	0.280	0.052	-0.021	0.095
APP	0.073	0.075	0.008	0.010	-0.138	0.270	0.416**	0.395**
TA	0.299***	0.255***	0.342***	0.235**	0.256	0.129	0.303**	0.290*
<i>R</i> ²	0.393	0.444	0.447	0.503	0.328	0.439	0.525	0.568
Adjusted <i>R</i> ²	0.380	0.432	0.425	0.483	0.225	0.354	0.479	0.527

Note: **p* < 0.05, ***p* < 0.01, ****p* < 0.001

domains, including finance, education, and government (Zhang and Von Dran, 2002). According to the finding of this study, in the context of alumni service, the appearance of the e-service channel does not contribute to the trust or commitment of the user toward the service provider.

In addition, CON (information accuracy, completeness, and clearness) does not affect trust and commitment. Liang and Chen (2009, p. 981) found that the association between information quality and customer trust is significant through the mediation of customer satisfaction, but the direct effect of information quality on customer trust is insignificant. Similarly, alumni in our study may regard APP and CON as basic services or requirements that do not significantly render direct effects for trust and commitment.

In predicting the moderating effect of CCQI, the results show that NAV is positively related to customer relationships in the consistency group but has no impact when CCQI occurs (i.e. in the positive and negative disconfirmation groups). This finding confirms our expectation that the discrepancy between perceived physical service and e-service would result in user disappointment and distrust, further weakening the effect of NAV on customer relationships. However, beyond our expectations, APP demonstrates a positive influence on customer relationships but only in the negative disconfirmation group. The less satisfactory experience with the electronic channel indicated by people in the negative disconfirmation group might reflect a less enthusiastic attitude about technology. The results seem to suggest that those users, owing to their low willingness to use and/or their lack of familiarity with e-service, might be affected by peripheral cues, such as web site appearance, to a greater degree. In other words, under low elaboration conditions (e.g. when people do not think the issue is important) from the elaboration likelihood model (Petty and Cacioppo, 1986), people tend to use simple methods (i.e. peripheral cues) to judge objects. Tractinsky and Lowengart (2007, p. 5) also propose that people may base judgment on site attractiveness because appearance and aesthetics are the easiest web site attribute to judge under low elaboration conditions. In addition, TA is positively related to customer relationships in the negative disconfirmation group. A plausible explanation is that people in the negative disconfirmation group may distrust e-service when CCQI occurs, but technical adequacy (i.e. system security and availability) will restore the confidence of these people. In other words, due to distrust, the service provider must provide more technical adequacy to gain the trust and commitment of users.

Overall, most of the predicted moderations of CCQI were not supported. Furthermore, CCQI does not differentiate the trust ($F = 0.196$; $p = 0.822$) and commitment ($F = 0.257$; $p = 0.773$) of the users. These results imply that CCQI seems not a key concern as we expected. That is, no matter whether inconsistency exists, users hold similar degree of trust and commitment (see Table II). This unexpected consequence emerges perhaps due to the research context, in which alumni tend to keep a good relationship with the university or their rights are not affected if CCQI occurs because they do not incur costs for alumni services. Nevertheless, although CCQI brings relatively small negative impact to users, managers should not ignore this negative impact. This topic is still worthy of follow-up study. Future research could replicate our framework in a business context, comparing their findings with ours.

Managerial implications

The findings of this study provide implications for improving customer relationships under different CCQI conditions for managers. First, NAV and TA have significant impacts on customer relationships among the full and consistency groups. That finding implies that to improve customer relationships under normal and consistent quality conditions, managers should spend more effort on NAV and TA features rather than CON and APP features.

Second, according to the means and standard deviations of the positive and negative disconfirmation groups (see Table II), CCQI does not significantly affect the values of trust and commitment. However, CCQI does affect the associations between e-service sub-constructs and customer relationships. Therefore, it is important for managers to monitor and control the degree of CCQI.

Third, for the positive disconfirmation group, CCQI diminishes the impacts of all e-service sub-constructs on customer relationships. This implies that managers who want to improve customer relationships should allocate resources directly to improving physical services, not e-services.

Fourth, for the negative disconfirmation group, users perceive e-services as having lower quality than physical services, resulting in an urgent need to improve e-service quality. Furthermore, the test statistics in Table IV show that APP and TA have significant effect for customer relationships, implying that, under limited resource constraint, managers should spend more efforts on APP and TA to regain user confidence in using e-service.

Finally, CCQI has different impacts on e-service quality and its association with customer relationships across the three cross-channel quality groups. Managers should be aware that providing consistently high quality across all channels is necessary for maintaining good customer relationships. Once CCQI occurs, the investment in e-services will be in vain because certain e-service sub-constructs lose their impact on customer relationships (especially in the positive disconfirmation group). Meeting customer needs in different channels might be a method to achieve high service quality across channels. For example, it may be necessary to provide e-service users with a quick response, efficient feedback, and full-time availability of services. Physical service users, on the other hand, can be better served by individualized and customized services (e.g. dealing with their personal problems or needs). Simultaneously satisfying customers through both channels will increase the perceived overall service quality and improve customer relationships. However, if CCQI persists in multichannel service, managers should adopt different strategies, as mentioned above, to improve customer relationships in the three different groups.

Conclusion

Multichannel services have created great opportunities for improving the scope and strength of customer relationships, as well as great challenges in managing the complexity of channels in a successful and cost-effective manner (Payne and Frow, 2005). As Rangaswamy and Bruggen (2005) mentioned, one of the challenges for businesses pursuing multichannel marketing is inconsistency across channels. They suggest further research into how such inconsistencies affect customer satisfaction and loyalty and how to reduce the occurrence and negative impact of such inconsistencies. The current study answered the research questions raised by Rangaswamy and

Bruggen. The findings of the current study suggest that inconsistency across channels diminished the impact of certain e-service quality on customer relationships. Managers need to periodically assess the quality of both physical and e-service channels to ensure the absence of CCQI. If inconsistency occurs, they should adopt different strategies under different CCQI situations to mitigate such diminishing impact. Specifically, when a company is under a negative disconfirmation condition, greater attention should be directed toward improving APP and TA quality. When positive disconfirmation exists, actions should be taken to improve physical service quality.

Next, prior studies merely focused on the direct effects of disconfirmation or CCQI on customer satisfaction (e.g. Cadotte *et al.*, 1987; Davis and Heineke, 1998; Madaleno *et al.*, 2007; Prenshaw *et al.*, 2006), but the issues associated with the moderation effects of CCQI are relatively scarce. This study extends the concept of EDT to the multichannel service context and pioneers the exploration of the moderating effect of CCQI in customer relationships, contributing to the understanding of the literature about the impacts of inconsistent quality on customer relationships.

Finally, the current study proposed and validated a CCQI framework in the context of a non-profit organization. The viewpoint and the framework discussed herein need further replication, extension, application, and critical evaluation. Future studies could address other conceptualizations (e.g. WOM, brand image, among others) to enhance the understanding of multichannel services.

Limitations and further research

Two major limitations of this study should be noted. First, our sample was collected from a university, and the generalizability of our results might be limited. Next, the source of our data comes from web service users and may contain sampling bias as well as non-response bias. Further research can improve the understanding of the CCQI phenomenon by incorporating additional factors, such as enduring affect (i.e. loyalty) and transient affect (i.e. satisfaction), into the analysis of customer relationships. Moreover, different analysis methods, such as MANCOVA or SEM, can be conducted to gain insight from a different perspective. Finally, because of the cross-sectional design, we did not investigate the process by which e-service quality develops or customer relationships change over time. The causal inferences of this study are only based on cross-sectional analyses. Future research could pursue a longitudinal study into how the associations of the constructs change over time.

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Further reading

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	Factor loading
<i>E-service quality (UPWQ)</i>	
<i>Technical adequacy</i> (Aladwani and Palvia, 2002)	
TA1. This web site looks secure for providing service functions	0.772
TA2. Web pages load fast on this web site	0.885
TA3. This web site is always up and available	0.856
<i>Content quality</i> (Aladwani and Palvia, 2002)	
CON1. The content of this web site is accurate	0.854
CON2. The content of this web site is complete	0.923
CON3. The content of this web site is clear	0.904
<i>Appearance</i> (Aladwani and Palvia, 2002)	
APP1. This web site looks organized	0.831
APP2. This web site uses multimedia features properly	0.892
APP3. This web site uses fonts properly	0.844
APP4. This web site uses colors properly	0.728
<i>Web site navigation</i> (Zeithaml <i>et al.</i> , 2000)	
NAV1. This web site contains functions that help me find what I need without difficulty	0.812
NAV2. This web site allows me to maneuver easily through the pages	0.774
<i>Physical service quality (SERVQUAL)</i>	
<i>Reliability</i> (Parasuraman <i>et al.</i> , 1991)	
REL1. When PAO staffs promise to do something by a certain time, they will do so	0.843
REL2. When I have a problem, the information provided by PAO staffs is dependable	0.894
<i>Responsiveness</i> (Parasuraman <i>et al.</i> , 1991)	
RES1. PAO staffs provide prompt service upon my request	0.918
RES2. PAO staffs are never too busy to respond to my requests	0.825
<i>Assurance</i> (Parasuraman <i>et al.</i> , 1991)	
ASS1. PAO staffs have the knowledge and skills to do their jobs well	0.896
<i>Empathy</i> (Parasuraman <i>et al.</i> , 1991)	
EMP1. PAO staffs give me individual attention	0.876
EMP2. PAO staffs have best interests at heart in listening to my questions	0.887
<i>Customer relationship quality</i>	
<i>Trust</i> (Roberts <i>et al.</i> , 2003)	
TRU1. This university is trustworthy	0.908
TRU2. This university has high integrity in society	0.918
<i>Commitment</i> (Roberts <i>et al.</i> , 2003)	
COM1. I feel emotionally attached to PAO	0.832
COM2. I continue to contact with PAO because I like being associated with it	0.879
COM3. When somebody defames this university, I am willing to clarify some facts	0.887

Table A1.
The questionnaire items
of research constructs

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