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The impacts of e-service quality on customer behaviour in multi-channel e-services

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A large number of e-services are multi-channel (MC), combining the Internet with other channels of service delivery, such as the phone and physical facilities. As a result, online customers frequently engage in MC behaviour. Existing research examining the impact of quality on behavioural intentions in e-services has not adequately recognised their MC nature. In order to address this gap, this study sets out to examine the following two-pronged impacts of e-service quality on customer behaviour in an MC e-service: (i) the impact on e-loyalty behavioural intentions; (ii) the impact on customer channel behaviour. Perceptual and objective data were collected from multiple sources in a major retail MC e-banking service. Two basic groups of online customers in terms of channel behaviour were found – Internet-Focused (IF) and MC – with the latter exhibiting a balanced use of channels and being more loyal, older, less educated and less experienced with the e-service. Data analyses revealed that e-service quality had a strong impact on e-loyalty intentions; but did not have an impact on customer channel behaviour. E-service quality does not seem to be an effective lever for influencing customer channel behaviour; however, it is a key driver of e-loyalty intentions. The results raise the possibility that migration of customer interactions to the Internet channel may reduce e-loyalty intentions.

Keywords: service quality; e-services; multi-channel services; customer behaviour.

Introduction

In traditional bricks-and-mortar services primarily provided by people, service quality has been validated as a lever that managers can employ to drive positive behavioural intentions and, ultimately, profitability (Zeithaml, 2000). Most of the examined behaviours have been closely related to loyalty behaviours, and many studies have established a positive relationship between service quality and customer loyalty (e.g. Boulding, Kalra, Staelin, & Zeithaml, 1993; Zeithaml, Berry, & Parasuraman, 1996).

In recent years, we have witnessed a strong growth of e-services. For example, online retail sales in Western Europe are expected to grow at a compound annual rate of 9.6% in the period 2008–2014 (Forrester Research, 2009). We define e-services as services produced by customers by interacting with a web site, excluding any interactions with service employees (Sousa & Voss, 2006). Given the key role of service quality as a driver of positive behavioural intentions 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

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different from traditional services (Froehle & Roth, 2004). Second, e-services are typically offered as part of a broader multi-channel (MC) service bundle, combining Internet-provided services with those delivered through other channels, such as the phone and physical facilities (Sousa & Voss, 2006). We employ the term 'MC e-services' to designate e-services which are part of a broader service bundle delivered by additional channels. Customers of such e-services will frequently engage in MC behaviour, using both online and traditional channels, and may be considered prime examples of MC customers in general (Kumar & Venkatesan, 2005).

Existing research has begun to address the absence of human contact by examining the impact of e-service quality on customer e-loyalty (e.g. Heim & Sinha, 2001; Sousa & Voss, 2009). However, such research tends to have a narrow single-channel mindset and, we argue, has not adequately recognised the MC nature of these services. Specifically, the impacts of e-service quality are more complex in an MC context: e-service quality may not only impact customer behavioural intentions towards the e-service vis-à-vis competitors' e-services (e.g. e-loyalty), but also customer channel behaviour across the several channels offered by the service provider. For example, a high-quality e-service may result in the migration of service interactions from other channels offered by the provider to the Internet channel. Although researchers have started to study the determinants of customer channel choice and behaviour (e.g. Balasubramanian, Raghunathan, & Mahajan, 2005; Coelho & Easingwood, 2004), e-service quality has remained surprisingly absent from such studies.

The main objective of this study is to examine the impacts of service quality on customer behaviour, explicitly recognising the MC nature of e-service settings. As such, the study sets out to examine the following two-pronged impacts of e-service quality in an MC e-service (e-banking): (i) the impact on e-loyalty behavioural intentions; (ii) the impact on customer channel behaviour (use). By e-loyalty, we mean loyalty towards the e-service (vis-à-vis competing services), rather than overall loyalty to the service provider. Our definition of e-loyalty is related to the likelihood of customer retention (future use of the e-service and word-of-mouth recommendation). As such, it is a distinct concept from a customer's pattern of channel use. For example, a customer may make most of his/her transactions over the Internet because he/she prefers that channel; this may occur even though he/she may not be loyal to the e-service and thus has a high likelihood of switching to a competitor's e-service.

In addressing these questions, our study departs from and/or complements existing research in a number of ways. First, most of the research on the impacts of e-service quality on e-loyalty has focused on online retail contexts involving the sale of physical products, which introduce a number of confounding factors (e.g. product pricing, transportation and physical characteristics of the product). By investigating an information-based MC e-service (e-banking), we build on and extend previous research.

Second, our study is one of the first to simultaneously examine the two-pronged effects of e-service quality on e-loyalty and channel behaviour in a given MC e-service. Third, research in MC e-services has mainly treated channels as means to distribute products rather than means to *deliver* services; therefore, they tend to address channel sales rather than channel usage (e.g. Ansari, Mela, & Neslin, 2008; Gensler, Dekimpe, & Skiera, 2007). Our study looks at MC e-services as service systems that deliver a range of (intangible) services across multiple channels by examining customer channel *use* in an information-based MC e-service (e-banking). Specifically, we address how customers of the chosen e-banking service apportion their service interactions across the several available channels.

Finally, several studies rely on self-reported rather than actual channel behaviour (e.g. van Birgelen, Jong, & Ruyter, 2006), and many rely on convenience samples of customers (e.g. students). Our study investigates actual customers in a real e-service setting and uses objective data to measure actual (rather than self-reported) customer channel behaviour, increasing the external validity of the results.

The structure of the paper is as follows. First, we review the literature and develop hypotheses related to the study's research questions. Second, we describe the employed methodology, comprising an online survey of the selected MC e-service's customers and the collection of back-office transactional and customer data. Third, we present the data analysis and results. Finally, we discuss the results, summarise the study's main contributions and identify limitations and avenues for future research.

Literature review and research hypotheses

The impact of e-service quality on e-service loyalty behaviour

Studies in traditional service operations have provided evidence of the behavioural impact of service quality such as willingness to recommend the company (e.g. Zeithaml et al., 1996) and purchase intentions (e.g. Boulding et al., 1993). Underlying such research is the notion that loyalty behaviours are influenced by customer *perceptions* of service quality (or experience). Such perceptions have been conceptualised around the SERVQUAL dimensions, which mainly apply to face-to-face service (Parasuraman, Zeithaml, & Berry, 1988). An important difference between e-service and traditional service settings is the nature of the service encounter (Froehle & Roth, 2004) and whether, in the absence of human contact, the relational aspects of Internet exchange may continue to drive customer loyalty (Parasuraman & Grewal, 2000; Yen & Gwinner, 2003).

One would expect that the quality–loyalty relationship would hold in e-services if SERVQUAL were to be replaced by an adequate instrument for measuring quality perceptions in e-service delivery. In e-services, e-service quality includes dimensions such as information quality, ease of use, privacy/security, graphic style and fulfillment (Sousa & Voss, 2006; Zeithaml, Parasuraman, & Malhotra, 2002).

Several studies have empirically examined the impact of service quality on loyalty in e-services. Overall, they lend support for this relationship, and fall into two categories. The first comprises studies developing instruments to measure 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 e-loyalty intentions, based on data from surveys (e.g. Collier & Bienstock, 2006; Lee & Lin, 2005; Parasuraman, Zeithaml, & Malhotra, 2005; Wolfinbarger & Gilly, 2003; Yoo & Donthu, 2001). The second category includes studies (mostly surveys) of existing e-service businesses' customers, spanning diverse industries. These have found relationships between several dimensions of e-service quality and e-loyalty intentions (e.g. Boyer & Hult, 2005; Chen & Hitt, 2002; Liang & Chen, 2009; Wu & Chan, 2011). Therefore, we put forward the following hypothesis:

H1: E-service loyalty intention is positively related to perceptions of e-service quality.

Factors influencing customer channel behaviour

Research has uncovered numerous factors affecting how customers use various channels and combinations of channels. Table 1 outlines some of the most commonly identified

Table 1. Factors affecting customer channel choice and behaviour.

Category	Factors	Sample of studies
Customer attributes	Attitude towards technology/channel preference	Black, Lockett, Ennew, Winklhofer, and McKechnie (2002), Boyer and Frohlich (2006), Dabholkar and Bagozzi (2002), Dholakia, Zhao, and Dholakia (2005), Froehle and Roth (2004), Meuter, Bitner, Ostrom, and Brown (2005), Parasuraman (2000)
	Demographic, socio-economic and lifestyle attributes	Black et al. (2002), Dabholkar and Bagozzi (2002), Ding, Verma, and Iqbal (2007), Schoenbachler and Gordon (2002), Venkatesan, Kumar, and Ravishanker (2007)
	Past channel experience (when and how the customer has purchased in the past). Customer channel switching costs/inertia	Dholakia et al. (2005), Frambach, Roest, and Krishnan (2007), Gensler et al. (2007), Schoenbachler and Gordon (2002)
	Recreational orientation, convenience orientation, independence orientation, delivery-related risk aversion and product and payment-related risk aversion	Schroder and Zaharia (2008)
Customer preferences and goals	Economic goals, self-affirmation, symbolic meaning, socialisation and experiential impact, invocation of channel script or schema	Balasubramanian et al. (2005), Ding et al. (2007)
	Information attainment, price comparison, possession (timing of securing an item) and assortment seeking	Noble, Griffith, and Weinberger (2005)
	Basket size, cross-buying, purchase frequency	Venkatesan et al. (2007)
	Convenience, entertainment, whether purchase is a gift or for self, product return frequency	Schoenbachler and Gordon (2002)
Product/Service characteristics	Product/service category	Schoenbachler and Gordon (2002)
	Purchasing stage (pre-purchase, purchase, post-purchase). Complexity	Frambach et al. (2007)
	Price	Black et al. (2002), van Birgelen et al. (2006)
	Perceived risk of purchase	van Birgelen et al. (2006) Black et al. (2002), Schoenbachler and Gordon (2002)
Channel attributes	Service quality in channel	Falk, Schepers, Hammerschmidt, and Bauer (2007), Montoya-Weiss,

(Continued)

Table 1. Continued.

Category	Factors	Sample of studies
	Usefulness	Voss, and Grewal (2003), Verhoef, Neslin, and Vroomen (2007)
	Efficiency	Dabholkar and Bagozzi (2002), Patrício, Fisk, and Cunha (2008)
	Personal contact	Patrício et al. (2008)
		Black et al. (2002), Dabholkar and Bagozzi (2002), McGoldrick and Collins (2007), Muthitacharoen, Gillenson, and Suwan (2006), Patrício et al. (2008)
	Convenience	Black et al. (2002), Boyer and Frohlich (2006), McGoldrick and Collins (2007), Wallace, Giese, and Johnson (2004), Verhoef et al. (2007)
	Waiting time	Boyer and Frohlich (2006), Dabholkar and Bagozzi (2002), Gupta, Su, and Walter (2004), Venkatesan et al. (2007), Wallace et al. (2004)
	Transaction cost/effort/ease of use	Black et al. (2002), Dabholkar and Bagozzi (2002), Gupta et al. (2004), Muthitacharoen et al. (2006), Verhoef et al. (2007)
	Perceived risk of channel	Black et al. (2002), Gupta et al. (2004), McGoldrick and Collins (2007), Verhoef et al. (2007)
	Information availability	Wallace et al. (2004), Verhoef et al. (2007)
	Web site design	Schoenbachler and Gordon (2002)
	Opportunity for tactile-sensory inputs	Citrin, Stem, Spangenberg, and Clark (2003), McGoldrick and Collins (2007)
	Product/service availability/selection offered by channel	McGoldrick and Collins (2007), Muthitacharoen et al. (2006), Schoenbachler and Gordon (2002), Wallace et al. (2004), Verhoef et al. (2007)
	Price/promotions in channel	Boyer and Frohlich (2006), Gupta et al. (2004), Venkatesan et al. (2007), Verhoef et al. (2007)

factors and a sample of associated studies. The table shows four different categories of factors: customer attributes, customer preferences and goals, product/service characteristics and channel attributes. The first three categories are customer-related. Research has shown that online customers are heterogeneous (Boyer & Frohlich, 2006) and thus are likely to differ across these three categories. As a consequence, customers will have different requirements for MC service delivery and will value different channel attributes.

It has been shown that customers rank channels differently in terms of their ability to meet their requirements (Black et al., 2002; Wallace et al., 2004). In general, while virtual channels tend to offer increased convenience, transactional efficiency, information availability and accessibility, the physical channels typically rank higher in terms of the richness and complexity of customer interaction, security factors and the ability to touch and

test the product (e.g. McKnight, Choudhury, & Kumar, 2002). Channels also differ in their abilities to support various service outputs, i.e. they do not perform similarly in delivering diverse service/product attributes (Coelho & Easingwood, 2004). As a consequence, it is no surprise that Table 1 shows channel attributes as a fourth relevant category affecting customer channel behaviour.

Online customers in an MC e-service typically use both online and traditional channels when interacting with their service provider (Kumar & Venkatesan, 2005). Based on the findings that channels differ in how they can meet diverse customer requirements, one would expect to observe different patterns of channel behaviour across customers of MC e-services.

The impact of e-service quality on customer channel behaviour

Surprisingly few studies have explicitly examined the effect of the quality of service delivered through multiple channels as a determinant of customer channel behaviour. Verhoef et al. (2007) consider the quality of the service delivered by a channel, but only the effects of the narrower aspects of customer service rather than service quality proper. Montoya-Weiss et al. (2003) and Falk et al. (2007) found that the quality of the offline service negatively affected the intentions to use the online service. However, in these three studies the impact of e-service quality on channel behaviour was not addressed.

We argue that e-service quality dimensions may affect how customers use multiple channels. As seen above, channel attributes are one important category of factors affecting customer channel behaviour. Although several of the attributes listed in Table 1 are related to the nature of the channel medium (or technology), and thus impose restrictions on managerial discretion, many are not deterministically fixed by the channel medium. Several of the channel attributes in Table 1 are associated with e-service quality. For example, information availability is associated with information quality; pursuit of efficiency is associated with ease of use; risk is associated with privacy/security; convenience and waiting time are associated with fulfillment. Thus, e-service quality can be seen as a moderator of perceived channel attributes and therefore could potentially be used by Operations managers to influence customer channel behaviour.

Specifically, we argue that, post adoption, e-service quality may affect the proportion of total service interactions apportioned by customers to the Internet, at the expense of other channels. Several studies have reported channel substitution effects resulting from e-service quality. Verhoef et al. (2007) showed that increased quality-related dimensions of 'service' and 'privacy' leads to increased use of the Internet channel at the expense of the physical store. van Birgelen et al. (2006) proposed that customers evaluate multiple channels against one another. Their study in banking found that customer satisfaction with simple/routine on-line service interactions reduced the value that customers derived from similar service interactions delivered via physical branches. Finally, based on customer behaviour towards risk, Bendoly, Blocher, Bretthauer, Krishnan, and Venkataramanan (2005) proposed that when customers experience service failures in one channel (i.e. poor service quality), alternative channels may appear more appealing. Their empirical study in retail services showed that the rate of product availability on the Internet channel was negatively related to customer use of the physical stores. We therefore put forward the following hypothesis:

H2: In an MC e-service provider perceptions of e-service quality are positively related to the proportion of total interactions apportioned by customers to the Internet channel.

Methodology

The study was based on data from a major retail e-banking service, which was part of a broader MC banking service. The chosen bank (in Portugal) had about 600,000 customers at the time of the study and employed physical branches, phone and Internet as its main channels. The study used several sources of data for the relevant research variables: (i) an online questionnaire administered to a sample of active customers of the e-service (variables: e-service quality perceptions, e-loyalty intentions); (ii) transactional data collected from the bank's back-office IT systems, which record all customer transactions across all available channels (variables: customers' degree of channel use and a control variable related to e-service use (experience)); (iii) demographic data collected from the bank's customer database (control variables: age, gender and education).

Measurement

In order to measure *e-service quality perceptions*, we drew on Zeithaml et al.'s (2002) five proposed dimensions: (i) information availability and content (information quality); (ii) ease of use; (iii) privacy/security; (iv) graphic style; and (v) fulfillment. We compiled a list of measurement items to capture these dimensions and 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 dimensions in the context of an e-banking service. Selecting only one item per dimension ensured that we arrived at a parsimonious set of items, a necessary requirement in our research. During these discussions, we considered it important to break the fulfillment dimension into two separate dimensions – reliability and responsiveness – because deficiencies in these two areas require corrective actions of different natures.

Following previous approaches that have conceptualised the construct of overall e-service quality as formative rather than reflective (e.g. Collier & Bienstock, 2006; Wolfinbarger & Gilly, 2003), we considered an aggregate e-service quality index made up of six formative indicators representing the following dimensions: information quality, ease of use, privacy/security, graphic style, reliability and responsiveness. Appendix 1 shows the six indicators of e-service quality, their general descriptions and the items that were chosen to measure them (Q1–Q6). The reliability and validity of the individual items as indicators of the e-service quality dimensions were ascertained through the test–retest method.

We drew on Oliver's (1999) definition of conative loyalty to measure *loyalty towards an e-service* (web site) by the following reflective items: (L1) the intention to re-use the e-service (web site) and (L2) word of mouth recommendation (see Appendix 1). Similar scales have been commonly used in service quality research (e.g. Boulding et al., 1993).

In order to characterise a customer's *channel-use pattern*, we focused on the set of transactions simultaneously available on the main three channels: Internet, branch and phone. This set comprised the large majority of transactions available online, given that virtually all of these were also available on the other channels. We considered four variables related to a customer's channel-use pattern (see Appendix 1). Transaction Volume (TVOL) was measured by the total number of transactions that were performed by a customer on the three channels during the month immediately after the questionnaire was removed from the web site. CInt (Internet), CPh (Phone), CBr (Branch) were measured by the proportion of total transactions (TVOL) that were performed by a customer through the respective channel.

Data collection

The bank's staff collected the data from the bank's customer database and back-office systems following the researchers' instructions. The remaining data were collected via online questionnaire administration to a sample of the service's customers. The sample included light and heavy users of the Internet channel, but purposefully excluded those who either did not use the Internet at all or did so to a negligible extent. This was operationalised by targeting customers fulfilling the following criteria: customers having made at least two logins to the service in the previous 3 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 was active on the site for 1 month, resulting in 5942 valid responses (16.6% response rate). The final sample is characterised in Table 2. The customers were predominantly male, young and educated, in line with the profiles observed for general Internet users (e.g. Eurostat, 2009). On average, customers conducted a substantial portion of their transactions through the Internet (90.3%), followed by the branch (7.5%) and the phone (2.2%). Customers were reasonably experienced with the e-service (first login done on average about 600 days before) and engaged in frequent e-service use (average of 82.6 logins in the previous 6 months – 13.8 logins per month). We compared respondent and non-respondent profiles across the variables in Table 2, using *t*-tests. We found no significant differences, indicating the absence of non-respondent bias.

Measurement model

The e-service quality index was successfully validated employing the procedures in Diamantopoulos and Winklhofer (2001) and was subsequently computed by the average

Table 2. Characterisation of the final sample ($n = 5942$).

Variable	Mean
<i>Gender</i>	
Male	72.0%
Female	28.0%
<i>Age</i>	
18–25	9.4%
25–35	44.8%
35–45	22.1%
45–55	14.2%
55+	9.5%
<i>Education</i>	
Primary education	3.4%
Secondary education	37.9%
Higher education (Bachelor's degree and above)	58.7%
<i>Pattern of channel use (% of transactions)</i>	
Internet (CInt)	90.3%
Phone (CPh)	2.2%
Branch (CBr)	7.5%
Experience with e-service (days since first login)	603.2
Frequency of use of e-service (no. logins in previous 6 months)	82.6

of the six indicators (Table 3). We used confirmatory factor analysis to check the validity and reliability of the e-loyalty scale (Table 3). The average variance extracted (AVE) of the scale was above 0.5, which supports convergent validity, and the respective AVE square root was greater than any pairwise correlations, suggesting adequate discriminant validity (Fornell & Larcker, 1981). Composite reliability (CR) above 0.7 indicated the scale was reliable (Bagozzi & Yi, 1988). A Harman single factor test was conducted and suggested that common method variance was not a problem (McFarlin & Sweeney, 1992).

Analysis and results

Hypothesis H1

We tested hypothesis *H1* through hierarchical regression analysis. We regressed controls and the independent variable (e-service quality) on e-loyalty intentions. The first step included the control variables of age, gender, education and experience. In the second step, the independent variable was entered and the hypothesis tested based on the significance of the regression coefficient and *F*-change statistic. Table 4 presents the regression coefficients. E-service quality perceptions have a significant and strong impact on e-loyalty intentions, thus providing support for *H1*. Demographics have a weak but significant effect, with older and female customers exhibiting higher levels of e-loyalty intentions. Experience has a weak but significantly negative effect on e-loyalty intentions.

Hypothesis H2

We conducted two sets of analyses to examine this hypothesis. First, we carried out cluster analysis to identify and characterise the patterns of customer channel use. Second, we employed hierarchical regression to formally test *H2*.

Cluster analysis of customers involved the three channel-use variables (CInt, CPh, CBr) and followed the procedures outlined in Hair, Anderson, Tatham, and Black (1998). First, we performed hierarchical cluster analysis with Ward's method and squared Euclidean distances. The examination of variation in the agglomeration coefficient suggested a two cluster solution. Second, we employed non-hierarchical methods to adjust the results from the hierarchical analysis. The clusters resulting from this analysis were quite similar to the hierarchical solution, confirming that the two-cluster solution is adequate.

Table 5 describes the two-cluster solution, which shows that clusters are significantly different across the three clustering variables. There is a large (91% of the sample) group

Table 3. Scale statistics.

	Mean	Std. dev	Standardised path loadings	CR	AVE	Correlations	
						1	2
1. <i>E-service quality</i>	4.1	0.5		–	–		0.536
2. <i>E-loyalty intentions</i>	8.3	1.6		0.796	0.661		(0.813)
L1			0.847				
L2			0.778				

Notes: *n* = 5942. AVE square root is in bold and parentheses.

Table 4. Hierarchical regression analyses on e-loyalty intentions (*H1*).

Variable	E-loyalty	
	Model 1	Model 2
Age	0.084***	0.067***
Gender	−0.083***	−0.067***
Education	−0.023	−0.021
Experience	−0.015	−0.036*
E-service quality		0.482***
<i>F</i> -change	12.167***	1217.502***
<i>R</i> ²	0.012	0.243
Adj. <i>R</i> ²	0.011	0.242

Notes: *n* = 5195. Standardised coefficients are shown.

**p* < 0.05.

***p* < 0.01.

****p* < 0.001.

Table 5. Results of the cluster analysis.

Cluster	Clustering variable mean values			Cluster size	Interpretation
	CInt	CPh	CBr		
1	0.49	0.11	0.40	467 (9% of sample)	Multi-Channel
2	0.94	0.01	0.04	4686 (91% of sample)	Internet-Focused

Note: Cluster differences are all significant at *p* < 0.000.

of customers with high use of the Internet channel (94%) and low use of the other channels (IF customers); and a relatively small group of customers who display a balanced use of the Internet (49%) and branch (40%), complemented with a moderate/low use of the phone (11%) (MC customers).

In order to have a better understanding of the two clusters, we profiled and compared them on additional variables: demographics (age, gender, education), experience with the e-service, transaction volume, e-service quality perceptions and e-service loyalty behavioural intentions (Table 6). IF customers tend to be younger, more highly educated, more experienced and display a higher transaction volume than MC customers. These differences are in line with the general profile of Internet users (Hitt & Frei, 2002), which reinforces the cluster solution's validity and practical significance. Interestingly, there are no significant differences in e-service quality perceptions between the two groups. However, MC customers seem to exhibit somewhat higher levels of e-loyalty intentions.

We tested hypothesis *H2* through hierarchical regression analysis. We regressed controls and the independent variable (e-service quality) on logit transformations of the three channel-use pattern variables, CInt, CPh and CBr. The first step included the control variables of age, gender, education and experience. Next, the independent variable was entered and the hypothesis tested based on the significance of the regression coefficients and *F*-change statistics. Table 7 presents the regression coefficients.

The results show that the impact of e-service quality perceptions on the three channel-use variables is not significant. As such, we find no support for *H2*. Age has a weak but

Table 6. Profile of the 2-cluster solution.

Profiling variables	Cluster 1	Cluster 2	Difference in means (1–2)	Significance level
	MC ($n = 467$)	IF ($n = 4686$)		
Age				
Mean	40.09	36.6	3.49	0.000*
Std. dev	12.66	11.25		
Gender				
Mean	0.73	0.72	0.01	0.594
Std. dev	0.44	0.45		
Education				
Mean	2.63	2.81	–0.18	0.001*
Std. dev	0.97	1.02		
Experience				
Mean	564.46	607.98	–43.52	0.000*
Std. dev	278.54	246.16		
Transaction volume				
Mean	31.40	46.81	–15.41	0.000*
Std. dev	23.08	34.32		
E-quality				
Mean	4.12	4.11	0.01	0.749
Std. dev	0.46	0.49		
E-loyalty intentions				
Mean	4.21	4.13	0.08	0.033*
Std. dev	0.74	0.79		

*Differences significant at the 0.05 level.

Table 7. Hierarchical regression analyses on pattern of channel use ($H2$).

Variable	CInt	CPh	CBr
<i>Model 1</i>			
Age	–0.063***	–0.065***	0.114***
Gender	0.009	–0.022	0.012
Education	0.052***	–0.048**	–0.019
Experience	0.037**	0.013	–0.042**
F -change	7.592***	7.766***	15.023***
R^2	0.008	0.008	0.015
Adj. R^2	0.007	0.007	0.014
<i>Model 2</i>			
Age	–0.062***	–0.066***	0.114***
Gender	0.009	–0.021	0.013
Education	0.052***	–0.048**	–0.019
Experience	0.038**	0.013	–0.043**
E-quality	–0.014	0.005	0.007
F -change	0.732	0.104	0.222
R^2	0.008	0.008	0.015
Adj. R^2	0.007	0.007	0.014

Notes: $n = 5133$. The dependent variables were subject to a logit transformation. Standardised coefficients are shown.† $p < 0.10$.* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

significant effect, favouring the use of the branch and decreasing the use of the remote channels (Internet and phone). Education has a weak but significant effect, favouring Internet use and decreasing the use of the other channels. Experience has a weak but significant effect, favouring Internet use and decreasing branch use. Collectively, these results are consistent with the profiling of the previously uncovered IF and MC clusters of customers (Table 6).

Discussion

The study provides empirical evidence for a strong relationship between e-service quality and e-loyalty behavioural intentions (*H1*). Our results concerning an information-based e-service are broadly in line with previous research findings which have mostly addressed online retail contexts. 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 shows that active customers of MC e-services could be categorised into two basic groups of customers who exhibit different channel behaviour patterns: IF and MC customers. The IF group comprised a large portion of customers, who were found to be younger, more highly educated, more experienced and displaying a higher transaction volume than MC customers. These findings are fairly consistent with those of McGoldrick and Collins (2007), who identified four different clusters of customers in retailing: three of them were focused on one of the considered channels (store, Internet and catalogue) and the fourth consisted of customers displaying a balanced use of the different channels.

Interestingly, MC customers seem to exhibit somewhat higher levels of e-loyalty intentions than IF customers (Table 6), i.e. although they rely less strongly on the Internet channel, they seem less likely to switch to a competitor's e-service. This occurs despite there being no differences in e-service quality perceptions between the two groups. One possible explanation for this finding may be that the integrated use of multiple channels and/or the use of channels with increased human interaction create lock-in effects to the service provider as a whole which extend to the online channel. This is consistent with previous findings that suggest that general MC strategies lead to increased customer retention (Kumar & Venkatesan, 2005) and that increased Internet usage may erode loyalty, for example, by lowering switching costs (Ansari et al., 2008). Although our study has not addressed how e-loyalty intentions change when a customer's channel-use pattern changes, firm strategies of migrating transactions to the Internet channel could be seen as resulting in an increase in the number of customers with a profile similar to our IF group, at the expense of MC customers. Under this premise, our results indicate that such moves may lead to decreasing levels of e-loyalty intentions.

Finally, our study found no support for the impact of customer perceptions of e-service quality on channel behaviour (*H2*). Given the large sample size and the corresponding enhanced power of the statistical tests, this strongly suggests that this relationship does not hold or is of negligible strength. Thus, although e-service quality seems to play a key role as a driver of e-loyalty intentions (*H1*), once a customer is an active e-service user, quality has no influence on how the customer apportions transactions across the available channels (*H2*). This is a highly counterintuitive result and is contrary to prevailing theory which suggests that e-service quality dimensions can impact channel behaviour.

Considering previous research and our findings, the lack of support for *H2* may be explained by the fact that, within the context of a given service provider, channel behaviour is mainly determined by other factors that override e-service quality effects (previously discussed intrinsic customer and channel attributes). Thus, once a customer

adopts a certain pattern of channel behaviour (determined by factors such as channel preferences) his/her channel behaviour may become less sensitive to variations in e-service quality. This is consistent with the zone of tolerance theory from traditional services. The zone of tolerance separates the 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) (Johnston, 1995). The associated theory posits that customers may accept variation in performance within this zone, and any increase or decrease will only have a marginal effect on behaviour. Parasuraman, Berry, and Zeithaml (1991) suggest that when customers perceive the absence of alternative suppliers, their zone of tolerance is wider. Therefore, once a customer adopts his/her preferred pattern of channel behaviour, he/she may not consider other patterns as adequate alternatives, thus exhibiting a wide zone of tolerance for e-service quality.

Past studies have suggested that reducing service quality in physical channels has a two-pronged effect: (i) it motivates customers to migrate interactions to the Internet channel; but (ii) it reduces overall customer loyalty to the service provider (Falk et al., 2007; Montoya-Weiss et al., 2003). Our results suggest that, concerning channel behaviour, the effects of variation of service quality in the online channel do not seem equivalent to those in physical channels. Specifically, the results concerning variation of e-service quality lend support for the second effect, but not the first. This seeming lack of symmetry of service quality effects across channels is a novel result. One possible explanation may be that customers do not treat channels as equivalent alternatives for service delivery, even though they could eventually perform most of their transactions through any of the channels. This is consistent with Falk et al.'s (2007) view which considers the physical channels as primary channels or status quo channels and the Internet as a new alternative. They propose that when customers face multiple options to choose from, they tend to stick with the status quo alternative. In the context of our study, this would imply that only large e-service quality variations would break this inertia barrier and result in customer channel behaviour changes.

Conclusions

Increasingly quality management of services takes place in multiple channels. The study examined the two-pronged impacts of e-service quality on customer behaviour within the context of a given MC e-service: the impact on e-loyalty behavioural intentions and the impact on customer channel behaviour. These impacts seem to be differentiated: while e-service quality does not impact channel behaviour, it nevertheless can prevent customers from switching to an alternative e-service provider. The findings suggest that, for example, a customer with a strong intrinsic preference for the Internet channel (e.g. due to this channel's attributes, such as convenience), would not change his/her channel behaviour due to online service quality changes. However, this same customer would potentially be a candidate for switching to the online service of a competitor, given his/her strong preference for this channel. In this case, e-service quality can act as a powerful managerial tool against defection.

The study contributes to research in e-service quality management in several ways. First, it provides an increased understanding of a relatively unexplored area, the post adoption customer channel behaviour in a given MC service, i.e. how customers apportion their transactions across the different available channels. Specifically, we identified and profiled two different online customer groups in terms of channel behaviour: a large group of IF customers and a relatively small group of MC customers. Hence, the study contributes

to the research stream investigating customer heterogeneity on the web (e.g. Boyer & Frohlich, 2006; Sousa, Yeung, & Cheng, 2008) and answers calls for a deeper understanding and characterisation of patterns of channel behaviour (Neslin et al., 2006).

Second, our study pioneers the examination of the impact of the quality of Internet delivered services on customer channel behaviour in the context of a given service provider. The observed absence of impact is in contrast to several studies which found that variation of service quality in physical channels affected the pattern of channel use (Falk et al., 2007; Montoya-Weiss et al., 2003). Therefore, it appears that there is no symmetry of the effects of the quality of service delivered through physical channels and the Internet.

Our study also has a number of implications for practice. First, our results reinforce the need for e-service providers to invest in high quality in the design and operation of e-services to drive e-loyalty, paying attention to dimensions such as privacy/security, information quality, ease of use, graphic style, reliability and responsiveness.

Second, our study provides insights into influencing customer channel behaviour. We found that MC customers are older, less educated, less experienced and display a lower transaction volume than IF customers. Therefore, increasing the Internet focus of MC customers may imply familiarising them with the technology, e.g. by taking advantage of their visits to the branch for providing training and support, raising the visibility of the online channel (e.g. via marketing communication on online service benefits) or offering price incentives (e.g. reduced costs or promotions in the online channel).

Finally, our study indicates that increasing e-service quality is not, or is no longer, an effective lever for migrating customer interactions to the Internet channel. At best, it would require a large jump in e-service quality to actually change customer patterns of channel use. Once e-service quality reaches a level that ensures adequate e-loyalty, further increasing quality efforts to drive transactions away from other channels to the Internet may be uncalled for. Thus, other means need to be employed (see above). Another implication is the possibility that this migration, an increase in the proportion of activity on-line, leads to a reduction in e-loyalty. As a consequence, this negative effect needs to be carefully weighed against the potential cost savings. To some extent, this compromise seems to have been recognised by practitioners in the banking industry. Many MC banks engaged in such initiatives have been careful not to curtail channel choice too drastically as well as not to totally disengage customers from branches. Branches facilitate the sale of value-added services and act as key anchors for customer retention and competitive advantage (Al-Hawari, Ward, & Newby, 2009).

Our investigation was based on one service industry, e-banking, an important type of service in today's e-service landscape. We believe that our findings can be generalised to other task-oriented, information-based e-services, but caution must be exercised in extending this study's conclusions to other services. It may be important for future research to test the developed hypotheses in other types of e-services. The absence of impact of e-service quality on channel behaviour was a surprising result. Future research should attempt to explore further this finding, for example, by testing the zone of tolerance theory as a potential explanation.

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Appendix 1. Measures of Research Variables and Data Sources

E-Service Quality (source: online questionnaire)

Indicators ^a	General Description ^a	Measurement Items ^b
1. Privacy/Security	Protection of personal information, risk of fraud and financial loss.	Q1. Safety in performing transactions.
2. Information Quality	The suitability of the information to the user's purposes.	Q2. Correct and up to date information about the bank's products and services.
3. Ease of Use	Effort of the end users in using the web site.	Q3. Ease of performing banking operations and accessing information.
4. Graphic Style	Presentation of graphics and text on the web site.	Q4. Visual attractiveness of web site.
5. Reliability	Ability to perform the promised service dependably and accurately.	Q5. Requests/instructions correctly processed.
6. Responsiveness	Speed of response.	Q6. Speed in delivering the services.

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

^bThe 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'.

E-Loyalty Intentions (source: online questionnaire)

(5-point Likert-type scale: '1 – Strongly disagree'; '5 – Strongly agree')

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.

Pattern of use of channels (TVOL, CInt, CPh, CBr) (source: bank's back-office IT systems)

Transaction Volume (TVOL). The total number of transactions available through the three channels that were performed by a customer during the month immediately after the questionnaire was removed from the web site.

CInt/CPh/CBr. The proportion of total transactions (TVOL) that were performed by a customer through the Internet/Phone/Branch, respectively.

Control variables

Customer demographic variables (source: customer database):

AGE

GENDER (0-Female; 1-Male)

EDUCATION (1-Primary Education; 2-Secondary Education; 3-Higher Education (Bachelor's degree and above)).

Experience in using the e-service (source: bank's back-office IT systems):

EXPERIENCE. Number of days elapsed since a customer's first login to the service. The 'present' date (the end date for the period in question) was taken to be the last day on which the questionnaire was active on the web site.