The Relationship between Quality and Loyalty in Multi-Channel E-Services: An Empirical Investigation

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Article under review at Production and Operations Management

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Abstract
Research in traditional (bricks-and-mortar) services has broadly supported the link between service quality and customer loyalty. Given the significance of customer loyalty for the profitability of e-services, it is important to ascertain whether the established role of service quality as a driver of loyalty in traditional services translates to e-service settings. An important feature which differentiates e-services from traditional services is the fact that e-services are typically offered as part of a broader multi-channel service package, combining the internet with other channels of service delivery, such as the phone and physical facilities. As a result, customers frequently engage in multi-channel behavior, using both online and traditional channels, and thus will exhibit different degrees of focus on the internet channel relative to other traditional channels. Existing research examining the quality-loyalty relationship in e-services has not adequately recognized the multi-channel nature of these services. As such, the objective of this study is to increase our understanding of the relationship between quality and loyalty in multi-channel e-service settings. In particular, we empirically test the quality-loyalty relationship in a multi-channel e-service; and examine whether a customer’s Degree of Focus on the Internet (DFI) channel moderates this relationship.

The study consisted of an online survey of customers of a commercial e-banking service which is part of a broader multi-channel service. Employing structural equation modeling, we found a strong and significant link between e-service quality and loyalty intentions, suggesting that this relationship also holds in e-services. In addition, we found that a customer’s DFI moderated this relationship. Specifically, the relationship between e-service quality and loyalty was weaker for customers with a higher DFI. The implications for the research and management of multi-channel e-services are discussed.

Keywords: Service Operations, E-Services, Quality, Loyalty.
Introduction

There has been substantial research examining the links between service quality and customer loyalty in traditional services, that is, bricks-and-mortar services primarily provided by people (e.g., Boulding et al., 1993; Cronin and Taylor, 1992; Cronin et al., 2000; Zeithaml et al., 1996). In general, this research has validated service quality as a lever that managers of service operations can employ to drive customer loyalty and, ultimately, profitability.

In recent years, we have witnessed a strong growth of e-services. We define e-services as services produced by customers by interacting with a web site, excluding any interactions with service employees (Sousa and Voss, 2006; Fassnacht and Koese, 2006). Customer loyalty is a key issue for the profitability of e-services (Reichheld and Schefter, 2000) and a number of researchers have identified the need to better understand how to retain customers in e-services (e.g., Bolton et al., 2004; Reichheld and Schefter, 2000; Zeithaml et al., 2002).

Given the key role of service quality as a driver of loyalty in traditional services, it is important to understand whether this role translates to e-service settings. Two important features differentiate e-services from traditional services. First, the nature of service encounters in e-services, notably the absence of human contact, is very different from traditional services (Bitner et al., 2000; Froehle and Roth, 2004; Olson and Boyer, 2005). Second, e-services are typically offered as part of a broader multi-channel service package, combining the internet with other channels of service delivery, such as the phone and physical facilities (Roth, 2001; Sousa and Voss, 2006) (we use the term “multi-channel e-services” to mean e-services which are part of a broader multi-channel service package). This situation results from the realization that companies that complement internet-based channels with traditional channels tend to be more
successful than single-channel companies (e.g., Gulati and Garino 2000; Vishwanath and Mulvin 2001). As a consequence, customers of such e-services will frequently engage in multi-channel behavior, using both online and traditional channels.

E-service quality and its impact must be considered in this context. We argue that although existing research examining the quality-loyalty relationship in e-services has began to address the absence of human contact, it has not adequately recognized the multi-channel nature of these services. For example, such research has typically made a binary distinction between online and offline customers (e.g., Shankar et al, 2003). In reality, customers frequently engage in multi-channel behavior and are more adequately characterized as being positioned along a continuum of the degree of focus on the internet channel relative to traditional channels. Hence, even within e-service customers, we may find high levels heterogeneity in this respect, ranging from more traditional customers (limited focus on the internet channel and strong reliance on traditional channels) to web-oriented customers (increased focus on the internet channel and weak reliance on traditional channels). Boyer et al’s (2002) E-Services Customer Retention Model posits that the importance of different operations-based capabilities as drivers of loyalty may vary across different customer segments. Hence, in a multi-channel context it is important to ascertain whether the impact of e-service quality – a key operations-based capability – on loyalty differs across customers with different degrees of focus on the internet channel. The examination of this question can provide key insights for devising loyalty strategies and for making the associated delivery system design choices in multi-channel e-services.
In an attempt to fill this research gap, this study empirically examines the relationship between quality and loyalty in a multi-channel information-based e-service (e-banking). Specifically, we test the direct quality-loyalty relationship and examine whether a customer’s degree of focus on the internet channel moderates this relationship.

The structure of the paper is as follows. First, we review the literature in traditional services and e-services and develop research hypotheses related to the study’s research objectives. Second, we describe the employed methodology, an online survey study of customers of the selected multi-channel e-service. Third, we present the data analysis and results. Finally, we discuss the results, summarize the study’s main contributions and identify limitations and avenues for future research.

**Literature review and research hypotheses**

In developing the research hypotheses, our default stance has been to apply theory from traditional services to e-service settings. There has been substantial research examining the links between service quality and customer loyalty behavior in traditional service operations. Zeithaml (2000) provides an excellent review of the numerous academic studies which have provided evidence of this association. Effects of service quality include loyalty behaviors such as willingness to recommend the company (e.g., Zeithaml et al, 1996) and purchase intentions (e.g., Boulding et al, 1993; Cronin and Taylor, 1992).

Underlying such research is the notion that loyalty behaviors are influenced by customer *perceptions* of service quality (or experience). Such perceptions have been conceptualized
around the SERVQUAL dimensions, which mainly apply to face-to-face service provided by a firm’s employees (Parasuraman et al, 1985, 1988). Taking the stance that theory from traditional services will find replication in e-services, one would expect that the relationship would hold in e-services if SERVQUAL is replaced by an adequate instrument for measuring quality perceptions in e-service settings. In e-services, e-service quality equates to web site quality (Sousa and Voss, 2006), including dimensions such as information quality, ease of use, privacy/security, graphic style and fulfillment (Zeithaml et al, 2002). Therefore, we put forward the following hypothesis:

H1. Perceptions of e-service quality are positively related to e-service loyalty behavior.

An important difference between e-service and traditional service settings with a relevant bearing on the quality-loyalty relationship is the nature of the service encounter (Froehle and Roth, 2004). In particular, some authors have questioned whether, in the absence of human contact, the relational aspects of the exchange over the internet may continue to drive customer loyalty (Parasuraman and Grewal, 2000; Yen and Gwinner, 2003). It is largely an empirical question whether this difference will affect the verification of the proposed hypothesis.

Several studies have empirically examined the quality-loyalty relationship in e-services. Overall, they lend support for H1, and fall in two categories. The first comprises studies developing instruments for measuring e-service quality. These assert the nomological validity of the developed scales by finding an association between e-service quality (as measured by the scales in question) and loyalty intentions, based on data from surveys. Examples include surveys of
students (Loiacono et al, 2001; Yoo and Donthu, 2001, Janda et al, 2002; Lee and Lin, 2005; Collier and Bienstock, 2006), a survey of consumers from an online panel (Wolfinbarger and Gilly, 2003) and a survey of users with shopping experience at two online stores (Parasuraman et al, 2005).

The second category includes studies (mostly surveys) of actual customers of existing e-service businesses. Chen and Hitt’s (2002) study of the online brokerage industry found that information and system quality were positively correlated to customers’ switching costs; surprisingly, ease of use was negatively correlated with switching costs. In the same industry, Balasubramanian et al (2003) found a positive association between the perceived day-to-day operational performance of a web site (including quality-related dimensions) and customer satisfaction. Olson and Boyer (2005) found that a measure of web site functionality in internet ticketing was positively associated with a measure of e-loyalty. Boyer and Hult (2005a, 2005b) found that measures of web site quality related to ease of use were positively associated with loyalty behavior in the online grocery industry. In the same industry, Heim and Sinha (2001) also found evidence of a relationship between e-service quality dimensions (web site navigation and information quality) and loyalty intentions. Harris and Goode (2004) found an indirect relationship (through satisfaction) between an overall service quality construct and several loyalty dimensions in the online book sector.

Few of these studies have had the examination of the quality-loyalty relationship as their main objective, a view that is shared with other researchers (e.g., Fassnacht and Koese, 2006). Accordingly, they exhibit some limitations for the purpose of rigorously examining this
relationship. The first type of study tends to draw on convenience samples (mainly students), rather than samples taken from the actual customer base of a service provider. This may reduce the external validity of the results (Fassnacht and Koese, 2006). The second type of study has not employed fully-fledged scales for measuring e-service quality. Some of the employed scales leave out several important dimensions of web site quality, such as the security and reliability of the web site (Olson and Boyer, 2005; Boyer and Hult, 2005a, 2005b; Heim and Sinha, 2001) or graphic style (Balasubramanian et al, 2003), while others mix both online and offline features (Harris and Goode, 2004; Chen and Hitt, 2002). In addition, both types of studies have largely focused on a limited set of e-service settings, namely, online shopping e-services involving physical products. In these contexts, important features besides the web site, notably, the logistics of the product delivery, have a strong impact on loyalty (Rabinovich and Bailey, 2004). Hence, it may be argued that these settings may not be ideal for testing the relationship between e-service (web site) quality and loyalty.

Therefore, we submit that, although the overall evidence lends support for H1, further testing of this relationship is required. Our study attempts to fill this gap by: i) employing a more complete set of web site quality dimensions; ii) examining registered customers in the context of an actual commercial e-service, arguably, a type of setting for which service quality matters the most, as customers naturally expect to receive high service quality (Fassnacht and Koese, 2006); iii) examining a service sector – e-banking – which is not associated with online shopping and may be seen as a representative of a pure (information-based) e-service setting, in which the web site plays a major role in service provision.
**Moderating effect of the Degree of Focus on the Internet Channel**

Research in the quality-loyalty relationship in traditional services has moved beyond its original focus on testing the direct relationship to a deeper understanding of factors moderating this relationship. Such research has found that customer segments vary in respect to how their loyalty intentions change in response to changes in perceived service quality (e.g., Garbarino and Johnson, 1999; Mittal and Kamakura, 2000). In this study we answer calls to do the same in an e-service context (Anderson and Mittal, 2000) by examining the moderating effect of a customer’s Degree of Focus on the Internet channel (DFI), relative to other channels. Our interest in DFI as a moderating variable is in recognition of the multi-channel nature of most e-services and aims at providing a better understanding of the quality-loyalty relationship in such settings. This variable may be seen as representing the relative attractiveness to a customer of the internet channel compared with competing channels. This attractiveness may in turn be dictated by convenience, information richness, price, etc., provided by the channel (Froehle and Roth, 2004; Keeney, 1999; Tse and Yim, 2001).

Based on the general existence of moderating effects in traditional services, we test the following hypothesis:

H2. A customer’s DFI moderates the relationship between quality and loyalty behavior in e-services.

We are not aware of research addressing the moderating effects of DFI. However, some studies have investigated differences between customers of traditional services and online services.
Generally, they have found that customers of online services are different from customers of traditional bricks-and-mortar services and that they have differentiated needs (e.g., Degeratu et al, 2000; Hitt and Frei, 2002; Iqbal et al, 2003; Muthitacharoen et al, 2006). This suggests that DFI may be a relevant moderating variable between quality and loyalty in e-service settings. However, such research has had two limitations. First, it has typically compared customers who shop online to those who don’t, ignoring the fact that in e-services customers frequently engage in multi-channel behavior, using both online and traditional channels. Second, it has treated online customers as homogeneous, while other research has shown that even within online customers there may be high levels of heterogeneity (Boyer and Frohlich, 2006). Our study attempts to address these shortcomings by characterizing customers by a continuous DFI variable in the context of a multi-channel service, avoiding the use of a simple dichotomy of online vs. offline users.

Methodology

The study was based on the administration of an online questionnaire to a sample of the customers of a major retail e-banking service, which was part of a broader multi-channel banking service. Our single-industry focus is in keeping with similar industry-specific research in e-services (e.g., Boyer and Hult, 2005a; Verma et al, 2004). E-banking was chosen for several reasons. First, it is a mature and one of the most widespread types of e-services, with high adoption levels among both service providers (e.g., the majority of banks now offer such a service) and users (according to Forrester Research, it is predicted that 35% of US households with internet connections will bank through the web by 2008). Second, it is an almost ideal representative of a multi-channel service setting in which customers can receive service via
several channels in complement to the internet (Huete and Roth, 1988). Third, it is a pure service, a context which, as mentioned in the literature review, has not received much attention by research on the quality-loyalty relationship. Fourth, in e-banking the web site plays a major role in service provision. Finally, the range of services offered at e-banking sites tends to be similar across different service providers and countries, enhancing the generalizability of our findings.

The chosen service, located in Portugal, had about 600,000 customers at the time of the study and is considered a “best practice” service, being ISO9001 certified and having won, among other awards, the “Best Consumer Internet Bank 2003” award by the *Global Finance* magazine. The study was based on triangulation of data collected from multiple sources in this e-service setting. The next sections discuss the measurement of the research variables and data collection.

*Measurement*

The study’s main research variables are e-service quality, loyalty and DFI. The measures are presented in Appendix 1 and are explained next.

**E-service quality**

In e-services, service quality equates to web site quality (Sousa and Voss, 2006). Several instruments have been developed with the reported objective of assessing the quality of web sites (e.g., Collier and Bienstock, 2006; Fassnacht and Koese, 2006; Loiacono et al., 2001; Parasuraman et al, 2005; Wolfinbarger and Gilly, 2003; Yoo and Donthu, 2001). There is significant variation in the number and meaning of the quality dimensions proposed by these
studies and a widely accepted scale is yet to emerge. However, there is substantial commonality among studies as to the overall content of the proposed dimensions, which generally match the five broad criteria that Zeithaml et al.’s (2002) comprehensive review of the e-service quality literature has proposed: i) information availability and content (information quality); ii) ease of use; iii) privacy/security; iv) graphic style; and v) fulfillment. Therefore, our starting point was an aggregate web site quality construct made up of these five dimensions.

As such, we compiled a list of items from existing instruments that would capture these dimensions. Using this base list of items, we held several iterative focus group discussions with managers from the bank’s quality and marketing departments with the objective of choosing one item to adequately represent each of the main quality dimensions in the context of an e-banking service. The procedure of selecting items from a broader set and associate them with hypothesized dimensions is a standard procedure for developing measures (Churchill, 1979) and has been generally used in quality management research (e.g., Samson and Terziovski, 1999). Our choice of selecting only one item per dimension ensured that we arrived at a parsimonious set of items, a key requirement to ensure appropriate response behavior in online questionnaires (Drolet and Morrison, 2001).

During these discussions, it was considered important to break the fulfillment dimension into two separate dimensions - reliability and responsiveness – because deficiencies in these two areas require corrective actions of different nature. For example, responsiveness problems may require an improvement in the processing capacity of back office systems, while reliability problems may indicate the need to revise back office processing procedures. Thus, we considered six main dimensions of web site quality in total, namely information quality, ease of use, privacy/security, graphic style, reliability and responsiveness.
During this process, the wording of the items was also adapted to an e-banking context, a recommended method in empirical research (e.g., Boyer and Pagell, 2000), which has been performed extensively to study service quality (e.g., Kettinger and Lee, 1994). The result of this process is presented in Appendix 1 which shows the six dimensions of web site quality, their general descriptions, and the items that were chosen to measure them (Q1-Q6).

Customer loyalty

There have been several conceptualizations of the customer loyalty construct (e.g., Zeithaml et al, 1996; Dick and Basu, 1994; Oliver, 1997, 1999). We have focused on loyalty in a conative sense, i.e., related to behavioral intentions (Oliver, 1997, 1999). In this connection, we drew on the definition of conative loyalty by Oliver (1997, 1999) to measure loyalty towards an e-service (web site) by the following items: L1) The intention to re-use the e-service (web site); and L2) Word of mouth recommendation. Similar scales have been commonly used in service quality research (e.g., Boulding et al, 1993; Spreng et al, 1995).

Degree of focus on the internet (DFI)

The DFI variable was measured by the proportion of the total number of transactions that were performed by a customer through the internet channel relative to the other available channels (physical counter, phone and ATM) during the month immediately after the questionnaire was removed from the web site.
Data collection

The data for the DFI variable were extracted from the bank’s customer database and the bank’s IT systems, which record all the transactions of a customer with the bank across the different available channels. This was performed by the bank’s staff according to the researchers’ instructions.

The data for the other variables were collected via the administration of an online questionnaire to a sample of the service’s customers. We drew on the overall customer database to exclusively target customers fulfilling the following criteria: active customers (customers having made at least two logins to the service in the previous three months), age over 18 years old, excluding bank employees. This screening resulted in a pool of 51,125 eligible customers. The actual target sample for our study consisted of a subset of 70% of this pool, generated through random extraction from the pool (35,781 customers).

The questionnaire was posted on the e-banking service web site, and placed immediately after the login stage. After the targeted customers logged in, they were asked whether they would like to fill in the questionnaire, in which case they were directed to the respective web page. The questionnaire software application kept track of the identification of all targeted customers, recorded respondents and non-respondents and, for the respondents, recorded their actual responses to the questionnaire. The software also ensured that customers who declined to fill in the questionnaire as well as those who did fill in the questionnaire were not asked again. The questionnaire was active on the site for one month, resulting in 5,942 valid responses, yielding a 16.6% response rate. The testing of hypothesis H2 required the overall sample to be split into
two subgroups based on the median of the DFI variable, at 54.55%: High DFI customers and Low DFI customers (see data analysis section). The final sample and the two subgroups are characterized in Table 1. The table shows that the predominant demographic profile in the sample was that of a male, young and educated customer. This pattern is in line with the patterns observed for general internet users in the European Union and the US, as well as for e-banking users (e.g., Eurostat, 2003; SIBIS, 2003). The table also shows that the two subgroups have similar demographic profiles, but that they exhibit high heterogeneity in terms of DFI (average levels of 75.1% and 33.0%). We conducted a non-respondent bias analysis employing t-tests to compare the profiles of respondents and non-respondents in terms of age, gender, education level and DFI. The analysis showed no significant differences, indicating the absence of non-respondent bias.

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**Take in Table 1**

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**Analysis and results**

The analysis employed Structural Equation Modeling (SEM) to test the model depicted in Figure 1, which underlies hypotheses H1 and H2. Normality plots did not show strong deviation from normality. Due to the large sample size, even severe non-normality would have negligible effects on the interpretation of SEM analyses (Lei and Lomax, 2005). Missing data was handled via the EM method (Little and Rubin, 1987). All the analyses were performed with the SPSS-Amos 6.0 software, employing Maximum Likelihood Estimation. We followed Anderson and Gerbing’s (1982, 1988) two-step paradigm on testing models in which the measurement model is tested first, followed by the testing of the structural model. In order to test the moderating effect
of DFI which underlies hypothesis H2 we employed multiple group analysis (Ping, 1996). This required the overall sample to be split into two subgroups based on the median of the DFI variable at 54.55%: High DFI customers and Low DFI customers.

Take in Figure 1

a. Measurement analysis
To ensure that the testing of hypothesis H2 can be conducted using robust measures, a four-step approach was used to assess the measures across the two subgroups. These steps include: 1) testing the robustness of each item across the two samples; 2) conducting a Confirmatory Factor Analysis (CFA) using the full sample and each sample separately; 3) assessing the reliability and validity of the scales in the overall and in each segmented sample; and 4) testing to ensure that common method bias is not a problem.

a1. Equivalence of item loadings across the two samples
To test the robustness of the survey items across the two customer types, we conducted a multigroup CFA. In this process, we examined the robustness of each item loading across the groups by constraining the individual loading estimates to be equal across the two groups. We then evaluated if the $\Delta \chi^2$ ($\Delta df=1$) against the baseline model (no equality restrictions imposed) was significant. Table 2 shows that all items were found to be equivalent across the two samples.

Take in Table 2
a2. Confirmatory factor analysis

We conducted a Confirmatory Factor Analysis (CFA) on the two constructs for the overall and individual samples, the results of which are shown in Table 3. The posited measurement model is supported by the various fit indices. The NFI, CFI and NNFI indices all exceed or are very close to 0.95 and RMSEA is below the 0.08 recommended level (Brown and Cudeck, 1993). The fact that all item loadings are significant at p< 0.000 and have the signal predicted by theory provide further evidence of fit. Although for completeness we report $\chi^2$ measures in the analysis, we do not rely on them to assess goodness of fit because for large samples these measures are unreliable, resulting in the tendency for rejecting a model even if it is only marginally inconsistent with the data (e.g., Raykov and Markouvides, 2000, p. 37; Shah and Goldstein, 2006).

The reliability of the two constructs was assessed by two means. First, factor analysis of the quality and loyalty constructs resulted in a single factor extracted in the overall sample and individual subgroups. Second, composite reliabilities were well in excess of the suggested level of 0.70 (Hair et al, 1998) (Table 3). Both analyses provide adequate evidence of the reliability of the two constructs.

Discriminant validity was tested by running the CFA model constraining the covariance coefficient between the two constructs to unity and performing a $\chi^2$ difference test with the unconstrained model (Anderson and Gerbing, 1988). Table 4 shows that the $\chi^2$ value for the
unconstrained model was found to be significantly lower than the $\chi^2$ for the constrained model in all three cases (overall sample and the two subgroups).

Overall, there is sufficient support for the reliability, convergent and discriminant validity of the constructs to allow us to proceed with an evaluation of the structural model and detailed hypotheses testing.

Take in Table 3

Take in Table 4

a3. Testing for potential common method bias

A Harman single factor test was conducted to check for common method variance (McFarlin and Sweeney, 1992). The rationale for this test is that if common method bias poses a serious threat to the analysis and interpretation of the data, a single latent factor would account for all manifest variables (Podsakoff and Organ, 1986). For the overall sample, the one-factor model yielded a $\chi^2 = 2213.2$ (df=20), compared with the $\chi^2 = 440.3$ (df=19) for the measurement model. Thus, the fit is considerably worse ($p<0.000$) for the uni-dimensional model than for the measurement model. Corresponding results were found for the High DFI subgroup ($\chi^2$ one-factor = 1220.1, $\chi^2$ measurement model = 253.5) and the Low DFI subgroup ($\chi^2$ one-factor = 1004.1, $\chi^2$ measurement model = 212.2). Collectively, these results indicate that common method variance does not pose a threat.
b. Structural model analysis

In order to test hypothesis H1 we estimated the SEM model shown in Figure 1. This model is similar to the CFA model addressed earlier, except that the correlation between the two constructs is replaced by a unidirectional path from Quality to Loyalty. Because of this similarity, all the data in Table 3 pertaining to the overall sample also applies to the structural model, which therefore exhibits good levels of fit. The standardized regression weight between the two constructs has a value of 0.587, significant at p<0.000. Thus, there is strong support for hypothesis H1.

In order to test hypothesis H2 we employed multiple group analysis. The work of Koufteros and Marcoulides (2006) provides a methodological template for conducting multiple group analysis using SEM. The procedure was as follows:

1) We estimated the model for each subgroup separately and assessed the quality of fit. Again, because of the similarity between these models and the earlier corresponding CFA models, the data in Table 3 pertaining to the two subgroups also applies to the structural models, which therefore exhibit good levels of fit. The regression weights between the two constructs are 0.565 for the High DFI subgroup and 0.615 for the Low DFI subgroup, both significant at p<0.000.

2) We also assessed the quality of fit of a joint model allowing for an entirely different set of parameters for each of the two subgroups (baseline model M1). The first row in Table 5 shows that this model exhibits a good fit.

3) We systematically tested for subgroup invariance across all components of the model, in the following sequence:
a) the factor loadings for the independent variable (e-service quality). We estimated a model (M2) obtained from the baseline model by restricting these factor loadings to be equal between the two subgroups. We then compared it with the baseline model (M1), resulting in a decision to accept M2 or to keep M1.

b) the factor loadings for the dependent variable (loyalty). We estimated a model (M3) obtained by adding to the model resulting from a) the restrictions on the equality of factor loadings for loyalty between the two subgroups. We then compared it with the model kept in a), resulting in a decision to accept M3 or to keep the model from a).

c) the structural coefficient between website quality and loyalty. We estimated a model (M4) obtained by adding to the model resulting from b) the restrictions on the equality of the structural path between the two subgroups. We then compared it with the model kept in b), resulting in a decision to accept M4 or to keep the model from b).

The comparisons between competing models were based on the significance level of differences in chi-square (Anderson and Gerbing, 1988). The results are presented in Table 5. This table shows that M2 and M3 do not represent a significant deterioration of fit over the preceding models, supporting the invariance of factor loadings across the two subgroups. However, M4 is rejected providing evidence of a difference in the path coefficient for the two subgroups.

4) Finally, we tested for differences in latent means for the Quality and Loyalty constructs across the two subgroups in order to rule out confounding effects of these eventual
differences. We followed the approach outlined by Sörbom (1974), which required the modification of the CFA baseline model as follows:

a) The factor loadings were constrained to be equal across the groups ensuring measurement model invariance.

b) The means of the two constructs were left unconstrained for the High DFI group and were fixed to zero in the Low DFI group, which thus acted as the reference for the construct means (identical results would be observed if we had chosen to set the means to zero in the High DFI group).

c) The error means were all fixed to zero in both groups.

d) The intercept terms of the observed variables were constrained to be equal in the two groups.

The results of the analysis are shown in Table 6. The fit indices indicate an excellent model fit. The mean differences were found not to be significant for both constructs indicating that average perceptions of quality and loyalty intentions are the same across the groups.

Collectively, the results provide strong support for hypothesis H2. Specifically, the relationship between quality and loyalty is significantly stronger in the Low DFI group (0.615) than in the High DFI group (0.565).
Discussion

Our study provides strong empirical evidence for a relationship between service quality and customer loyalty in an e-service setting (H1). Hence, the different nature of the service encounter in e-services, in particular the absence of human contact, does not seem to reduce the role of service quality relative to traditional services. Our results concerning a pure information e-service are broadly in line with the results of other studies which have addressed different e-service contexts (mainly, online shopping). Therefore, it appears that the quality-loyalty relationship is valid across different types of e-services, including online shopping and pure information services.

The study also provides evidence of the moderating effect of DFI on the quality-loyalty relationship (H2). In particular, e-service quality seems to be a more important driver of loyalty for customers who are less prone to use the internet channel, than for those who exhibit a high intrinsic preference for this channel. We looked for theories in traditional services that might help explain the direction of the observed moderating effect (theory extension, i.e., attempting to better structure theory in light of the observed results, Handfield and Melnyk, 1998). We did not find any sufficiently powerful theory with a direct bearing on this relationship (otherwise, a directional hypothesis would have been warranted in the first place). However, the theory on the zone of tolerance emerged as potentially promising in providing such an understanding.

The zone of tolerance separates desired service level (the level of service the customer hopes to receive) from the adequate service level (the level of service the customer will accept) (Zeithaml et al, 1993). The associated theory posits that customers may accept variation in performance
within this zone, and any increase or decrease in performance within this area will only have a marginal effect on perceptions and behavior - only when performance moves outside of this range will it have any real effect (Johnston, 1995). Overall, it may be that customers with a high DFI exhibit wider zones of tolerance, thus explaining the observed moderating effect. Two reasons may account for this.

First, customers with a high DFI may be seen as having a higher intrinsic preference for the internet channel relative to other channels, for example, due to the afforded convenience and time savings (e.g., Bhatnagar et al, 2000; Donthu and Garcia, 1999). Hence, it may be that they consider the other channels as less adequate alternatives. Parasuraman et al (1991) suggest that when customers perceive the absence of alternative suppliers, their zone of tolerance is wider.

Second, it may be that customers with a high DFI are less involved with the service (involvement can be defined as a customer’s perceived importance of a purchase situation; Johnston, 1995). Prud’homme et al (2005) found that as individuals become more comfortable and familiar with the internet they begin to take the technology for granted and it plays less of a role in impacting their satisfaction. Johnston (1995) has proposed that the width of the zone of tolerance is inversely proportional to a customer’s level of involvement with the service. For example, a person with little previous experience of flying and envisaging a high risk factor is expected to have very narrow bands of tolerance (Johnston, 1995).

The sample examined in our study revealed that there can be a high degree of variability in DFI among customers of a given e-service, even though demographics (age, gender and education
level) are similar (Table 1). These results are in line with other studies that have suggested that demographic variables may be less powerful segmentation variables in online contexts (Chen and Hitt, 2002; Roth, 2001; Spiller et al, 2007). On the contrary, our study showed that DFI significantly moderated the quality-loyalty relationship. Thus, our study puts forward DFI as a potentially relevant customer segmentation variable in multi-channel e-service contexts for devising loyalty strategies based on service quality.

The observed moderating effect of DFI may be extrapolated to gauge the importance of web site quality as a tool to drive e-service loyalty in multi-channel services with different degrees of scalability (Hallowell, 2001) within the same service sector. For example, in the banking sector we find services with very different degrees of scalability (Huete and Roth, 1988). At one extreme, we find services which are narrowly focused on the internet channel, possibly combining it with the phone and none or very limited physical presence (“online” banks, high scalability). At the other extreme, we find services that offer customers a wide range of channels, including the internet, phone and strong physical presence (“multi-channel” banks, low scalability). One might argue that customers who favor the former services may be similar to the high DFI group of customers in our study, while those who favor the latter may resemble the low DFI group. For “multi-channel” customers, we found that web site quality plays a key role in e-service customer retention. For customers of internet-focused services, our findings suggest that e-service retention can be achieved through web site quality as well, but strength is reduced. Thus, our results suggest that these businesses may have to devise e-service retention mechanisms other than web site quality. Examples could include building communities or creating switching barriers (Tsai and Huang, 2007). This may be especially important for
internet-focused services because barriers to entry and customer switching costs are arguably lower.

Our results hint at a possible paradox which multi-channel service providers may face. By developing excellent capabilities associated with the internet channel, namely, those associated with offering a high quality web site, service providers are able to increase customer loyalty for their e-services. However, the web-oriented (High DFI) customers who possibly value the internet channel more than the more traditional (Low DFI) customers, are also those for whom such web-based capabilities are less effective in driving loyalty. On the contrary, customers who value the internet channel less than traditional channels, may be induced loyalty behavior more strongly precisely via the development of internet-based capabilities.

In the specific case of the e-banking service that we studied, the perceived levels of quality and loyalty were the same between High and Low DFI customers. This seems to indicate that, although e-service quality may play less of a role in driving loyalty for High DFI customers, it is possible for service providers to achieve retention levels similar to those of Low DFI customers. This finding raises interesting questions for firms engaged in strategic initiatives geared towards achieving increasing levels of scalability. Attracted by potential cost reductions, many firms have attempted to migrate customers away from traditional channels onto the internet, effectively changing the composition of their customer base in terms of DFI. Although only tentatively, our results suggest that: i) it may be possible to accomplish these strategic moves without compromising e-service retention levels; and ii) this may require supplementary retention mechanisms other than e-service quality.
Conclusions

This study contributes to research in e-services in several ways. First, it provides empirical evidence into the effects of service quality on loyalty in an information-based service, a context which has been relatively unexplored to date. In doing so, the study investigated actual customers in a real e-service setting, increasing the external validity of the results. Such an approach has been lacking in existing e-service research which tends to employ convenience samples (mainly students), rather than samples taken from the actual customer base of service providers. Overall, these results complement existing research in supporting the key role of service quality in driving customer loyalty in e-services. Hence, the different nature of the service encounter in e-services, in particular the absence of human contact, does not seem to reduce the role of service quality relative to traditional services. This is an important result, given that loyalty has been considered harder to achieve in e-services than in traditional services.

Second, the study provides a better understanding of the quality-loyalty relationship in multi-channel e-services, a context which, although being pervasive in today’s business environment, has not received much attention from previous studies. In particular, the study found that the importance of web site quality in driving loyalty, while still strong, is reduced for web-oriented customers when compared to traditional customers. This work answers calls for more research investigating relevant factors moderating the quality-loyalty relationship in e-services (Parasuraman and Grewal, 2000).
Third, the study contributes to the research stream investigating customer heterogeneity on the web (e.g., Boyer et al., 2002; Boyer and Frohlich, 2006; Hitt and Frei, 2002). This has been an important area of research because one of the challenges that e-services face when compared to traditional services is their typical exposure to a large number of customers with different profiles and requirements (Boyer et al., 2002). Research to date has typically made a binary distinction between online and offline customers and has treated customers of an e-service as homogeneous in terms of DFI. Our study provides evidence of high customer heterogeneity in terms of DFI and puts forward DFI as a potentially relevant customer segmentation variable in multi-channel e-service contexts for devising loyalty strategies based on service quality. Therefore, future research in this area should recognize this source of heterogeneity among customers.

Collectively, the last two contributions provide empirical support for Boyer et al.’s (2002) E-Services Customer Retention Model, at two levels: i) the existence of heterogeneity in the e-target markets (specifically, in what concerns a customer’s DFI); ii) the need to employ operations strategies that are aligned with the target markets (specifically, in what concerns the role of e-service quality - as an operations-based capability - in driving customer retention). Our findings also lend support to previous studies which have proposed that e-services with different levels of scalability may require different competitive capabilities and operations strategies to succeed (Oliveira et al., 2002) and that there should be alignment between the level of scalability of an e-service and the design of the associated service delivery system (Boyer et al., 2002). Specifically, they suggest that the importance attached to e-service quality as an operations-based capability as well as the importance attached to the associated service delivery system
design choices does not have to be as high for high-scalability e-services as for low-scalability e-services. This contributes to answering calls for more research on the design of multi-channel e-services (Boyer et al, 2002).

Finally, the research hypotheses, largely based on theory from traditional services, were broadly supported. This further extends the generalizeability of research in traditional services into the context of online service. Thus, the study provides general support in defense of theories that draw parallels between online and offline services.

Our study also has a number of implications for practice. First, our results reinforce the need for e-service providers to invest in the design and operation of high quality web sites as a means to increase customer loyalty. In an e-service, this implies worrying about quality dimensions such as privacy/security, information quality, ease of use, graphic style, reliability and responsiveness. In designing high quality web sites, Operations Managers should be aware that these different dimensions are provided by different parts of the service delivery system (Sousa and Voss, 2006). For example, while ease of use is essentially provided by the web site’s user interface, reliability depends mainly on the associated back office IT systems.

Second, our results raise awareness of the fact that different loyalty strategies – in particular, the role assigned to e-service quality as a driver of customer loyalty – may need to be employed both across different types of customers within a given multi-channel service and across multi-channel services with different levels of scalability.
Finally, service providers should recognize DFI as a useful customer segmentation variable in a multi-channel e-service. In today’s e-services, back office IT systems can be used to automatically characterize a customer’s DFI at low cost, thus making DFI a readily available segmentation variable.

**Limitations and future research directions**

Our findings open a number of directions for future research. Although our study validates the development of high quality web sites as a driver of customer loyalty, it does not address the issue of whether it is cost-effective to employ such strategy. The bulk of research in traditional services supports the link between service quality and profitability. In addition, Reichheld and Schefter (2000) have argued that loyalty may be more important in e-services than for comparable, traditional bricks-and-mortar services because: i) attracting new customers has been found to be considerably more expensive in e-services; ii) the profitability of individual customers accelerates much faster on the web; and iii) the cost of serving a customer decreases much faster on the web. This suggests that more overall investment in service quality may be awarded in e-services than in traditional services. Nevertheless, future research should investigate the impact of quality on profitability in e-service settings. In the light of our results, it would be particularly interesting to examine such relationship across multi-channel services with different degrees of scalability.

We put forward the theory on the zone of tolerance as a promising explanation for the observed direction of the moderating effect of DFI. Future research should empirically test this, for
example, by attempting to measure the zone of tolerance for customers with different levels of DFI.

In this study, we do not delve into what drives DFI, but rather, focus on this variable as a readily observable customer trait and thus a possible customer segmentation variable. It would be important for future research to examine the antecedents of DFI.

The investigation is based on one service industry, e-banking, a very important type of service in today’s e-service landscape. We believe that the findings can be generalized to other task-oriented e-services, but caution must be exercised in extending the conclusions of this study to other services. It may be important for future research to test the developed hypotheses in other types of e-services, in particular, types of e-services which are more strongly associated with experiential/hedonic use (e.g., entertainment services).

Our unit of analysis has been the “e-service”. As such, our study has addressed the relationship between quality and loyalty in an e-service which is part of a wider service package offered by the firm. For example, our findings suggest that the quality of the service provided through the firm’s web site is related to customer loyalty to that component of the overall service package. It was not this study’s goal to examine the contribution of e-service quality to a customer’s overall loyalty towards the firm. Future research might explore this relationship in the wider context of the overall service package and the firm.
Finally, we have focused on loyalty behavioral intentions, what Oliver (1999) calls conative loyalty. Although previous research has provided empirical support for the causal link between intentions and actual actions (Venkatesh and Davis, 2000), future research may examine if loyalty behavior is linked to loyalty actions (what Oliver (1999) calls action loyalty).
Appendix 1. Measures of Research Variables and Data Sources

E-Service Quality (source: online questionnaire)

<table>
<thead>
<tr>
<th>Measurement Dimensions (a)</th>
<th>General Description (a)</th>
<th>Measurement Items (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Information Quality</td>
<td>The suitability of the information to the user’s purposes.</td>
<td>Q2. Correct and up to date information about the bank’s products and services.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ease of Use</td>
<td>Effort of the end users in using the web site.</td>
<td>Q3. Ease of performing banking operations and accessing information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Reliability</td>
<td>Ability to perform the promised service dependably and accurately.</td>
<td>Q5. Requests/ instructions correctly processed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) Adapted from Zeithaml et al (2002). Consistent with existing instruments, we employed the SERVPERF logic (e.g., Cronin and Taylor, 1992) to measure e-service quality.

(b) The wording of these items was adapted to the context of an e-banking service. Items used a 5-point Likert-type scale ranging from “1 - Strongly disagree” to “5 - Strongly agree”.

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Customer Loyalty (source: online questionnaire)

L1. Intention to re-use the [name of e-banking service] service (web site).

L2. Intention to recommend the [name of e-banking service] service (web site) to a friend or relative.

Both items used a 5-point Likert-type scale ranging from “1 - Strongly disagree” to “5 - Strongly agree”.

Degree of Focus on the Internet (DFI) (source: bank’s back office IT systems)

DFI. The proportion of the total number of transactions that were performed by a customer through the internet channel relative to the other available channels (physical counter, phone and ATM) during the month immediately after the questionnaire was removed from the web site.
References


Drolet, A., D. Morrison. 2001. Do we really need multiple-item measures in service research?. Journal of Service Research, 3(3), 196-204.


Harris, L., M. Goode. 2004. The four levels of loyalty and the pivotal role of trust: A study of online service dynamics. Journal of Retailing, 80(2), 139-158.


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Table 1. Characterization of the final sample (n=5,942).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total Sample n=5942</th>
<th>High DFI n=2971</th>
<th>Low DFI n=2971</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of Focus on the Internet (DFI)</td>
<td>54.0 %</td>
<td>75.1 %</td>
<td>33.0 %</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[18-25[</td>
<td>9.4 %</td>
<td>7.9 %</td>
<td>10.9 %</td>
</tr>
<tr>
<td>[25-35[</td>
<td>44.8 %</td>
<td>46.1 %</td>
<td>43.5 %</td>
</tr>
<tr>
<td>[35-45[</td>
<td>22.1 %</td>
<td>21.7 %</td>
<td>22.5 %</td>
</tr>
<tr>
<td>[45-55[</td>
<td>14.2 %</td>
<td>14.5 %</td>
<td>13.9 %</td>
</tr>
<tr>
<td>55+</td>
<td>9.5 %</td>
<td>9.8 %</td>
<td>9.2 %</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>72.0 %</td>
<td>74.0 %</td>
<td>70.0 %</td>
</tr>
<tr>
<td>Female</td>
<td>28.0 %</td>
<td>26.0 %</td>
<td>30.0 %</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary education</td>
<td>3.4 %</td>
<td>3.4 %</td>
<td>3.4 %</td>
</tr>
<tr>
<td>Secondary education</td>
<td>37.9 %</td>
<td>36.8 %</td>
<td>38.9 %</td>
</tr>
<tr>
<td>Higher Education (Bachelor’s degree and above)</td>
<td>58.7 %</td>
<td>59.8 %</td>
<td>57.7 %</td>
</tr>
</tbody>
</table>

Table 2. Item analysis across the two samples.

<table>
<thead>
<tr>
<th>Item</th>
<th>Δχ² against baseline model (Δdf=1)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>0.44</td>
<td>0.51</td>
</tr>
<tr>
<td>Q2</td>
<td>0.44</td>
<td>0.51</td>
</tr>
<tr>
<td>Q3</td>
<td>0.01</td>
<td>0.92</td>
</tr>
<tr>
<td>Q4</td>
<td>0.50</td>
<td>0.48</td>
</tr>
<tr>
<td>Q5</td>
<td>0.12</td>
<td>0.73</td>
</tr>
<tr>
<td>Q6</td>
<td>0.78</td>
<td>0.38</td>
</tr>
<tr>
<td>L1</td>
<td>0.69</td>
<td>0.41</td>
</tr>
<tr>
<td>L2</td>
<td>0.69</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Baseline model: χ² = 465.690; df=38.
Table 3. Measurement statistics for the overall sample and DFI subgroups.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Standardized Loadings</th>
<th>T-Values (critical ratios)</th>
<th>Mean</th>
<th>S.D.</th>
<th>Composite Reliabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall Sample, n=5,942(a)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation between the two constructs = 0.587 (p&lt;0.000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-Service Quality</td>
<td>Q1</td>
<td>0.57</td>
<td>-- (*)</td>
<td>24.7</td>
<td>2.9</td>
<td>0.811</td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>0.59</td>
<td>32.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>0.63</td>
<td>33.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td>0.59</td>
<td>25.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q5</td>
<td>0.72</td>
<td>36.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q6</td>
<td>0.77</td>
<td>37.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loyalty</td>
<td>L1</td>
<td>0.76</td>
<td>-- (*)</td>
<td>8.3</td>
<td>1.6</td>
<td>0.798</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>0.87</td>
<td>37.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High DFI Subgroup, n=2,971 (b)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation between the two constructs = 0.565 (p&lt;0.000)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>E-Service Quality</td>
<td>Q1</td>
<td>0.59</td>
<td>-- (*)</td>
<td>24.7</td>
<td>2.9</td>
<td>0.825</td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>0.62</td>
<td>25.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>0.65</td>
<td>25.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td>0.60</td>
<td>19.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q5</td>
<td>0.73</td>
<td>26.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q6</td>
<td>0.78</td>
<td>27.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loyalty</td>
<td>L1</td>
<td>0.76</td>
<td>-- (*)</td>
<td>8.3</td>
<td>1.6</td>
<td>0.800</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>0.87</td>
<td>25.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Low DFI Subgroup, n=2,971 (c)</strong></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Correlation between the two constructs = 0.615 (p&lt;0.000)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-Service Quality</td>
<td>Q1</td>
<td>0.54</td>
<td>-- (*)</td>
<td>24.7</td>
<td>2.9</td>
<td>0.794</td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>0.56</td>
<td>21.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>0.61</td>
<td>21.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td>0.58</td>
<td>17.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q5</td>
<td>0.71</td>
<td>23.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q6</td>
<td>0.75</td>
<td>23.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loyalty</td>
<td>L1</td>
<td>0.76</td>
<td>-- (*)</td>
<td>8.3</td>
<td>1.5</td>
<td>0.795</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>0.86</td>
<td>27.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Indicates a parameter fixed at 1.0 in the original solution.

Model Fit Indices:

(a) Overall Sample: \( \chi^2 = 440.3, \) df = 19; NFI = 0.964 (Bentler and Bonnet, 1980); CFI=0.966 (Bentler, 1990); NNFI (Bentler and Bonett, 1980) = 0.950; RMSEA (Steiger and Lind, 1980) = 0.065 (90% Confidence Interval=[0.060; 0.071]).

(b) High DFI Subgroup: \( \chi^2 = 253.5, \) df = 19; NFI = 0.962; CFI=0.965; NNFI = 0.948; RMSEA = 0.068 (90% Confidence Interval=[0.061; 0.076]).

(c) Low DFI Subgroup: \( \chi^2 = 212.2, \) df = 19; NFI = 0.963; CFI=0.966; NNFI = 0.950; RMSEA = 0.063 (90% Confidence Interval=[0.055; 0.071]).
Table 4. Assessment of discriminant validity.

<table>
<thead>
<tr>
<th>( \chi^2 ) Comparisons</th>
<th>Overall Sample</th>
<th>High DFI Subgroup</th>
<th>Low DFI Subgroup</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \chi^2 ) unconstrained model</td>
<td>440.3</td>
<td>253.5</td>
<td>212.2</td>
</tr>
<tr>
<td>( \chi^2 ) constrained model</td>
<td>3437.6</td>
<td>1746.2</td>
<td>1716.2</td>
</tr>
<tr>
<td>( \Delta \chi^2, \Delta(df) = 1 )</td>
<td>2997.3</td>
<td>1492.7</td>
<td>1504.0</td>
</tr>
<tr>
<td>p-value</td>
<td>p&lt; 0.000</td>
<td>p&lt; 0.000</td>
<td>p&lt; 0.000</td>
</tr>
</tbody>
</table>

Table 5. Invariance tests across DFI subgroups.

<table>
<thead>
<tr>
<th>Model</th>
<th>NFI</th>
<th>CFI</th>
<th>NNFI</th>
<th>RMSEA</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>( \Delta \chi^2 )</th>
<th>( \Delta(df) )</th>
<th>P-value</th>
<th>Reject?</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 - Baseline</td>
<td>.963</td>
<td>.965</td>
<td>.949</td>
<td>.047</td>
<td>465,690</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 – Equal loadings for Q</td>
<td>.962</td>
<td>.966</td>
<td>.955</td>
<td>.044</td>
<td>469,106</td>
<td>43</td>
<td>3.416</td>
<td>5</td>
<td>0.636</td>
<td>No</td>
</tr>
<tr>
<td>M3 - Equal loadings for L</td>
<td>.962</td>
<td>.966</td>
<td>.956</td>
<td>.043</td>
<td>469,812</td>
<td>44</td>
<td>0.706</td>
<td>1</td>
<td>0.401</td>
<td>No</td>
</tr>
<tr>
<td>M4 – Equal loadings (Q, L), equal structural coefficient</td>
<td>.962</td>
<td>.965</td>
<td>.957</td>
<td>.043</td>
<td>474,881</td>
<td>45</td>
<td>5.069</td>
<td>1</td>
<td>0.024</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 6. Mean comparisons for the High DFI and Low DFI groups.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean Difference (*)</th>
<th>Standard Error</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>-0.006</td>
<td>0.011</td>
<td>0.571</td>
</tr>
<tr>
<td>Loyalty</td>
<td>-0.015</td>
<td>0.020</td>
<td>0.464</td>
</tr>
</tbody>
</table>

Model fit indices: \( \chi^2 = 480.3, df = 50; \) NFI = 0.961; CFI=0.965; NNFI = 0.961; RMSEA = 0.041.

(*) The mean levels for the two constructs for the Low DFI group were fixed at zero. The means represent the amount by which construct means for the High DFI group differ.
Figure 1. Structural equation model underlying hypotheses H1 and H2.