

Purchasing behaviour in an online supermarket: the applicability of E-S-QUAL

Abstract

Purpose: The purpose of this paper is twofold: (i) to assess the applicability of the four dimensions of online service quality as proposed in the E-S-QUAL scale to the setting of an online supermarket; and (ii) to propose and test a model that links these e-quality dimensions with loyalty and purchasing behaviour in the setting of an online supermarket.

Design/methodology/approach: An online questionnaire is used to survey 131 customers of an online Spanish supermarket using the E-S-QUAL scale. The data are analysed by exploratory factor analysis to: (i) test the applicability of the E-S-QUAL scale to the setting of an online supermarket; and (ii) generate an extended model (including constructs for 'perceived value', 'loyalty' and 'actual purchases'). The model is then checked by structural equation modelling (SEM).

Findings: The four dimensions proposed by the E-S-QUAL scale are confirmed in the setting of an online Spanish supermarket. The influence of these various quality dimensions on perceived value, loyalty, and actual purchases are delineated.

Practical implications: The study reassures online vendors that E-S-QUAL is an appropriate instrument by which to measure online service quality. The study also provides empirical evidence that high levels of e-service quality have a positive influence on purchasing behaviour.

Originality/value: The study is the first to provide definitive empirical evidence of the commonly presumed linkage between the quality dimensions proposed in the E-S-QUAL scale and the constructs of loyalty and actual - not self-reported - purchase behaviour.

Key words: Internet; electronic commerce; electronic service quality; E-S-QUAL

Paper type: Research paper

1. Introduction

The well-known SERVQUAL instrument (Parasuraman *et al.*, 1985, 1988, 1991) has become one of the most widely used generic measures of service quality. More recently, Parasuraman *et al.* (2005) have developed a new instrument, known as 'E-S-QUAL', to assess service quality in the context of electronic commerce (e-commerce). The E-S-QUAL scale is composed of 22 items arranged in four dimensions for measuring the service quality delivered by online retail websites. Although this scale has been in existence for only a few years, it has nevertheless sparked debate in the literature with regard to its efficacy (Kim *et al.*, 2006; Ingle and Connolly, 2006; Connolly, 2007; Boshoff, 2007).

The purpose of the present study is to explore and clarify some aspects of this debate. In general, criticism of E-S-QUAL has focused on the interrelated issues of its structure and its applicability to various settings. Questions have been raised about the number and nature of the dimensions of service quality proposed in the instrument (Boshoff, 2007; Collier and Bienstock, 2006), while other authors have noted that there are few reports of practitioners having actually applied the measure (Boshoff, 2007; Kim *et al.*, 2006; Ingle and Connolly, 2006).

In addition, the present authors note that, whatever the merits of the E-S-QUAL scale, it is of interest that there are few (if any) studies that have established an empirical link between service quality and actual sales in the online environment. Although some studies have proposed models linking e-quality with loyalty (Chiou and Shen, 2006; Enzmann and Schneider, 2005; Ribbink *et al.*, 2004), none appear to have established a definite link between online service quality and actual purchases.

The objectives of the present study are therefore twofold:

1. to explore the suitability of E-S-QUAL for application in a particular e-commerce setting (an online Spanish supermarket); and
2. to analyse how website quality impacts upon customer loyalty and actual e-sales.

The structure of the paper is as follows. In the next section we discuss the literature and the development of the research model and hypotheses tested in the study. This is followed by a section outlining the methodology used in the research. Section four reports on the findings of our analysis, including factor analysis, PLS and tests for validity and reliability of the structural model. The penultimate section discusses the findings and provides juxtaposition with the literature. Finally, the last section rounds off with conclusions, including implications for future research and practice in this area.

2. Literature and research model

E-S-QUAL (Parasuraman *et al.*, 2005) was not the first attempt to establish a measurement scale of various aspects of e-commerce service. According to several reviews of the literature in this area (Cristóbal and Marimon, 2007; Li and Suomi, 2007; Barnes, 2006), the pioneers in assessing website quality have been Barnes and Vidgen (2000, 2002) and Loiacono *et al.* (2000, 2007). Each of these research teams developed their own scale separately, and both called it 'WEBQUAL' (although it was the latter who formally registered the term). However, as Kim *et al.*, (2006) have pointed out, both of these scales focus on the user experience and technical quality of websites, rather than on the quality of the entire service provided. Other significant contributions in this emerging area of research have been made by Yoo and Donthu (2001), who developed the so-called 'SITEQUAL' scale, and Van Riel *et al.*, (2001), who identified three dimensions that can be used to evaluate overall customer satisfaction and intention to use a website again in the future.

This stream of research on e-quality has evolved in parallel with a marked increase in online sales, which has triggered a growing interest in the measurement of the quality of online services. Web presence and low prices were previously believed to be key drivers of success (Yang and Fang, 2004); however, it has become apparent more recently that this is not enough (Kim *et al.* 2006). In these circumstances, instruments such as E-S-QUAL might have been expected to attract interest among e-commerce vendors who wish to make an accurate assessment of the quality they are providing to their customers. However, several authors have noted that there are

few reports of practitioners having actually applied the measure (Boshoff, 2007; Kim *et al.*, 2006; Ingle and Connolly, 2006).

The E-S-QUAL scale (Parasuraman *et al.*, 2005) is composed of 22 items arranged in four dimensions for measuring the service quality delivered by online retail websites. The four dimensions are:

- *efficiency*: ease and speed of accessing the site (8 items);
- *system availability*: reliable technical functioning of the site (4 items);
- *fulfilment*: the extent to which the site's promises about order delivery and product availability are fulfilled (7 items); and
- *privacy*: the degree to which the site is safe and protects customer information (3 items).

Some academics have expressed concerns about the scale. In particular, Boshoff (2007) has contended that a six-factor configuration provides a better explanation of e-commerce service quality than the original four-factor model of Parasuraman *et al.* (2005). Four of Boshoff's (2007) factors were quite close to the original model, but two new ones have also been postulated by splitting the original 'fulfilment factor' into two factors (called 'delivery' and 'reliability'). However, despite these misgivings, Boshoff (2007) has acknowledged that E-S-QUAL is, in general, a useful tool.

Other authors, such as Connolly (2007), have concluded that the E-S-QUAL model is useful in a variety of situations. Collier and Bienstock (2006) also applauded E-S-QUAL as an important step in conceptualising e-service quality, although they proposed a wider model with some new constructs; their main objection was that E-S-QUAL uses only 'reflective' indicators, whereas they contended that e-service quality is made up of 'formative' indicators.

Given that the instrument is quite recent, debate about its utility is to be expected, both within the academic field and among e-business practitioners as well. It is apparent that further research and practical testing of this instrument is required.

Whatever the merits of the E-S-QUAL scale, it is of interest that few (if any) studies have linked e-commerce quality with e-commerce sales. There are some studies that have proposed models linking e-quality with loyalty (Chiou and Shen, 2006; Enzmann and Schneider, 2005; Ribbink *et al.*, 2004), but it is difficult to find any literature that attempts to explain whether (and how) quality impacts on actual purchases. For example, Huang (2008) found that loyalty to a web-based travel agency resulted in an increased *intention* to purchase from that agency, but the author had nothing to say about *actual* sales.

2.1 Research model

Drawing on E-S-QUAL and the work of Boshoff (2007), who hypothesised relationships between the previously identified dimensions of e-service quality ('efficiency', 'system availability', 'fulfilment', and 'privacy') and the constructs 'perceived value' and 'loyalty', we extend the model to include 'actual purchases' (Figure 1).

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Figure 1: Hypothesised relationships between the dimensions of e-service quality and the constructs 'perceived value', 'loyalty', and 'actual purchases'

The hypotheses can be summarised as follows:

Hypothesis H1: Higher levels of efficiency in a website are positively related to higher levels of perceived value.

Hypothesis H2: Higher levels of system availability in a website are positively related to higher levels of perceived value.

Hypothesis H3: Higher levels of fulfilment in a website are positively related to higher levels of perceived value.

Hypothesis H4: Higher levels of privacy in a website are positively related to higher levels of perceived value.

Hypothesis H5: Higher levels of perceived value in a website are positively related to higher levels of loyalty with regard to that website.

Hypothesis H6: Higher levels of loyalty with regard to a website are positively related to higher levels of actual purchases on that website.

The first five hypotheses are similar to the Boshoff (2007) model. For the sixth hypothesis, the present study added a new dependent variable ('actual purchases'), which has not been reported on previously in e-service research.

3. Methodology

3.1 Data collection and sample

The setting for the research is a Spanish supermarket, *Plusfresc*, who provides an online ordering system to its customers. *Plusfresc* is a supermarket chain with over 75 years of history which currently has 69 shops and more than 850 workers. It is the leader in sales in the local area where it operates, with more than 150,000 customers per week and a turnover of €113 million in 2007. The supermarket has a long and substantial history of innovation and customer orientation. In 1996, it introduced its loyalty card *Plusi*, the first customer marketing card in Catalonia. In 1998, *Plusfresc* won the "Global Electronic Marketing Award" in the United States for the best electronic marketing programme presented by a non-American company. Following this trajectory of technology adoption, in 2001 *Plusfresc* developed its online presence and by 2007 was getting more than 16,600 visits, resulting in 4,284 orders with an average expenditure of €111.5. Although online sales, at €479,231, are a relatively small part of total turnover they are recognized as a growth area for sales and a strategic capability for *Plusfresc*.

The E-S-QUAL instrument (Parasuraman *et al.*, 2005) was adapted for application in the case studied here. Table 1 provides a list of the quality dimensions (and their items) used in the present study. As in the original E-S-QUAL model, responses were recorded on 5-point Likert-

type scales with anchors of 1 = strongly disagree and 5 = strongly agree. Responses to the items constituting ‘perceived value’ and ‘loyalty’ were made on a 5-point Likert-type scale with anchors of 1 = poor and 5 = excellent.

Take in Table 1 about here

Table 1: Questionnaire factors and items for service quality (adapted from E-S-QUAL)

Only two slight modifications to items (both within the dimension of ‘fulfilment’) were made from the original E-S-QUAL scale. The supermarket delivers customer orders daily on a fixed delivery schedule with a failure rate close to zero. To reflect this operating environment item FUL3 was removed and item FUL7 was reworded to assess delivery convenience rather than delivery forecast accuracy.

Table 2 shows the items used for ‘perceived value’ and ‘loyalty’ (the same that were used in Parasuraman *et al.*, 2005), with the same Likert scale from 1= strongly disagree to 5 = strongly agree.

Take in Table 2 about here

Table 2: Items for constructs ‘Perceived value’ and ‘Loyalty’

Respondents were uniquely identifiable through their customer id. This allowed each respondent to be linked to their actual purchases at *Plusfresc*. Data made available by *Plusfresc* included the number of orders a customer made and the total amount (value) of those purchases. The purchase data was categorised into PUR1 (number of purchases) and PUR2 (value of purchases) as in Table 3. Each item was grouped as: (i) five possible answers for number of purchases; and (ii) five possible answers for total monetary amount. This operationalization of the actual purchases construct reflects both the value and frequency of purchases made.

Take in Table 3 about here

Table 3: Items for ‘Actual purchases’

The questionnaire was distributed to all 413 online customers of the supermarket using a specific webpage designed for the purpose. Since the population was not large, all respondents were encouraged to answer the questionnaire by the provision of a small reward to each. As a result, 131 valid responses were received, which implies an acceptable response rate of 31.7%. For instance, Boshoff (2007) in his study devoted to assessment of the E-S-QUAL scale obtained a response rate of 20.4%. Manfreda *et al.* 2008 have specifically analyzed the response rates in web surveys. They compared 45 studies and the response rates were between 11.3% and 82.1%, with an average of 32.6% and a standard deviation of 17.3%. Roster *et al.* (2004) also obtained a similar rate in their study comparing response rates between web surveys and telephone surveys: 32.6% for web surveys and 40.5% for telephone surveys. Thus, overall, our response rate compares favourably with similar studies.

The demographic characteristics of the sample are summarised in Table 4. A gender bias (75.6% female) was detected. Almost half (48.1%) of the respondents were aged between 35 and 44 years. This represents a higher percentage than in the total population of the online buyers in *Plusfresc*, and consequently older buyers were under represented. This is also detected in the Boshoff study. The educational level of the sample was high, with more than half (57.3%) of the sample having a university degree. This kind of bias was also detected in the Parasuraman *et al.* (2005) study and in Boshoff (2007). To place our study in context, consider the following population data. The latest study of B2C e-commerce published by the Spanish Ministry of Industry, Tourism and Trade (2008) shows that online shoppers in Spain were 40.5% female in 1997, with 40.2% aged between 25 and 35 years and 36.5% with a University degree.

Take in Table 4 about here

Table 4: Demographic characteristics of the response sample and the population of online shoppers of *Plusfresc*

4. Findings

An array of exploratory factor analysis taking the items of Table 1 was conducted to identify the quality dimensions formed from our data. The scale was analyzed in accordance to John and Reve's (1982) and Hair *et al.* (1998) recommendations. As expected, the four E-S-QUAL dimensions appeared, although with some discrepancies from the original composition:

- Efficiency: EFF1, EFF4, EFF8
- System availability: EFF5, SYA2, SYA3, SYA4
- Fulfilment: FUL1, FUL2, FUL4, FUL5, FUL7
- Privacy: PRI1, PRI2, PRI3

The first factor is 'efficiency', which contains EFF1, EFF4, and EFF8. Item EFF5 loaded on system availability. However, closer inspection of the wording of the item ('It loads its pages fast') may explain this migration since it is understandable that this could be interpreted as being closer to the factor of 'system availability' than to that of 'efficiency'. In system availability, item SYA1 (availability) loaded almost equally on two factors and was removed. The remaining efficiency factors loaded on more than one component with item EFF6 loading equally on three factors. For fulfilment, all the items loaded with the exception of FUL6. All three privacy items loaded cleanly.

The next step was to assess the reliability of each these four quality factors (see Table 4). Acceptable levels were achieved in all criteria usually used for this purpose (Hair *et al.*, 1998). Cronbach's α and composite reliability in every case exceeded the threshold value of 0.7 for internal consistency (Nunnally and Bernstein, 1994). In addition, four factorial exploratory

analyses were performed, one for each factor, and all extracted only one factor. These findings confirmed the unidimensionality of each item to its first-order dimension.

Take in Table 5 about here

Table 5: Reliability analysis of the E-S-QUAL adapted subscales

A first-order confirmatory factorial analysis was performed using EQS software. In view of the size of the sample, a robust maximum-likelihood estimation method was chosen. The comparative fit index (CFI) was 0.945 and the root mean-square error of approximation (RMSEA) was 0.051. The fit indices shown in Table 6 are acceptable (Byrne, 1994; Hu and Bentler, 1999). The Satorra-Bentler scaled chi-square was 112.7 on 84 degrees of freedom and its probability value for the chi-square statistic was 0.02. The loads were all high (at a significance level of 0.05). The model is therefore an acceptable fit for the data.

Take in Table 6 about here

Table 6: Loads on quality factors and goodness fit statistics for E-S-QUAL adapted scale

Content validity of the scale can be assumed on the basis of the close similarity between the present scale and the original E-S-QUAL model of Parasuraman *et al.* (2005). Convergent validity was confirmed when the factor loadings of the confirmatory model were found to be statistically significant (level of 0.05) and greater than 0.5 points (Sanzo *et al.*, 2003); only one parameter was below this threshold ('EFF1'=0.471).

In summary, the first objective of this study has been realised by establishing that a scale that is very close to the generic E-S-QUAL scale is suitable for assessment of e-quality in an online supermarket. The same dimensional factors have been retained, although some unsuitable items have been removed from the original E-S-QUAL list.

4.1 Relationship between e-quality and purchases

In pursuit of the second objective of this study (an analysis of the extent to which website quality impacts upon customer loyalty and e-sales) a new construct was required: 'actual purchases'. This item was created specifically for this study because, as previously noted, there is apparently no study in the extant literature that has attempted to correlate actual purchase information with e-service quality. Two additional constructs were used: 'perceived value' and 'loyalty', based on Parasuraman *et al.* (2005), and modelled following Boshoff (2007). The analysis conducted on the four E-S-QUAL factors was also conducted on these three factors and as a result one item from perceived value, PEV1 (economy), was dropped. All the loyalty items were retained, as were items for actual purchase. Table 7 shows the reliability analysis for these constructs.

Take in Table 7 about here

Table 7: Reliability analysis of the constructs 'Perceived value', 'Loyalty' and 'Purchasing'

Structural equation modelling (SEM) was conducted using a partial least squares (PLS) procedure run in the Smart-PLS software package, which allows path modelling with latent variables (Ringle *et al.*, 2005). The PLS procedure is able to model latent constructs under conditions of non-normality and small-to-medium sample size (Compeau and Higgins, 1995). Rather than assuming equal weights for all indicators of a scale, PLS allows each indicator to vary with regard to how much it contributes to the composite score of the latent variable. Indicators with weaker relationships to related indicators and the latent construct are thus given lower weightings. A power analysis using G*Power 3.0 ($\alpha=0.05$, $\beta=0.20$) indicates that the sample size is adequate for explaining medium population effects, where $f^2 > 0.11$ (Faul *et al.*, 2007).

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Table 8: PLS summary

The analysis in Table 8 shows that four hypotheses in our original research model are accepted: H2, H3, H5, and H6. The rejection of H1 and H4 suggests that efficiency and privacy have no influence on value (at least in the context of an online supermarket).

5. Discussion

The present analysis found no relationship between efficiency and perceived value (thus rejecting Hypothesis H1). This finding represents the main difference between the present study and previous studies (Boshoff, 2007; Parasuraman *et al.*, 2005). It would seem that the difference arises from the specific context. Whereas a ‘generic’ online buyer is concerned about efficiency, a buyer in an online supermarket apparently attaches less importance to this dimension—perhaps because these customers expect that the service will be efficient in an online supermarket. Another possible explanation for anomalies in the ‘efficiency’ dimension has been suggested by Kim *et al.* (2006). According to these authors, most of the website attributes that facilitate efficient online shopping and purchasing (such as advanced search functions, comparison shopping, sitemaps, browsing instructions, order instructions, express checkouts, and e-billing) have usually been overlooked in previous studies. This observation suggests that the construct of ‘efficiency’ should (perhaps) be constituted by other items.

The present study found that ‘system availability’ had a significant impact on value, thus confirming Hypothesis H2. Parasuraman *et al.* (2005) also found that this dimension was a critical contributor to customers’ perceptions of value. This finding cannot be compared with Boshoff (2007) because this dimension was not included in his model.

The present analyses also found that ‘fulfilment’ had a significant impact on perceived value, thus confirming Hypothesis H3. Boshoff (2007) concurred with this conclusion in finding that ‘fulfilment’ was the strongest predictor of value perception in his study. Similarly,

Parasuraman *et al.* (2005) found that 'efficiency' and 'fulfilment' were the most critical (and equally important) dimensions of website service quality. The present study concurs with respect to 'fulfilment'; however, as discussed above, the present study failed to establish a relationship between 'efficiency' and 'perceived value'.

The present study rejected Hypothesis H4 (that higher levels of privacy in a website are positively related to higher levels of perceived value). This finding differed from both Boshoff (2007) and Parasuraman *et al.* (2005), both of whom confirmed this hypothesised relationship (albeit with a lower level of significance than that found in the other three quality factors). However, it should be noted that Parasuraman *et al.* (2005) observed that previous research had suggested that 'privacy' might not be a critical factor. In view of these variable findings, it is apparent that the influence of privacy on perceived value requires further investigation. The relationship might depend on the sector being analysed; for example, the cases of Amazon and Walmart, in which Parasuraman *et al.* (2005) detected a relationship between 'privacy' and perceived value, might not be typical. In addition, privacy is perhaps more of a concern for first time online customers of the supermarket and less of a concern for returning customers (of the type seen in our study) who have already built-up trust through prior transactions. Finally, other reasons, including those that are political or cultural in nature for instance, could also contribute towards explaining why 'privacy' is not linked with perceived value.

The present study found that the strongest relationship of the model was that between 'value' and 'loyalty'. This finding agrees with Boshoff's (2007) model in concluding that this relationship is very strong and significant.

Finally, this study has detected a significant influence of 'loyalty' on 'actual purchases'. This finding has important managerial implications. It provides empirical confirmation of the final link in the chain between the dimensions of e-quality and financial turnover—which had not previously been investigated in earlier studies. Although the R-squared for 'actual purchases' was quite low, which suggests that other factors might have to be included in a comprehensive model,

the existence of a relationship between 'loyalty' and 'actual purchases' has clearly been demonstrated.

6. Conclusions

This study of the applicability of the E-S-QUAL scale (Parasuraman *et al.*, 2005) to an online supermarket has confirmed that (with minor modifications) the four dimensions of the original scale are applicable to assessments of quality in this e-commerce setting. The findings of the study are thus in general accordance with those of previous authors (Connolly, 2007; Collier and Bienstock, 2006) who have endorsed the usefulness of this measurement instrument.

The present study has also demonstrated important relationships between most of the E-S-QUAL dimensions of e-service and the constructs of 'perceived value', 'loyalty', and 'actual purchases'. In particular, the dimension of 'fulfilment' has been confirmed as having an important impact on loyalty and purchasing (although the effect is mediated through 'perceived value'). In this regard it is interesting to note that established models of service quality (such as SERVQUAL) have allotted a main role to 'reliability' (understood as the ability to perform the promised service dependably and accurately) as a means of ensuring high standards of service quality; indeed, Parasuraman *et al.* (1985; 1988) contended that a company is unable to compete unless it is reliable, and Berry (1995) has argued that service companies that are unable to provide services as promised will lose customers. The dimension of 'fulfilment' in the model proposed in the present study is quite close to the notion of 'reliability'; moreover, in an online service such as that provided by a supermarket, 'fulfilment' (or 'reliability') is especially important. In this regard, it is interesting to note that most of the complaints that were registered in the present study (in an 'open box' included in the questionnaire) were related to this dimension, which demonstrates that the issue of 'fulfilment' (or 'reliability') is significant for customers of an online supermarket.

The present study also found that 'privacy' had no effect on 'perceived value' (although it might be important in other respects, such as the ability to compete). A similar finding was made

with regard to the relationship between 'efficiency' and 'perceived value'. It is acknowledged that, in studies of other sectors, 'efficiency' has been shown to affect 'perceived value'; however, in the setting of an online supermarket, so such relationship is apparent.

Finally, the study has definitely established that e-quality has an effect on actual purchase behaviour. However, it is acknowledged that there are likely to be other factors (not included in the present model) that also have an influence on sales. To our knowledge, this is the first time that a link between e-quality and actual purchases has been reported using actual purchase data rather than self-reported data.

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Figure 1: Hypothesised relationships between the dimensions of e-service quality and the constructs of ‘perceived value’, ‘loyalty’, and ‘actual purchases’

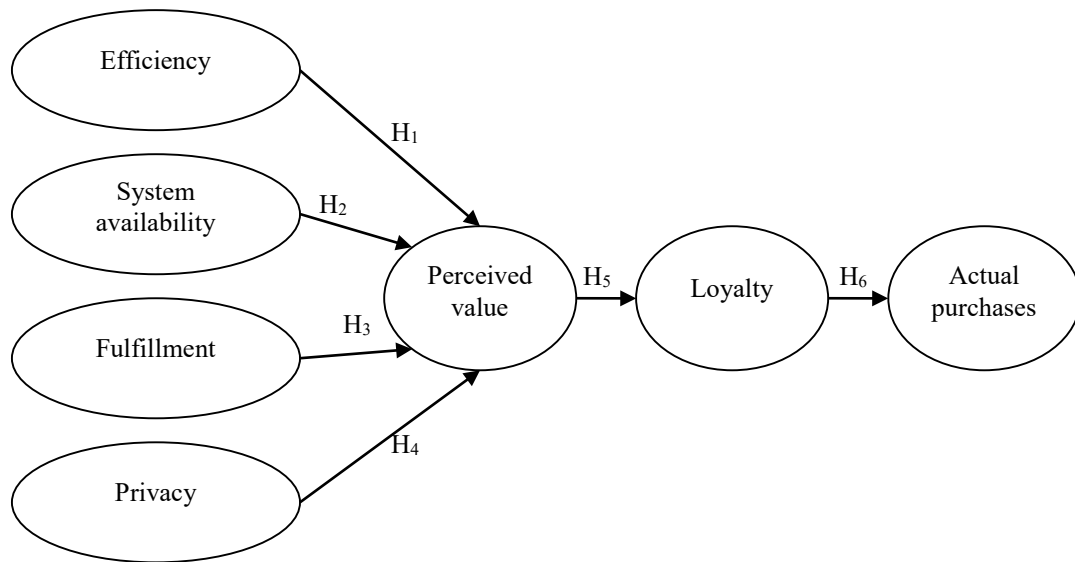


Table 1: Questionnaire factors and items for service quality (adapted from E-S-QUAL)*

Efficiency	
EFF1	This site makes it easy to find what I need.
EFF2	It makes it easy to get anywhere on the site.
EFF3	It enables me to complete a transaction quickly.
EFF4	Information at this site is well organized.
EFF5	It loads its pages fast.
EFF6	This site is simple to use.
EFF7	This site enables me to get on to it quickly.
EFF8	This site is well organized.
System availability	
SYA1	This site is always available for business.
SYA2	This site launches and runs right away.
SYA3	This site does not crash.
SYA4	Pages at this site do not freeze after I enter my order information.
Fulfilment	
FUL1	It delivers orders when promised.
FUL2	This site makes items available for delivery within a suitable time frame
FUL4	It sends out the items ordered.
FUL5	It has in stock the items the company claims to have.
FUL6	It is truthful about its offerings
FUL7	The delivery time offered to me is convenient
Privacy	
PRI1	It protects information about my Web-shopping behaviour.
PRI2	It does not share my personal information with other sites.
PRI3	This site protects information about my credit card.

*note: FUL3 in original E-S-QUAL is removed and FUL7 has been reworded to reflect the fixed delivery times of the supermarket operation

Table 2: Items for constructs ‘Perceived value’ and ‘Loyalty’

Perceived value	
PEV1	The prices of the products and services available at this site (how economical the site is).
PEV2	The overall convenience of using this site.
PEV3	The extent to which the site gives you a feeling of being in control.
PEV4	The overall value you get from this site for your money and effort.
Loyalty	
LOY1	Say positive things about this site to other people?
LOY2	Recommend this site to someone who seeks your advice?
LOY3	Encourage friends and others to do business with this site?
LOY4	Consider this site to be your first choice for future transactions?
LOY5	Do more business with this site in the coming months?

Table 3: Items for construct ‘Actual purchases’

Actual purchases	
PUR1	Number of online orders in 2007: 1 = one or two orders 2 = three or four orders 3 = between 5 and 9 orders 4 = between 10 and 19 orders 5 = 20 orders or more
PUR2	Total value of online orders in 2007: 1 = < €175 2 = between €176 and €500 3 = between €501 and €1000 4 = between €1001 and €1500 5 = > €1501

Table 4: Demographic characteristics of the response sample and the population of online shoppers of *Plusfresc*

Age category				
	Sample		Population	
	Number	%	Number	%
= < 24 years	0	0	4	1.0
Between 25 and 34 years	37	28.2	99	24.0
Between 35 and 44 years	63	48.1	165	40.0
Between 45 and 54 years	26	19.8	100	24.2
Between 55 and 64 years	3	2.3	34	8.2
= > 65 years	2	1.5	11	2.6
Total	131	100.0	413	100
Gender				
	Sample		Population	
	Number	%	Number	%
Male	32	24.4	129	31.2
Female	99	75.6	284	68.8
Total	131	100.0	413	100
Education level				
	Sample		Population	
	Number	%	Number	%
Without studies	1	0.8	5	1.2
Primary school	5	3.8	26	6.3
Secondary School	46	35.1	112	27.1
University degree	75	57.3	249	60.3
Others	4	3.1	21	5.1
Total	131	100.0	413	100

Table 5: Reliability analysis of the E-S-QUAL adapted subscales

Subscale	Items	Cronbach's alpha	Range for Cronbach's alpha removing one item	Range for correlations of the items and the sum of the subscale
Efficiency	EFF1 EFF4, EFF8	.756	.561 - .811	.449 - .659
System Availability	SYA2, SYA3, SYA4, EFF5	.887	.839 - .869	.716 - .795
Fulfillment	FUL1, FUL2, FUL4, FUL5, FUL7	.757	.682 - .733	.432 - .605
Privacy	PRI1, PRI2, PRI3	.879	.818 - .835	.753 - .778

Table 6: Loads on quality factors and goodness fit statistics for E-S-QUAL adapted scale

Efficiency	Loadings*	r ²
EFF1	.471	.222
EFF4	.773	.597
EFF8	.902	.814
System availability		
SYA2	.869	.755
SYA3	.811	.658
SYA4	.768	.590
EFF5	.810	.656
Fulfillment		
FUL1	.691	.477
FUL2	.638	.407
FUL4	.631	.398
FUL5	.529	.280
FUL7	.623	.388
Privacy		
PRI1	.828	.685
PRI2	.844	.712
PRI3	.854	.729

* These are standardized loading estimates from Confirmatory Factor Analysis. All parameters significant at $p < 0.05$

Goodness of fit statistics (Robust method)

χ^2	112.698
	(p-value = .02004)
df	84
CFI	.945
Bentler-Bonett non-normed fit index	.931
Bollen's (IFI) fit index	.947
RMSEA	.051
90% confidence interval for RMSEA	.21; .74

Table 7: Reliability analysis of the constructs ‘Perceived value’, ‘Loyalty’ and ‘Purchasing’

Subscale	Items	Cronbach's alpha	Range for Cronbach's alpha removing one item	Range for correlations of the items and the sum of the subscale
Perceived value	PEV2, PEV3, PEV4	.826	.723 - .783	.659 - .718
Loyalty	LOY1, LOY2, LOY3, LOY4, LOY5	.896	.849 - .898	.628 - .843
Purchasing	PUR1, PUR2	.958	-	.920

Table 8: PLS Summary

	Loadings						
	EFF	FUL	PRI	SYA	VAL	LOY	PUR
EFF1	0.6744**						
EFF4	0.8884**						
EFF8	0.8846**						
FUL1		0.7264**					
FUL2		0.6620**					
FUL4		0.7917**					
FUL5		0.6081**					
FUL7		0.7339**					
PRI1			0.8756**				
PRI2			0.9241**				
PRI3			0.8872**				
EFF5				0.8514**			
SYA2				0.8850**			
SYA3				0.8374**			
SYA4				0.8449**			
PEV2					0.8657**		
PEV3					0.8374**		
PEV4					0.8799**		
LOY1						0.8791**	
LOY2						0.9060**	
LOY3						0.8840**	
LOY4						0.7695**	
LOY5						0.7648**	
PUR1							0.9818**
PUR2							0.9778**
AVE	0.6755	0.5002	0.8026	0.7469	.7416	0.7014	0.9600
Cronbach's α	0.7557	0.7571	0.8792	0.8871	0.8259	0.8964	0.9584
Composite reliability	0.8602	0.8323	0.9242	0.9219	0.8959	0.9243	0.9796
R ²					0.3645	0.4301	0.0792
Path parameters estimates							
H ₁ : EFF→VAL	0.0791						
H ₂ : SYA→VAL	0.3404*						
H ₃ : FUL→VAL	0.3058**						
H ₄ : PRI→VAL	0.0249						
H ₅ : VAL→LOY	0.6558**						
H ₆ : LOY→PUR	0.2814*						

Note: significance levels denoted by * (1%) and ** (0.1%).