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E-Service Quality: A Meta-Analytic Review

Abstract

The dominance of the internet as a shopping and distribution channel also necessitates an understanding of e-service quality. Using means-ends-chain theory, we develop a conceptual framework to understand the different models and the associated multiple measures that have been developed to examine this construct. We test the measures empirically using meta-analytic techniques. We also summarize the impact of e-service quality on key outcomes—customer satisfaction, repurchase intentions, and word-of-mouth, as well as the moderating impact of three contextual factors: country culture, regulatory environment, and industry context. Results indicate that e-service quality has four underlying dimensions (website design, fulfilment, customer service, and security/privacy) though their relevance for overall e-service quality is moderated by country-specific (uncertainty avoidance, masculinity, power distance, individualism), regulatory environment-specific (financial secrecy, rule of law), and industry-specific (services/goods, retailing/banking) factors as well as research-design factors.

E-channels are fast replacing traditional channels as a means of shopping and consumption, with annual growth rates exceeding 18% over the last decade in the U.S. (McKinsey & Company 2013). Consider Amazon and Wal-Mart, two of the most successful retailers. Wal-Mart began investing in its e-commerce website in 2000; by 2014 it had online sales of 10 billion (out of 500 billion USD total revenue) where "e-commerce operation represents its fastest-growing business" (*The Wall Street Journal* 2014). Amazon publicly launched in 1997 with a stock price of 1.73 USD per share; today, Amazon has a market cap exceeding 150 billion USD surpassing most retailers (*Forbes* 2015). Large swaths of services (e.g., travel and tourism, financial services, airlines) have embraced online channels. Services such as education and healthcare are being increasingly delivered online. In all these, e-service quality—the quality of service customers experience in online channels—is critical.

Parasuraman, Zeithaml, and Malhotra (2005, p. 5) define e-service quality as the "extent to which a website facilitates efficient and effective shopping, purchasing, and delivery." Wolfinbarger and Gilly (2003, p. 183) define e-service quality as "the beginning to the end of the transaction including information search, website navigation, order, customer service interactions, delivery, and satisfaction with the ordered product." Though they may overlap, e-service quality can substantively differ from service quality in brick-and-mortar settings; e-service lacks interpersonal contact and may pose greater perceived risk and privacy issues for customers (Bitner, Brown, and Meuter 2000; Dabholkar 1996). Thus, findings from service quality may not be readily transplanted to the e-service quality domain.

Against this background, the goal of this research is to develop a conceptual framework relating different components of e-service quality to its outcomes (see Figure 1). The framework is rooted in means-ends-chain theory (Gardial et al. 1994). The framework is tested using a meta-analysis of 89 independent samples representing 31,264 individual observations. For researchers, these results provide a better understanding of the components,

consequences, and moderators of e-service quality, and a stronger basis for further theorizing and conducting empirical research. Managerially, our findings can help firms to refine their strategy by (i) prioritizing specific components of e-service quality to optimize outcomes such as customer satisfaction, repurchase intentions, and word-of-mouth, (ii) implementing specific strategies in countries with different cultures and regulatory regimes, and (iii) understanding how the relationships change based on different industries.

More specifically, this paper makes four contributions. First, using means-ends-chain theory it develops a conceptual framework (Figure 1) to synthesize the existing theoretical and empirical literature. Second, our results from testing this framework provide guidance to managers and researchers about the conceptualization and measurement of e-service quality, and its association with specific antecedents and consequences. In this regard, we test alternative models of e-service quality dimensions, and examine specific moderators of key relationships. Our moderator analysis provides guidance about boundary conditions (country culture, regulatory environment, and industry) that can mitigate or enhance key relationships. Third, our results clarify measurement issues (appropriate scale items and e-service quality dimensions), sampling issues (e.g., student versus non-student sample), and issues regarding potential co-variates. Fourth, typical of a meta-analysis, we provide many useful empirical generalizations such as those regarding the association between e-service quality dimensions and overall e-service quality, and how these associations are moderated by differences in a country's culture, regulatory system, and industry type. Kamakura, Kopalle, and Lehmann (2014, p. 121) underscore the importance of empirical generalization in retailing: "grouping related studies (replications) can provide a more powerful test of specific theories than any single study as well as help identify boundary conditions for them." Bass (1995) clarifies that empirical generalizations enable researchers to (i) assess how far they have progressed in research, (ii) assess what they have learned through the processes, and (iii) develop unifying

principles to guide future research. In this regard, our study not only assesses the current progress (what are the existing measures of e-service quality) and the current learning (how these measures relate to key outcomes), but also helps advance research through the conceptual framework provided.

The remainder of this paper is divided into four sections. First, we briefly present our theory and conceptual framework to guide our meta-analysis. Second, we provide an overview of existing conceptualization of the e-service quality construct and hypothesize the effect of contextual factors that have the potential to influence the association between overall e-service quality and its dimensions. Third, we present our findings. Fourth, we develop a research agenda for future research on e-service quality.

THEORY, CONCEPTUAL FRAMEWORK, AND HYPOTHESIS DEVELOPMENT

Components and Consequences of E-Service Quality

Rooted in the customer satisfaction (Mittal, Ross, and Baldasare 1998) and service quality (Parasuraman, Zeithaml, and Berry 1985) literatures, a multi-attribute approach (Wilkie and Pessemier 1973) provides the conceptual basis to understand e-service quality. Theoretically, the multi-attribute approach is rooted in the means-ends-chain theory which describes how customers evaluate their consumption experiences—from specific means to more abstract ends (Gardial et al. 1994; Johnson 1984; Jung and Kang 2010; Zeithaml 1988). In the means-ends-chain theory, each specific attribute is associated with a higher-order dimension; each dimension is associated with a higher-order, overall, summary construct such as e-service quality. From a consumer psychology perspective (Gardial et al. 1994) the means-ends-chain theory suggests that consumers are able to evaluate their experiences in terms of specific and concrete occurrences (at the attribute level) which may then be synthesized and related to higher order dimensions, the latter being relatively more abstract

(Johnson 1984). More importantly, these dimensions may represent various meta-categories which can be based on consumer goals (Jung and Kang 2010), consumption settings (Gardial et al. 1994), and even identities (Reed, Forehand, Puntoni, and Warlop 2012).

Within an e-service setting, our review of studies shows that the means-ends-chain theory is descriptively accurate and conceptually sound. For example, consumers may evaluate their consumption experiences in terms of specific attributes such as "product selection" which may then be related to higher order performance dimensions such as "website design." The dimensions are associated with e-service quality, which in turn is associated with key outcomes such as customer satisfaction, customer behavioral intentions (e.g., repurchase intentions), and customer behavior (e.g., word-of-mouth; see Mittal and Frennea 2010). Conceptually and empirically, a key issue is to determine the relative weight (or importance) afforded to each attribute and each dimension (LaTour and Peat 1979). In such a conceptual approach, it is critical to understand (i) the strength of relationships among the different components and overall e-service quality, (ii) overall e-service quality and its outcomes such as customer satisfaction, repurchase intentions, and word-of-mouth, and (iii) different factors that can moderate these associations.

As described later, there is disagreement in the literature about the specific dimensions that comprise e-service quality. We empirically compare two rival models to ascertain the dimensions comprising e-service quality. However, the basic conceptual model, rooted in means-ends-chain theory, is veridical to both rival models. In the basic conceptual framework, attributes are associated with dimensions, dimensions are associated with overall e-service quality which is associated with outcomes such as customer satisfaction, repurchase intentions, and word-of-mouth. Because this conceptual framework is widely accepted and has been tested many times, we do not formally hypothesize it, though we do test it in the

structural equation model (SEM) evaluating alternative conceptualizations of quality

dimensions. The conceptual framework for e-service quality is shown in Figure 1.

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Insert Figure 1 about here

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Attributes, Dimensions, and their Association with Overall E-Service Quality

Based on the conceptual framework in Figure 1, scholars have proposed different

attributes and dimensions associated with e-service quality. Not surprisingly, some of the

attributes and dimensions—e.g., merchandise assortment and service policies—overlap with

a brick-and-mortar context (Holloway and Beatty 2008; Warrington, Abgrab, and Caldwell

2000). The different models that have been developed to measure e-service quality over the

last few years are summarized in Table 1 (Francis and White 2002; Loiacono, Watson, and

Goodhue 2002; Parasuraman, Zeithaml, and Malhotra 2005; Wolfinbarger and Gilly 2003;

Yoo and Donthu 2001). Table 1 also shows the specific attributes used in each model and the

general impact of each model (measured as the Google citation count). Interestingly, some

attributes such as "website design" and "security" are included in all nine studies, while some

attributes such as "delivery condition" are included in very few, and recent studies only.

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Insert Tables 1 and 2 about here

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Tables 1 and 2 provide an overview of the 16 attributes, their definitions, source

studies, and other relevant information. In our empirical analysis we test two rival models to

synthesize findings from past research, and to provide guidance for future research. Tables 1

and 2 also show the different rival models which have conceptual overlaps and differences

among them. For instance, Wolfinbarger and Gilly (2003) test the eTailQ model using six

different subsamples of customers: browsers, goal-oriented customers, frequent buyers,

book/music shoppers, auctions, and e-tail. Website design and fulfilment are important in all subsamples, but customer service and security are important in two or fewer subsamples. Thus, there is a need to empirically compare, synthesize, and quantify the magnitude of the association these attributes may have with the different dimensions. It may be that some of the attributes related to customer service and security dimensions only marginally contribute to the online shopping experience. Further, it is also important to ascertain the different dimensions, and their relative weight, in determining overall e-service quality. Clearly, each model and the underlying scale shown in Table 1 is theoretically supported. The goal of the meta-analysis is not to re-examine the theoretical underpinnings of any specific model and associated scale. Rather, we seek to empirically determine the model that best describes the dimensions that comprise e-service quality.

Among the different scales developed since 2000 (the study inclusion period for the meta-analysis), eTailQ (Wolfinbarger and Gilly 2003) and E-S-QUAL (Parasuraman, Zeithaml, and Malhotra 2005) include the most attributes (each scale captures 13 attributes) and are also among the most widely cited. As such, further testing in the empirical analysis is based on these two models. Though we do not have any specific hypotheses in this regard, we empirically compare these two models to determine the set of dimensions that best describe the data from the available studies.

E-Service Quality: Relevance across Contexts

A key benefit of e-service is the ability of firms—small and large—to service customers across different industries and countries. Yet, it is not clear how the relationships depicted in Figure 1 may vary across different contexts (e.g. country cultures, regulatory environments, and industries). Prior research shows differences among countries in service quality (e.g. Donthu and Yoo 1998; Furrer et al. 2000; Mattila 1999), as well as technology-related industries (e.g. McCoy, Galletta, and King 2007; Yoon 2009). Why should the

association of different e-service quality dimensions and overall e-service quality be moderated by country? We examine two explanations based on country culture (Hofstede 1984) and regulatory environment (Steenkamp and Geyskens 2006).

These two factors—in addition to their theoretical relevance—are also the most widely examined factors in an e-service quality context. Steenkamp and Geyskens (2006) examined 8,886 online customers from 23 countries and found individualism—among all the Hofstede (1984) dimensions—to interact with perceptions of website privacy and customization. Tsikriktsis (2002) used a convenience sample of 171 MBAs and showed that website quality expectations are associated with all four cultural dimensions proposed by Hofstede (1984).

We advance the literature by examining how these factors moderate the association of each e-service quality dimension to overall e-service quality and its outcomes. Our meta-analytic approach, unlike a single-sample approach, is not constrained. In a single-sample study, often it is not possible to include more than two or three countries, and even with that it may not be possible to simultaneously examine more than one or two moderating factors. Our approach overcomes such limitations as we are able to jointly examine (1) country-culture, (2) regulatory environment, and (3) industry context factors with a larger set of countries. This provides for a richer comparative analysis, enabling deeper insights for researchers and managers.

E-Service Quality: Contextual Model

Figure 2 describes the contextual model tested using a meta-analytical approach. The contextual model builds on the more general theoretical framework shown in Figure 1, which is rooted in means-ends-chain theory (Gardial et al. 1994). To formulate the exact model that was tested, we use a discovery-oriented approach as recommended by Wells (1993) and utilized by other studies (Fournier 1998). In this approach, we use a combination of theory

(c.f., means-ends-chain), our understanding of patterns in data (c.f., consistent and inconsistent findings from studies in Table 1), and the interplay of theory and data (i.e., testing of rival models) to develop testable hypotheses, which we then empirically test in the meta-analysis. While our initial conceptualization (as shown in Figure 1) is grounded in theory, the articulation of e-service quality dimensions is driven by a combination of theoretical thinking (i.e., dimensions tested in previous rival models) and patterns we observe in the empirical findings (see Tables 1 and 2). In summary, we empirically test rival models to understand the different dimensions of e-service quality based on a combination of theoretical models and empirical findings from the meta-analysis (see Figure 2 for summary).

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Insert Figure 2 about here
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Moderating Role of Country Culture: Hypotheses

Uncertainty avoidance. Uncertainty avoidance is "the extent to which the members of a culture feel threatened by uncertain or unknown situations," (Hofstede 1991, p. 113). In the context of e-service quality, customers from countries with a high uncertainty-avoidance culture will have a greater need for certainty (Donthu and Yoo 1998) than customers who are from a low uncertainty-avoidance country. As such, customers from high uncertainty prefer more information in their judgment formation because it may alleviate negative emotions emanating from the decision process (Bettman, Luce, and Payne 1998; Luce 1998). As such, customers from countries with relatively higher uncertainty avoidance will be more likely to utilize information associated with specific quality-dimensions to draw judgments about overall e-service quality. Consequently, the association between the different dimensions and overall e-service quality is likely to be stronger as uncertainty avoidance increases. Thus:

H_{1A}: *The positive effect of website design on overall e-service quality is <u>stronger</u> in cultures with higher uncertainty avoidance.*

H₁B: *The positive effect of fulfilment on overall e-service quality is <u>stronger</u> in cultures with higher uncertainty avoidance.*

H₁C: *The positive effect of customer service on overall e-service quality is <u>stronger</u> in cultures with higher uncertainty avoidance.*

H₁D: *The positive effect of security on overall e-service quality is <u>stronger</u> in cultures with higher uncertainty avoidance.*

Masculinity–femininity. The second cultural dimension is masculinity–femininity (Hofstede, Hofstede, and Minkov 2010). A masculine orientation, also described as an agentic orientation (Bakan 1966; He, Inman, Mittal 2008), is characterized with assertiveness, competitiveness, a focus on maximizing upside, and a functional orientation (i.e., a focus on the functional aspect of consumption). In contrast, a feminine orientation—or a communal orientation—is characterized with reciprocity, relational values, benevolence, a focus on minimizing downside, and an experiential orientation (i.e., a focus on the experiential aspects of consumption).

Consistent with this, functional dimensions of quality such as fulfilment should be more relevant to overall e-service quality in countries with masculine cultures. The fulfilment dimension involves accurate representation of the product, on-time delivery, and accuracy of price and product in orders, and these should be more important to those with a masculine orientation (Lim and Ang 2008).

In contrast to the stronger relational, experiential, and loss-minimization focus associated with feminine cultures, we expect that e-service quality dimensions related to customer-firm relationship (customer service), personal experience during the online shopping (website design), and loss minimization (security) should be more important in countries with higher feminine cultures. Therefore,

H₂A: *The positive association between website design and overall e-service quality is stronger in <u>feminine</u> cultures.*

H₂B: *The positive association between fulfilment and overall e-service quality is stronger in <u>masculine</u> cultures.*

H₂C: *The positive association between customer service and overall e-service quality is stronger in <u>feminine</u> cultures.*

H_{2D}: *The positive association between security and overall e-service quality is stronger in* <u>*feminine*</u> *cultures.*

Power distance. Power distance belief is the extent to which people expect and accept inequality in a system (Hofstede 1984, 2001; Oyserman 2006). In countries with high power distance there is an acceptance and expectation among consumers of a higher need for providing structure, well-defined social roles, and security. Such an expectation exists from both individuals and institutions (public and private) deemed more powerful. E-service providers may be such institutions.

Consumers in high power distance cultures expect and assume that institutions providing e-service quality should provide more structure and security (Hofstede 1984). Those with higher power distance belief are assured that the larger, more powerful e-service provider also provides security, whose importance should be higher.

To the extent that a service provider's website design, customer service policies, and fulfilment policies are seen as the status quo and characteristic of the e-service in general, consumers will expect and accept inequality in their online experience with the website (website design), the customer-firm relationship (customer service), and the policies regarding charging and delivering products or services (fulfilment). Thus, power distance belief is not expected to consistently affect the association between website design, customer service, and fulfilment and overall e-service quality. Therefore,

H_3: *The positive association between security and overall e-service quality is stronger in high power distance cultures.*

Individualism-collectivism. This cultural dimension refers to the extent to which people in a country prefer to act in an independent (individualistic), as opposed to an interdependent (collectivistic), manner (Kacen and Lee 2002; Mattila and Patterson 2004). In an online retailing context, consumers in "individualistic societies place their personal goals, motivations, and desires ahead of those of others, whereas collectivistic cultures are

conformity oriented and show a higher degree of group behavior and concern to promote their continued existence" (Steenkamp and Geyskens 2006, p. 139).

Individualistic cultures, like masculine cultures, are also expected to be more agentic, such that they focus on the upside, are risk seeking, and have a functional orientation. Collectivistic cultures, like feminine cultures, are expected to be more communal, such that they focus on loss prevention and have an experiential orientation (He, Inman, and Mittal 2008).

Regarding the four dimensions of e-service quality, we expect to find that fulfilment is more important in individualistic cultures than in collectivistic cultures due to the functional orientation associated with individualistic cultures. A functional orientation focuses on a customer's immediate needs and the extent to which a product fulfils its intended purpose, and prefers fulfilment to experiential dimensions such as website design, customer service, and security. Thus, we can expect that the positive association between fulfilment and overall e-service quality is stronger for individualistic cultures.

We expect that website design, customer service, and security are more important in collectivistic cultures due to an experiential orientation and loss prevention focus. The experiential orientation focuses on the online experience (website design) and customer-firm relationship (customer service) associated with a service provider, while the loss prevention focus increases the need for security. Thus, we can expect that the positive associations between website design, customer service, and security and overall e-service quality are stronger for collectivistic cultures (less individualistic cultures). Formally stated,

H_{4A}: *The positive association between website design and overall e-service quality is stronger in <u>collectivistic</u> cultures.*

H_{4B}: *The positive association between fulfilment and overall e-service quality is stronger in <u>individualistic</u> cultures.*

H_{4C}: *The positive association between customer service and overall e-service quality is stronger in <u>collectivistic</u> cultures.*

H_{4D}: *The positive association between security and overall e-service quality is stronger in <u>collectivistic</u> cultures.*

Moderating Role of Regulatory Environment: Hypotheses

With respect to the regulatory environment, we argue that the financial secrecy—the extent to which people in a country can maintain financial secrecy and the scale of their activities—and rule of law—both—influence the association between the security dimension and overall e-service quality.

Financial secrecy. The Financial Secrecy Index is reported by the Tax Justice Network (2014). Conceptually, the level of financial secrecy should be associated with a higher level of loss-minimization focus, such that a higher level of financial secrecy is indicative of a stronger need for loss minimization. In countries with higher financial secrecy, people have a higher level of undisclosed assets and information, which may be disclosed if security is breached. As such the perceived necessity of guarding against losses associated with a financial-secrecy breach should lead to a higher association between security and overall e-service quality in countries scoring higher on the financial secrecy index. Therefore,

H_5:   *The positive association between security and overall e-service quality is <u>stronger</u> in countries with greater financial secrecy.*

Rule of law. A country's rule of law "addresses the degree to which the behavior of individuals and organizations (including government authorities) is guided by formal, transparent, legal rules that apply to everyone regardless of rank and status" (Steenkamp and Geyskens 2006, p. 139). In countries with stronger rule of law, consumers feel they are already safeguarded against security breaches because they have more confidence in and abide by the rules (Kaufmann, Kraay, and Zoido-Lobaton 2000). Thus, the perceived necessity of guarding against security breaches is lower in countries with stronger rule of law. Therefore,

H_6:   *The positive association between security and overall e-service quality is <u>weaker</u> in countries with stronger rule of law.*

Moderating Role of Industry Context: Hypotheses

Services versus goods. Services, relative to goods, are more intangible such that consumers must often use environmental cues to evaluate the quality of service and other outcomes (Anderson, Fornell, and Rust 1997; Zeithaml, Parasuraman, and Berry 1985). Thus cues based on website design, customer service, and security should be more informative for evaluating services than goods. Therefore,

H_{7A}: *The positive association between website design and overall e-service quality is stronger in the <u>services</u> industry.*

H_{7B}: *The positive association between customer service and overall e-service quality is stronger in the <u>services</u> industry.*

H_{7C}: *The positive association between security and overall e-service quality is stronger in the <u>services</u> industry.*

Especially in an online retailing or e-service context, a key issue is the timely and accurate delivery of goods, which would typically be a relatively minor issue in physical stores and a non-issue for services. Thus, the fulfilment dimension should relatively more important for goods relative to services an e-service context. Therefore,

H_{7D}: *The positive association between fulfilment and overall e-service quality is stronger in the <u>goods</u> industry.*

As described later, in our empirical testing, we not only test goods versus services, but also a hybrid of goods and services. Reassuringly, the conclusions remain unchanged.

Retailing versus banking. We examine the relative moderating effect of a retailing (hybrid of goods and services) and banking (pure service) for further conceptual clarification. As previously argued, the associations between website design, customer service, and security should be stronger with overall e-service quality and other for banking (a pure service) than in for retailing (a hybrid of goods and services). Therefore,

H_{8A}: *The positive association between website design and overall e-service quality are stronger in a <u>banking</u> context than in a retailing context.*

H_{8B}: *The positive association between fulfilment and overall e-service quality are stronger in a <u>banking</u> context than in a retailing context.*

H_{8C}: *The positive association between customer service and overall e-service quality are stronger in a <u>banking</u> context than in a retailing context.*

H_{8D}: *The positive association between security and overall e-service quality are stronger in a* <u>*banking*</u> *context than in a retailing context.*

Note, our hypothesis regarding fulfilment being more important in banking (pure service) than retailing (hybrid of goods and service) may seem counter to our earlier argument. There we argued that fulfilment is critical for goods because of aspects such as accuracy and quality of delivery. Thus, we deem H_{8B}, the hypothesis regarding fulfilment exploratory.

Controls

The collected studies for this meta-analysis differ in many ways. To ensure that observed variance is not caused by factors other than those hypothesized, we include several control variables related to method and measurement characteristics of sampled studies.

We also coded the studies for the following method characteristics (1) experience sampling: whether the participants in studies were sampled based on prior experience with website; (2) panel data use: study used a longitudinal panel data versus a cross-sectional data; (3) student sampling: the use of students or non-students; and (4) year of data collection: we coded the year in which data was collected.

Coded measurement characteristics include which scale the study used. We coded for the use of (1) SERVQUAL by Parsuraman, Zeithaml, and Berry (1988) (1 = SERVQUAL, 0 = other), and E-S-QUAL by Parasuraman, Zeithaml, and Malhotra (2005) (1 = E-S-QUAL, 0 = other).

METHOD

Data Collection

Our sample of studies spans 15 years of research (2000-2014), as the year 2000 is when the research on this topic took off in earnest. We collected studies from many sources: (i) academic databases such as ABI/INFORM, Proquest, Google Scholar, and EBSCO

(Business Source Premier), (ii) top management journals such as *Information &*
Management, Information Systems Research, Journal of Business Research, Journal of
Retailing, Journal of Service Research, Journal of Services Marketing, Managing Service
Quality, MIS Quarterly, Service Industries Journal, and *Total Quality Management*, (iii)
articles cited in the earliest papers in e-service quality research (see Tables 1 and 2), (iv)
articles citing the earliest papers in e-service quality research, and (v) web searches. Our
initial sample consisted of 170 empirical studies. We narrowed them to 89 independent
samples using the inclusion criteria described next.

Inclusion Criteria

We included empirical studies that examined e-service quality in the context of
websites and reported these statistics: correlation or regression coefficients, and sample size.
When possible, we contacted the authors to obtain these pieces of information and included
the revised information when it was provided. Studies examining only outcomes other than
customer satisfaction, repurchase intentions, and word-of-mouth behavior were excluded.

Our final dataset consists of 573 effect sizes and 31,264 individuals from 89
independent samples published in 69 articles. These articles are listed in Web Appendix A.

Calculation of Effect Size Measure

Where possible, we used correlations to measure association. For some studies, we
transformed regression coefficients to correlations using established formulas (Peterson and
Brown 2005). Among the 573 effect sizes, 59% of the effects are based on correlations and
41% of the effects are derived correlations from the regression coefficient. We used the
Pearson correlation coefficient (r) as our effect-size measure since it is a scale-free measure.

Data Coding

All studies were coded by two independent coders. The agreement level between the
coders was high ($>$90%) and discrepancies were resolved via discussion (Szymanski and

Henard 2001). The coders used the construct definitions in Table 1 to classify variables and code effect sizes. The coders assigned the attributes to the two alternative dimension classifications: a four-dimension model based on Holloway and Beatty (2008) and Wolfinbarger and Gilly (2003), and a six-dimension model based on Parasuraman, Zeithaml, and Malhotra (2005). Both classification models were tested in the SEM testing subsequently.[1] Some studies included in this meta-analysis did not measure the attributes of e-service quality independently but instead aggregated or combined multiple attributes in a single, higher-order attribute. We classify such attributes as "mixed" attributes of e-service quality. For example, both security and privacy attributes may be lumped together as one. Some samples use multiple measures of a construct and therefore report multiple correlations. In such cases, we average the correlations between two constructs and report the data as a single study (Hunter and Schmidt 1990).

We coded and statistically corrected the effect sizes for the following seven artifacts which can bias the effect size: (i) sampling error, (ii) measurement error in the dependent variable, (iii) measurement error in the independent variable, (iv) dichotomization of a continuous dependent variable, (v) dichotomization of a continuous independent variable, (vi) range restriction in a dependent dichotomous variable, and (vii) range restriction in an independent dichotomous variable.

Next, we coded three theoretical moderators to test our hypotheses: (i) country culture, (ii) regulatory environment, and (iii) industry context. Country culture was coded as: uncertainty avoidance (UAI), masculinity (MAS), power distance (PDI), and individualism (IDV) based on Hofstede (1984, 2001, 2014). Regulatory environment was measured as a country's score on the Financial Secrecy Index (Tax Justice Network 2014) and rule of law (World Bank 2014). The Financial Secrecy Index scores range from 0 to 100 with higher

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[1] We coded another 1,781 raw effects to produce a complete correlation matrix for all constructs in the SEM.

values corresponding to greater financial secrecy in a country. Rule of law scores range from
-2.5 to 2.5 with higher values corresponding to stronger rule of law in a country (World Bank
2014). Industry context was measured as services versus goods (services = 1; goods = 0), or
as retailing versus banking (retailing = 1; banking = 0).

We also coded several additional study characteristics: (i) the year of publication to
capture consumer expertise with the Internet and familiarity with websites; (ii) the method of
data collection (panel = 1; non-panel = 0); (iii) sample type (students = 1; non-students = 0);
(iv) time elapsed between customer experience with website and data collection (experience
in the last six months = 1; non-experience in the last six months = 0).[2]

Finally, we dummy coded which measure of e-service quality was used in each study
(e.g. E-S-QUAL = 1; others = 0; see Table 1 for all measures). We created separate dummy
variables for each of the nine measures in Table 1. In the random effects meta-regression, we
examined the impact of E-S-QUAL and SERVQUAL on effect sizes since regression
analyses require at least five data points for both sides of the moderator variable. The dummy
variables for remaining scales were examined in the sub-group analysis.

Approach to Analysis

We used a four-step approach to analysis: (1) bivariate associations, (2) SEM, (3)
moderator analysis, and (4) comparison of different measures.

First, we estimated the bivariate relationships among key constructs. Following
Hunter and Schmidt (2004) we corrected the effect sizes for potential biases and developed
bivariate estimates of key relationships. We corrected the effect sizes for dichotomization and
range restriction. We corrected correlations for measurement error by dividing them by the
product of the square root of the respective reliabilities of the two constructs (Hunter and

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[2] Research has shown that to minimize memory lapses and maximize reliable recall, a time period of six months
is appropriate (Keaveney 1995; Voorhees, Brady, and Horowitz 2006).

Schmidt 2004). We used artifact-corrected effect sizes and transformed them into Fisher's z coefficients, weighted them by the estimated inverse of their variance (N – 3); this gives more weight to more precise estimates, before converting them back to correlation coefficients (Kirca, Jayachandran, and Bearden 2005). We employed a random-effects approach for calculating the average effect sizes using the SPSS macros from Lipsey and Wilson (2001).

For each bivariate relationship, we report a 95% confidence interval of this sample-weighted reliability-adjusted averaged correlation.[3] We also calculated the fail-safe N, which indicates the number of non-significant and unavailable studies that would be needed to make the cumulative effect size non-significant.[4] This statistic assesses the robustness of the results and evaluates publication bias (Rosenthal 1979).

We tested the homogeneity of the distribution of effect size using the Q-statistic (Lipsey and Wilson 2001). A statistically significant Q-statistic indicates that differences in effect sizes are related to factors other than sampling error (i.e., moderators). Identifying these moderators can reveal sources of systematic heterogeneity. To assess the extent of heterogeneity, we calculated the I^2 statistic which indicates the proportion of variation due to heterogeneity between studies. I^2 values greater than 75 percent indicate high amounts of heterogeneity (Higgins and Thompson 2002; Higgins, Thompson, Deeks, and Altman 2003). We also excluded single outliers from our dataset as suggested by Brown and Peterson (1993) to assess whether homogeneity can be achieved this way.

Second, we conducted a structural equation models test to compare rival conceptualizations of e-service quality (four versus six dimensions). For this, we calculated a complete correlation matrix including the effect sizes of all dependent and independent

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[3] To ensure that the calculated confidence intervals were not affected by the small number of effects for some relationships, we further calculated (a) bootstrap confidence intervals and (b) bias-corrected confidence intervals to ensure (Adams, Gurevitch, and Rosenberg 1997; Efron 1987). The three types of confidence intervals produced consistent results.

[4] In our study, we have chosen a level of .05 as "just significant" (Grewal et al. 1997).

variables.[5] We used path analysis to simultaneously examine the direct and mediated impact of e-service quality dimensions on overall e-service quality, customer satisfaction, and repurchase intentions. We excluded word-of-mouth from this analysis because we did not have enough effect sizes to produce a complete correlation matrix for word-of-mouth and other variables.

Due to the variability in sample sizes associated with each correlation in the matrix, we entered the harmonic mean of all sample sizes (N = 3,244) in the meta-analytic correlation matrix (Viswesvaran and Ones 1995).[6] We then converted correlations to co-variances using standard deviations. The analyses used the complete covariance matrix as input to LISREL 8.80 to test our model (Franke and Park 2006).

Third, we conducted a moderator analysis to test our hypotheses. We used random effects meta-regression (REML) based on Z_r to assess the impact of moderators on the effect size (Sultan, Farley, and Lehmann 1990).[7] For comparison, we also provide a sub-group analysis by presenting the sample-weighted reliability-adjusted correlations by each moderator variable. For continuous moderators (e.g., year of the study), we correlated the moderators with the corrected effect sizes.

Fourth, we provide a descriptive overview of existing measures of e-service quality to guide future research toward a more ideal measure of e-service quality. Though qualitative in nature, we hope this descriptive review is insightful.

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[5] For this correlation matrix we reviewed all manuscripts once again and coded 1,781 additional raw correlations between all attributes of e-service quality, overall e-service quality, customer satisfaction, and repurchase intentions. The reported correlations are also artifact-corrected, transformed into Fisher's z coefficients, and weighted by the estimated inverse of their variance (N – 3).

[6] The harmonic mean fits a model that is not biased by a particular relationship involving a large cumulated total sample size. Compared to the arithmetic mean and the median, the harmonic mean is lower and the estimations in the SEM are more conservative.

[7] We used the SPSS macros provided by Lipsey and Wilson (2001) to test moderators (Wilson 2006; http://mason.gmu.edu/~dwilsonb/ma.html). Since this macro does not employ Knapp-Hartung variance estimator for significance testing, we also replicated moderator analysis using the meta-regression module in STATA provided by Harbord and Higgins (2009). Results of both are identical and available from first author.

RESULTS

(1) Bivariate Analysis to Assess the Association of Attributes, Dimensions, E-Service

Quality, and Outcomes

Table 3 presents the bivariate relationships including the number of correlations (k)

for each relationship of interest, the cumulative sample size across the independent samples

(N), the average artifact-corrected correlation, and the Q-statistic.

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Insert Table 3 about here

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The table reports the association that each of the 16 attributes has with overall e-

service quality, and its outcomes. It also shows the association between overall e-service

quality and customer satisfaction, repurchase intentions, and word-of-mouth.[8] In general, the

attributes have a significant association with overall e-service quality, customer satisfaction,

and repurchase intentions, but not word-of-mouth. There is also a significant association

between each dimension and overall e-service quality ($r = .471$, $p < .05$), customer

satisfaction ($r = .351$, $p < .05$), repurchase intentions ($r = .406$, $p < .05$), and word-of-mouth

($r = .312$, $p < .05$). Note, we show four dimensions because this is the model supported in the

SEM analysis later. The second to last row in Table 3 shows the effect of all dimensions of e-

service quality together. The final row shows the association of overall e-service quality with

customer satisfaction ($r = .588$, $p < .05$), repurchase intentions ($r = .477$, $p < .05$), and word-

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[8] We also calculated 95% confidence intervals for each effect size on an attribute- and dimension-level. In each
case, the confidence interval did not include zero, thus the effect size was significant. We verified these
conclusions using bootstrap confidence intervals and bias-corrected confidence intervals to increase confidence
in our results (Adams, Gurevitch, and Rosenberg 1997; Efron 1987). Finally, we calculated the file-drawer N,
which ranges between 12 and 1,054 for the overall e-service quality predictors (Ø file-drawer N: 173), 10 and
1,766 for the customer satisfaction predictors (Ø file-drawer N: 254), 7 and 1,426 for the repurchase intentions
predictors (Ø file-drawer N: 240), and 4 and 155 for the word-of-mouth predictors (Ø file-drawer N: 38). We
conclude that number of publication is not a serious issue in our study. We also calculated additional funnel
plots with the sample size on one axis and the correlations on the other axis. These plots indicate numerous
small and negative effect sizes in our dataset. These correlations would not have been found if publication bias
would have been present in our dataset.

of-mouth (not calculated since we did not have enough data). Each of the 16 attributes except

merchandise availability (with just one reported effect size) is significantly associated with at

least one outcome. Thus, we conclude that all 16 attributes should be included in the SEM

analysis reported next.

(2) Path Model to Test Rival Models of Overall E-Service Quality

We calculated two path models to test the rival conceptualizations shown in Figure 3.

These were based on two complete correlations matrices shown in Table 4, panels A and B.

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Insert Figure 3 and Table 4 about here

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Similar to Morgan and Hunt (1994), we compare the four-dimension model with the

six-dimension model on several criteria as shown Table 5, panel A. Path estimates for both

models are shown in Table 5, panels B and C.

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Insert Table 5 here

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As seen in panel A of Table 5, the four-dimension model (AIC=55.93; CAIC=239.98;

PNFI=.095; PGFI=.071) shows better fit than the six-dimension model (AIC=90.03;

CAIC=387.35; PNFI=.083; PGFI=.067).

Comparing the direct and indirect effects of e-service quality dimensions on the

outcomes in the four-dimension model, we observe that website design ($\beta = .196$, $p < .01$),

fulfilment ($\beta = .248$, $p < .01$), and customer service impact overall e-service quality ($\beta = .211$,

$p < .01$) while security does not ($\beta = .014$, p > .05). For customer satisfaction, all dimensions

show significant total effects (website design: $\beta = .253$, $p < .01$; fulfilment: $\beta = .145$, $p < .01$;

customer service: $\beta = .056$, $p < .01$; security: $\beta = .083$, $p < .01$). This finding underlines the

strong mediating effect of overall e-service quality between e-service quality dimensions and

customer satisfaction. This mediation is also reflected in the high relative importance of

overall e-service quality ranging between 6.74 and 63.64 percent.[9] Finally, we observe

significant total effects on repurchase intentions for website design ($\beta = .282$, $p < .01$),

customer service ($\beta = .222$, $p < .01$), and security ($\beta = .107$, $p < .01$). We also find positive,

direct main effects on repurchase intentions for website design ($\beta = .114$, $p < .01$), customer

service ($\beta = .175$, $p < .01$), and security ($\beta = .055$, $p < .01$). The relative importance (ranging

between 17.47% and 79.55%) indicates a strong mediating role of customer satisfaction. The

model explains 34.8% of the variance in overall e-service quality, 22.9% of the variance in

customer satisfaction, and 23.5% of the variance in repurchase intentions.

As indicated in Table 6, we also tested the relative weight of the four dimensions in

affecting overall e-service quality. We did this using a restrictions test. Using a χ^2 difference

test, we contrasted a constrained model where two paths—each denoting the weight of two

different dimensions—were set as equal to an unconstrained model where the paths were free

to vary. Support for the unconstrained model would suggest that two dimensions have

dissimilar weights, and vice versa. Results indicate that website design, fulfilment, and

customer service have equal weights in determining overall e-service quality (each $p > .05$).

However, security systematically has a weight smaller than each of the other three

dimensions (each $p < .01$). Managerially, this suggests that website design, fulfilment, and

customer service are relatively more important than security.

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Insert Table 6 about here

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(3) Role of Moderators

Moderator analysis is appropriate when there is systematic heterogeneity among

effects. We calculated the Q-statistic to assess the extent of variance in and effect size

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[9] We calculated the mediation effect using the Alwin and Hauser's (1975) formula of the relative importance:
|indirect effect|/(|indirect effect|+|total effect|).

wherever the average adjusted r was significant and the effect was based on three or more correlations (see Table 3). A statistically significant Q-statistic indicates the presence of systematic heterogeneity. Of the 64 calculated Q-tests, only five tests were non-significant. We conclude this dataset is characterized by heterogeneity.

To assess the extent of heterogeneity, we calculated individual I^2 values for all available Q-statistics. The average I^2 across all 64 calculated Q tests is 87%, which is higher than the recommended level of 75%; consequently, we conclude we have high amounts of heterogeneity in our data (Higgins and Thompson 2002; Higgins et al. 2003). Literature suggests deleting single outliers from the analysis to achieve homogeneity (Brown and Peterson 1993). Exclusion of these outliers reduces variance in our data set, but the average I^2 value remained above 75%. In such cases, researchers should explain the variance in the effect sizes using moderator analyses, because the heterogeneity is likely systematic.

To provide guidance about the relevance of different dimensions for overall e-service quality across different industry and country contexts, we calculated moderator analyses using random-effects meta-regression (REML) based on Z_r. Results of this analysis are presented in Table 7 and summarized next.

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Insert Table 7 about here
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Country culture. Representing country culture, we test the moderating effects of uncertainty avoidance, masculinity, power distance, and individualism separately (Samaha, Beck, and Palmatier 2014).

Uncertainty avoidance: H_1 states that high uncertainty avoidance will strengthen the effect of dimensions of e-service quality on overall e-service quality. Results show high uncertainty avoidance strengthens the effect of website design ($\beta = .77$, $p < .01$), customer service ($\beta = .48$, $p < .01$), and security ($\beta = .80$, $p < .01$) on overall e-service quality. Thus,

H_{1A}, $H_{1C,}$ and H_{1D} are supported. The data are directionally consistent with H_{1B}, such that high uncertainty avoidance strengthens the effect of fulfilment ($\beta = .26$, $p > .05$) on overall e-service quality, though not significantly.

Masculinity/femininity: Support for our theorizing in regard to the moderating role of masculinity/femininity is mixed. Specifically, in support of H_{2C} and H_{2D}, which state that femininity will strengthen (masculinity will weaken) the effect of customer service and fulfilment (respectively) on overall e-service quality, we find that masculinity weakens (i.e., femininity strengthens) the effect of customer service ($\beta = -.27$, $p < .01$) and security ($\beta = -.77$, $p < .01$) on overall e-service quality. H_{2A}, which states that femininity strengthens the relationship between website design and overall e-service quality, and H_{2B}, which states that masculinity strengthens the relationship between fulfilment and overall e-service quality, are not supported (each $p > .05$).

Power distance: In support of H_3, which states that high power distance will strengthen the effect of security on outcome variables, we find that high power distance strengthens the effect of security on overall e-service quality ($\beta = .82$, $p < .01$).

Individualism/collectivism: Our findings regarding individualism/collectivism are mixed and unexpected. Opposing H_{4B}, which states that individualism strengthens the association between fulfilment and overall e-service quality, we find that collectivism strengthens the association between fulfilment and overall e-service quality ($\beta = -.65$, $p < .05$) The effect of individualism/collectivism on the association between the remaining e-service quality dimensions (website design, customer service, and security) and overall e-service quality are non-significant.

Regulatory context. We examined two factors: financial secrecy and rule of law.

Financial secrecy: In support of H_5 we find that financial secrecy strengthens the effect of security on overall e-service quality ($\beta = .71$, $p < .01$).

Rule of law: In support of H_6, we find that rule of law weakens the effect of security on overall e-service quality ($\beta = -.69$, $p < .01$).

Industry context. We examined two factors: services versus goods, and retailing versus banking.

Services vs. goods: We find support for H_{7A} only, which states that website design will have a strengthening effect on outcome variables in a services industry ($\beta = .43$, $p < .01$). We find directional support for H_{7C}, which states that a services (vs. goods) industry has a strengthening effect on the association between security and overall e-service quality ($\beta = .19$, $p > .05$). H_{7D}, which states that a goods (services) industry has a strengthening (weakening) effect on the association between fulfilment and overall e-service quality is not supported ($\beta = -.40$, $p > .05$). H_{7B}, regarding the strengthening effect of a services industry on the association between customer service and overall e-service quality, is not supported ($\beta = -.22$, $p > .05$).

Retailing vs. banking: In examining a hybrid of goods and services, we examined online retailing (hybrid) as compared to online banking (pure service), hypothesizing that a banking context should strengthen the association between e-service quality dimensions and overall e-service quality. We find that a banking context strengthens the association between fulfilment and overall e-service quality (H_{8B}; $\beta = -.42$, $p > .05$), customer service and overall e-service quality (H_{8C}; $\beta = -.31$, $p < .01$), and security and overall e-service quality (H_{8D}; $\beta = -.38$, $p < .05$). H_{8A}, regarding the strengthening effect of a banking context on the association between website design and overall e-service quality, is not supported ($\beta = .11$, $p > .05$).

Controls. In addition to using industry and country characteristics, we included several variables as covariates. In particular, we find moderating effects of year of publication, experience with the internet and websites, student samples, and E-S-QUAL and SERVQUAL dummy variables when controlling for the impact of the scale used. Inclusion of

control variables did not affect stability of our findings. The use of panel data was not a statistically significant moderator.

The moderator analysis is largely consistent with the sub-group analysis. However, it also shows the need for further studies in different countries so more robust comparisons can be made in the future (Table 8). Differences between moderator and sub-group analyses were due to the fact that sub-group analysis is a bivariate analysis while moderator analysis controls the other conceptual moderators, as well as study characteristics.

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Insert Table 8 about here
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(4) Comparing the Performance of Different Overall E-service Quality Measures

In addition to the descriptive results on the main effects of e-service quality (Table 3) and sub-group analysis (Table 8), we also compared the performance of different overall e-service quality measures. In Table 9, we report—where available—the reliability-adjusted average-weighted correlations of each dimension with overall e-service quality, customer satisfaction, and repurchase intentions. The second last row reports the average correlation for the column, which can be interpreted as a surrogate for scale performance. This comparison and our findings on the e-service quality dimensions help guide scale developers and researchers in the field of e-service quality.[10]

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Insert Table 9 about here
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In this descriptive analysis, we contrasted nine measures of e-service quality with each other and find two measurements to outperform the others. The greatest averaged effect

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[10] We thank one anonymous reviewer for suggesting this analysis.

size was found for a measure developed by Yang, Jun, and Peterson (2004) in an online banking context ($r = .75$). This measure includes eight attributes (out of 16 in the four-dimension model): website organization, website convenience, product selection, order accuracy, service level, return policies, security, and privacy of information (Table 3). While some of the following attributes may need to be adapted to a banking context, future measures should include attributes related to information quality, purchase process merchandise availability, price offerings, website personalization, system availability, timeliness of delivery, and delivery condition.

For an online retailing context, we suggest employment of the WebQual measure (Loiacono, Watson, and Goodhue 2002) because it had the highest effect sizes within retailing ($r = .58$). This measure includes ten attributes (out of 16 in the four-dimension model): information quality, website organization, purchase process, website convenience, merchandise availability, website personalization, system availability, service level, security, and privacy (Table 3).

GENERAL DISCUSSION

Given the importance of e-service quality in the current economy, it is important to take stock of the research in this area and provide guidance for its development in the future. In this regard, we took a meta-analytic approach to develop and test a model of overall e-service quality that is based in the means-ends-chain theory (Gardial et al. 1994). Our results provide guidance for marketing scholars and managers alike by providing a conceptual model (Figure 1), a series of empirical generalizations regarding key relationships (Tables 3, 4, and 5), testing rival models about mediated relationships (Figure 3 and Tables 5 and 9), and identifying boundary conditions (e.g., moderators) for the key associations (Tables 7 and 8). Key conclusions and directions emanating from our results are summarized in Tables 10 and 11.

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Insert Tables 10 and 11 here

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The basic framework rooted in means-ends-chain theory is supported by the meta-analytical results. As seen in Table 3, e-service quality attributes and dimensions are statistically associated with overall e-service quality, and overall e-service quality is associated with higher-order abstract outcomes such as customer satisfaction. The underlying mediated model, tested via SEM, confirms the basic conceptual framework; it shows that overall e-service quality is a key construct linking specific attributes and dimensions to customer satisfaction and repurchase intentions. More importantly, we also find that the association between key dimensions and overall e-service quality is not unconditional—rather it is moderated by country culture, regulatory environment, and industry context.

The specific results from the meta-analysis provide useful empirical generalizations, which can inform researchers and managers alike in their decision making. First, as shown in Table 3 attributes such as information quality of the website, website organization, purchase process, website convenience, product selection, merchandise availability, price offerings, website personalization, and system availability are critical and must be included. Additionally, fulfilment related attributes such as timeliness of delivery and delivery condition should be included. More generally, our results suggest all 16 attributes are associated with either overall e-service quality or customer satisfaction. Second, as described in Tables 4 and 5, we test a mediated model linking e-service quality dimensions (website design, fulfilment, customer service, security) to overall e-service quality. In this regards we test two alternative conceptualizations, finding support for a four-dimension model. As seen in Table 5, website design, fulfilment, and customer service are relatively more strongly associated with overall e-service quality than security. These results also resolve previous conflicting findings. While Parasuraman, Zeithaml, and Malhotra (2005) found customer

service and security to be significant, Wolfinbarger and Gilly (2003) found customer service and security to be non-significant. Our results suggest the inclusion of customer service in further models. Regarding security—the dimension is non-significant in the path model, but the attribute is significantly associated with overall e-service quality and customer satisfaction; thus, its inclusion is warranted in future models.

Third, the moderator analysis provides specific guidance in terms of contextualizing the association between e-service quality dimensions and overall e-service quality. The specific moderators—country culture, regulatory environment, industry context, and other methods related factors—provide guidance for interpreting the results and designing future studies. By highlighting the role of country culture and industry context as key boundary conditions, we show that e-service quality—while a globally relevant construct—should be carefully interpreted and implemented with a local mindset. Moreover, managers wanting to manage e-service quality must take a context-specific approach to understand and optimize it. Online retailing is a global enterprise which must be locally adaptive. For example, global companies such as Amazon adapt their strategy and develop websites for each country. Our research about the moderating effect of countries can provide useful guidance in this regard. Regarding cultural differences, masculinity and uncertainty avoidance affect the importance of customer service and security, but in opposite directions. Thus, understanding a country's cultural values can enable managers to better position themselves for improving overall e-service quality, and thus its outcomes.

Directions for Future Research

In addition to understanding how the associations between e-service quality dimensions and overall e-service quality differ for goods versus services, it will be important to understand how they differ for hybrid industries—where the lines between goods and services are often blurred. This will require that researchers more carefully ask consumers to

record their experiences, and refine the categories and scales used to measure industry classification in future studies.

Table 11 provides a brief prospectus for further research. These research questions are largely driven by the fact that a quantitative meta-analysis, even when synthesized with a theoretical model, can be largely descriptive: it can tell us <u>what</u> the state of the art is, but it may not reveal the <u>why</u> of it. More grounded theory and testing will be needed (Deshpande 1983) to move the field forward. In this regard, we have suggested a list of issues and questions that should serve as starting points for research scholars. Complementing these with in-depth interviews and Delphi studies with researchers, consumers, managers, and technology experts to understand factors that might constitute and contribute to experience in online channels is recommended. In particular, we suggest understanding additional outcomes such as cross-buying, share of wallet, willingness to pay a price premium, posting online reviews, and liking a brand online. Prior research in the relationship marketing literature suggests that drivers for these outcomes may differ (Bolton, Lemon, and Verhoef 2004).

Insights from other related research areas like self-service technologies suggests that variables like consumer readiness (Meuter, Bitner, Ostrom, and Brown 2005) could be investigated in regard to e-service quality. Similarly, constructs like self-efficacy (Gist and Mitchell 1992), confidence (Laroche, Kim, and Zhou 1996; Locander and Hermann 1979), and moral identity (Winterich, Mittal, and Aquino 2013) could also be investigated in this context in future research. Finally, methodological issues such as the costs and benefits of using convenience samples, cross-sectional surveys, and regression-based approaches should be examined. Inclusion of approaches such as experiments, process-tracing studies, and analysing longitudinal cohorts should be encouraged and explored.

Limitations

The limitations of our meta-analysis could be used to guide future research. First, the limited number of published studies and the constructs examined restricted us from investigating additional moderators of the association between e-service quality dimensions and overall e-service quality. As more studies accumulate, the scope of moderators can be broadened.

Second, meta-analyses are retrospective. Online channels have changed, and will continue to change rapidly in the next few years. Thus, this meta-analysis should be viewed as one milestone in a longer journey, and not the final word on this topic. Additional attributes and dimensions of e-service quality, along with more relevant outcomes, should continue to be explored.

In conclusion, we hope the synthesis and insights from this study will spur further research on this topic. Though they are quantitative and retrospective, our results will gain—abundantly—from qualitative commentary, judgment, and insights from customers, managers, technology experts, and researchers. Augmented with those, a richer path for future research can be charted.

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FIGURE 1:
CONCEPTUALIZATION OF E-SERVICE QUALITY
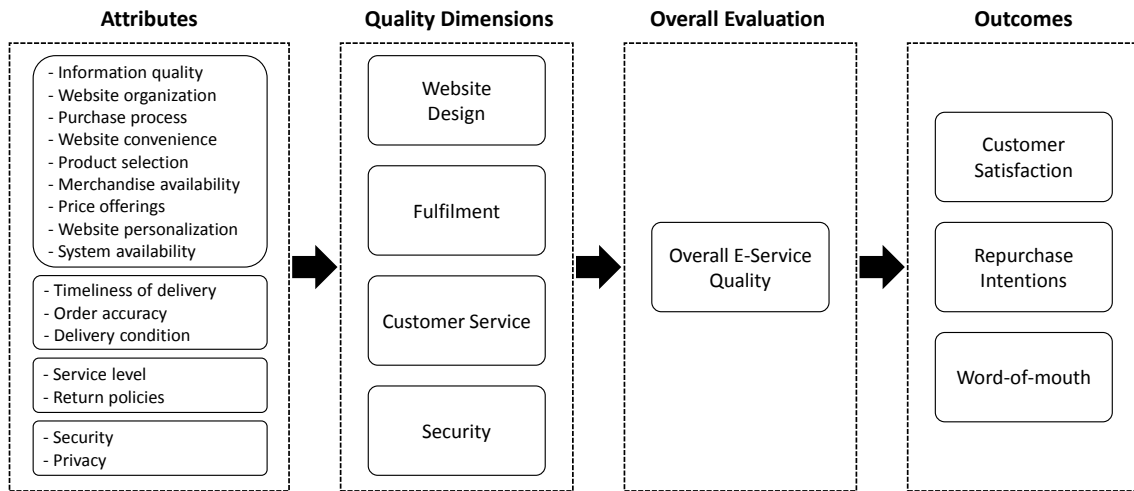
FIGURE 2:
A CONTEXTUAL MODEL FOR UNDERSTANDING E-SERVICE QUALITY
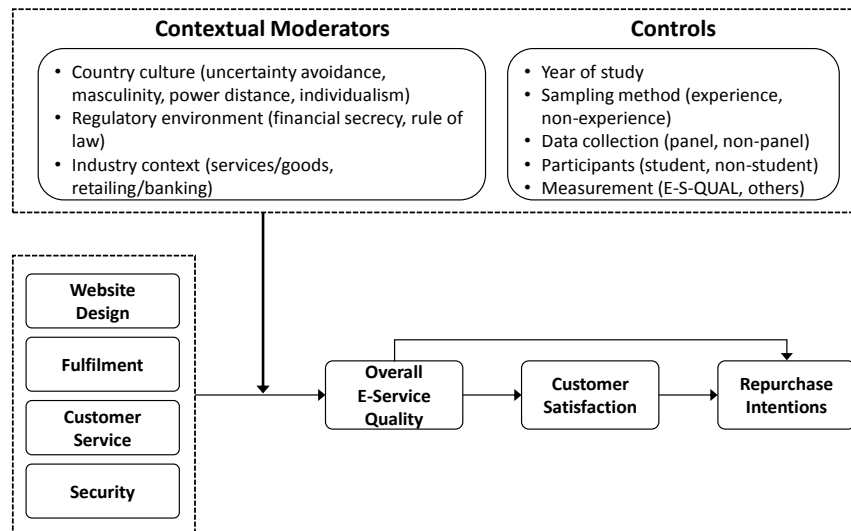
FIGURE 3:
E-SERVICE QUALITY DIMENSIONS: TWO COMPETING MODELS

A: Four-Dimension Model Based on Wolfinbarger and Gilly, 2003

Website Design — Fulfilment — Customer Service — Security

Overall E-Service Quality → Customer Satisfaction → Repurchase Intentions

B: Six-Dimension Model Based on Parasuraman, Zeithaml, and Malhotra, 2005

Efficiency — Fulfilment — System Availability — Privacy — Responsiveness — Contact

Overall E-Service Quality → Customer Satisfaction → Repurchase Intentions

TABLE 1:
ATTRIBUTES USED IN DIFFERENT E-SERVICE QUALITY MODELS

Attributes	Adapted Parasuraman, Zeithaml, and Berry (1988): SERVQUAL	Adapted Dabholkar (1996)	Szymanski and Hise (2000)	Yoo and Donthu (2001): SITEQUAL	Janda, Trocchia, and Gwinner (2002): ISRQ	Loiacono, Watson, and Goodhue (2002): WebQual	Wolfinbarger and Gilly (2003): eTailQ	Yang, Jun, and Peterson (2004)	Parasuraman, Zeithaml, and Malhotra (2005): E-S-QUAL
Website design									
- Information quality	NO	NO	✓	NO	✓	✓	✓	NO	✓
- Website organization	✓	✓	✓	✓	✓	✓	✓	✓	✓
- Purchase process	✓	✓	NO	✓	✓	✓	✓	NO	✓
- Website convenience	✓	✓	✓	✓	NO	✓	✓	✓	✓
- Product Selection	NO	NO	✓	NO	✓	NO	✓	✓	NO
- Merchandise availability	✓	NO	NO	NO	NO	✓	NO	NO	✓
- Price offerings	NO	NO	NO	NO	NO	NO	NO	NO	NO
- Website personalization	✓	NO	NO	NO	NO	✓	✓	NO	NO
- System availability	NO	NO	NO	NO	NO	✓	NO	NO	✓
Fulfilment									
- Timeliness of delivery	✓	✓	NO	NO	NO	NO	✓	NO	✓
- Order accuracy	✓	✓	NO	NO	✓	NO	✓	✓	✓
- Delivery condition	NO	NO	NO	NO	NO	NO	✓	NO	✓
Customer service									
- Service level	✓	NO	NO	NO	✓	✓	✓	✓	✓
- Return policies	NO	NO	NO	NO	✓	NO	✓	✓	✓
Security									
- Security	✓	✓	✓	✓	✓	✓	✓	✓	✓
- Privacy	NO	NO	NO	NO	✓	✓	✓	✓	✓
Number of attributes	9	6	5	4	9	10	13	8	13
Context	Retailing[a]	Banking[a]	Retailing	Retailing	Retailing	Retailing	Retailing	Banking	Retailing
Google cites	18,447	1,207	1,554	857	440	606	1,308	285	1,942

[a] The measurement from Parasuraman et al. (1988) and Dabholkar (1996) were developed in an offline context and were later adapted to online retailing and online banking.
Notes: (1) Some scales do not examine the influence of attributes on overall quality, customer satisfaction, and repurchase intentions. Instead the attributes were related to dimensions. Thus, Parasuraman et al. (2005) identified seven dimensions, and Wolfinbarger and Gilly (2003) identified four dimensions. (2) Google cites as of May 2015.

TABLE 2:
DEFINITION OF CONSTRUCTS USED IN THE META-ANALYSIS
(E-SERVICE QUALITY)

Construct	Definition	Attributes	Source
Website design	Includes all elements of the consumer's experience on the website (except for customer service), including navigation, information search, order processing, shipment tracking, product availability, product and price offerings, personalization, and system availability (adapted from Holloway and Beatty 2008).	• Website information quality • Website organization/ design/navigation • Purchase process • Website convenience/ ease of use • Product selection • Merchandise stock availability • Personalization • System availability	Holloway and Beatty (2008); Parasuraman, Zeithaml, and Malhotra (2005); Wolfinbarger and Gilly (2003)
Fulfilment	Customers receive what they thought they ordered based on the display and description provided on the website; and/or delivery of the right product at the right price (i.e., billed correctly) in good condition within the time frame promised (Holloway and Beatty 2008).	• Timeliness of delivery • Order accuracy • Delivery condition • Billing accuracy • Merchandise quality	Holloway and Beatty (2008); Parasuraman, Zeithaml, and Malhotra (2005); Wolfinbarger and Gilly (2003)
Customer service	Helpful, responsive service that responds to customer inquiries and returns/complaints quickly during or after the sale (Holloway and Beatty 2008).	• Service level • Return handling/policies	Holloway and Beatty (2008); Parasuraman, Zeithaml, and Malhotra (2005); Wolfinbarger and Gilly (2003)
Security	The security of credit card payments and the privacy of shared information during or after the sale (Holloway and Beatty 2008).	• Security • Privacy	Holloway and Beatty (2008); Parasuraman, Zeithaml, and Malhotra (2005); Wolfinbarger and Gilly (2003)
Overall e-service quality	The overall excellence or superiority of the service (Zeithaml 1988).	• E-service quality • Perceived service quality	Fassnacht and Koese 2006; Parasuraman, Zeithaml, and Malhotra (2005)
Customer satisfaction	A customer's overall judgment that a product or service provided (or is providing) a pleasurable level of consumption-related fulfilment (Oliver 2010).	• Overall satisfaction • Cumulative satisfaction	Anderson and Sullivan (1993)
Repurchase intentions	Intent to maintain the relationship in the future which captures the likelihood continued purchases from the firm (Anderson 1994).	• Purchase intentions • Likelihood of leaving (reverse-coded) • Relationship continuity	Anderson (1994)
Word-of-mouth	Communication between parties concerning evaluations of goods and services (Anderson 1998).	• Referrals • Complaints (reverse-coded) • Recommendations	Anderson (1998)

TABLE 3:
DESCRIPTIVE STATISTICS AND CORRELATIONS OF E-SERVICE QUALITY WITH OUTCOME VARIABLES

Predictor Variable	Overall E-Service Quality				Customer Satisfaction				Repurchase Intentions				Word-of-mouth			
	k	N	r	Q	k	N	r	Q	k	N	r	Q	k	N	r	Q
Website design	66	13,795	.489*	1,297*	133	15,616	.384*	1,967*	111	16,121	.461*	2,279*	17	2,828	.402*	325*
- Information quality	11	5,905	.593*	392*	28	7,534	.301*	286*	16	6,602	.418*	345*	5	986	.353*	68*
- Website organization	20	9,260	.522*	209*	22	9,390	.468*	283*	31	10,363	.399*	734*	4	1,717	.559*	28*
- Purchase process	3	904	.393*	18*	8	1,344	.293*	66*	11	2,232	.324*	141*	2	589	.376*	6
- Website convenience	9	4,942	.540*	214*	28	4,874	.453*	344*	14	3,637	.630*	206*	1	240	.536*	−
- Product Selection	2	753	.699*	−	7	2,805	.371*	235*	2	776	.485	−	2	450	.011	−
- Merchandise availability	1	271	.038	−	−	−	−	−	−	−	−	−	−	−	−	−
- Price offerings	1	472	.620*	−	12	1,198	.119	−	1	472	.647*	−	−	−	−	−
- Website personalization	6	2,380	.374*	22*	7	1,897	.412*	38*	7	2,240	.443*	46*	1	112	.490*	−
- System availability	7	2,586	.305*	86*	9	3,555	.446*	169*	13	4,290	.404*	250*	−	−	−	−
- Mixed measures	6	2,417	.402*	60*	12	3,641	.464*	202*	16	5,492	.566*	120*	2	589	.420*	−
Fulfilment	19	7,630	.529*	332*	26	7,876	.380*	252*	32	8,448	.297*	398*	5	2,138	.228*	38*
- Timeliness of delivery	3	411	.306*	4	2	280	.336*	−	2	431	.521*	−	−	−	−	−
- Order accuracy	−	−	−	−	3	459	.279*	5	−	−	−	−	−	−	−	−
- Delivery condition	1	1,258	.650*	−	−	−	−	−	−	−	−	−	−	−	−	−
- Mixed measures	15	7,459	.558*	305*	21	7,417	.399*	305*	30	8,257	.280*	371*	5	2,138	.228*	38*
Customer service	11	6,110	.414*	438*	43	7,090	.264*	649*	31	7,530	.371*	293*	6	1,553	.148	−
- Service level	11	6,110	.414*	438*	29	7,270	.327*	611*	28	7,211	.387*	279*	6	1,553	.148	−
- Return policies	−	−	−	−	14	1,608	.124*	7	3	1,073	.224*	2	−	−	−	−
- Mixed measures	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Security	14	4,734	.342*	346*	32	8,863	.296*	450*	22	7,775	.316*	301*	5	1,927	.265*	93*
- Security	11	1,900	.357*	280*	14	4,638	.268*	262*	13	3,589	.307*	121*	4	892	.216*	42*
- Privacy	3	1,821	.291	61*	16	3,055	.290*	133*	8	3,151	.351*	154*	−	−	−	−
- Mixed measures	−	−	−	−	2	1,170	.358*	−	1	1,035	.145	−	1	1,035	.430*	−
All Predictors	110	13,795	.471*	2,950*	234	16,219	.351*	3,582*	196	16,504	.406*	3,583*	33	2,828	.312*	651*
Overall e-service quality	−	−	−	−	10	4,559	.588*	114*	11	5,426	.477*	307*	−	−	−	−

Notes: k = number of correlations, N = total sample size across independent samples, r = average artifact-corrected correlation, Q = Q-statistic for homogeneity test. * indicates significance at $p < .05$. Operationally, we attempted to calculate the Q-statistic only when there were a minimum of three correlations. A dash indicates that this condition was not met.

TABLE 4: RELIABILITY-ADJUSTED AVERAGE-WEIGHTED CORRELATIONS AMONG CONSTRUCTS
PANEL A: FOUR-DIMENSION E-SERVICE QUALITY MODEL
(BASED ON WOLFINBARGER AND GILLY, 2003)

	WD	FF	CS	SEC	QUAL	SAT	RI
Website Design (WD)	[.93][b]						
Std. Dev.	-						
N	-						
Fulfilment (FF)	.55	[.93]					
Std. Dev.	.19	-					
N	10366	-					
Customer Service (CS)	.47	.50	[.91]				
Std. Dev.	.20	.18	-				
N	7816	5973	-				
Security (SEC)	.41	.48	.39	[.93]			
Std. Dev.	.15	.16	.18	-			
N	18656	5349	5042	-			
Overall E-Service Quality (QUAL)	.47	.51	.47	.32	[.98]		
Std. Dev.	.17	.18	.26	.24	-		
N	14300	8320	6295	4734	-		
Customer Satisfaction (SAT)	.43	.39	.31	.31	.58	[.97]	
Std. Dev.	.19	.15	.15	.20	.16	-	
N	18151	8634	9160	9160	4559	-	
Repurchase Intentions (RI)	.42	.33	.39	.31	.47	.65	[.95]
Std. Dev.	.20	.19	.16	.19	.24	.24	-
N	19206	9527	8453	7775	5426	9815	-
M	5.00	5.23	4.89	5.08	4.95	5.18	5.30
Std. Dev.	1.17	1.22	1.20	1.26	1.11	1.09	1.26

PANEL B: SIX-DIMENSION E-SERVICE QUALITY MODEL
(BASED ON PARASURAMAN, ZEITHAML, AND MALHOTRA, 2005)

	EFF	FUL	SYS	PRI	RES	CON	QUAL	SAT	RI
Efficiency (EFF)	[.94][b]								
Std. Dev.	-								
N	-								
Fulfilment (FUL)	.56	[.94]							
Std. Dev.	.20	-							
N	10058	-							
System Availability (SYS)	.69	.58	[.90]						
Std. Dev.	.17	.12	-						
N	3182	2012	-						
Privacy	.42	.48	.51	[.93]					
Std. Dev.	.16	.16	.09	-					
N	18981	5349	3182	-					
Responsiveness (RES)	.46	.58	.27	.21	[.92]				
Std. Dev.	.16	.18	.01	.01	-				
N	4487	2844	742	742	-				
Contact (CON)	.52	.54	.16	.41	.70	[.94]			
Std. Dev.	.19	.16	.00	.21	.13	-			
N	2829	1433	551	1896	953	-			
Overall E-Service Quality (QUAL)	.49	.51	.30	.32	.59	.52	[.98]		
Std. Dev.	.16	.18	.17	.24	.21	.16	-		
N	13809	8320	1821	4734	2260	2120	-		
Customer Satisfaction (SAT)	.41	.39	.43	.31	.28	.32	.58	[.97]	
Std. Dev.	.18	.15	.21	.20	.21	.23	.16	-	
N	17339	8634	2567	9160	3641	2819	4559	-	
Repurchase Intentions (RI)	.44	.33	.37	.31	.40	.41	.47	.65	[.95]
Std. Dev.	.20	.19	.21	.18	.17	.22	.24	.24	-
N	18872	9527	3445	8203	4616	3162	5426	9815	-
M	5.00	5.23	5.94	5.08	4.86	4.92	4.95	5.18	5.30
Std. Dev.	1.17	1.22	.94	1.26	1.09	1.42	1.11	1.09	1.26

Notes: Harmonic mean across all collected effect sizes including word-of-mouth is 3,244. This sample size is more conservative than the sample size of 10,410 when excluding word-of-mouth.

[a] We included constructs in the causal model only when three or more correlation coefficients were available among that construct and all other constructs in the model. Please note that word-of-mouth was excluded due to missing data.

[b] Entries in the diagonal [ ] are weighted-mean Cronbach alpha coefficients.

TABLE 5: RESULTS OF THE STRUCTURAL EQUATION MODEL
PANEL A: MODEL FIT COMPARISON

	Four-Dimension E-Service Quality Model (based on Wolfinbarger and Gilly, 2003)	Six-Dimension E-Service Quality Model (based on Parasuraman, Zeithaml, and Malhotra, 2005)
Chi-Squared	3.93 (df = 2)	6.03 (df = 3)
p	.14	.11
Comparative Fit Index (CFI)	1.000	1.000
Root Mean Square Error of Approximation (RMSEA)	.017	.018
Akaike Information Criterion (AIC)	55.93	90.03
Consistent Akaike Information Criterion (CAIC)	239.98	387.35
Parsimonious Normed Fit Index (PNFI)	.095	.083
Parsimonious Goodness of Fit Index (PGFI)	.071	.067

PANEL B: FOUR-DIMENSION E-SERVICE QUALITY MODEL (BASED ON WOLFINBARGER AND GILLY, 2003)

	Overall E-Service Quality			Customer Satisfaction		Repurchase Intentions			
	Total (Direct on QUAL)	Direct (on SAT)	Indirect (via QUAL)	Total (Direct + Indirect)	Relative Importance	Direct (on RI)	Indirect (via SAT)	Total (Direct + Indirect)	Relative Importance
Website Design	.196**	.162**	.091**	.253**	26.45%	.114**	.168**	.282**	37.33%
Fulfilment	.248**	.030	.116**	.145**	44.44%	-.077**	.105**	.027	79.55%
Customer Service	.211**	-.042**	.098**	.056**	63.64%	.175**	.047**	.222**	17.47%
Security	.014	.077**	.006	.083**	6.74%	.055**	.052**	.107**	32.70%
Overall E-Service Quality		.466**		.466**		.060**	.288**	.348**	45.28%
Customer Satisfaction						.618**		.618**	
R^2	.348			.229				.235	

* p < .05; ** p < .01

PANEL C: SIX-DIMENSION E-SERVICE QUALITY MODEL (BASED ON PARASURAMAN, ZEITHAML, AND MALHOTRA, 2005)

	Overall E-Service Quality			Customer Satisfaction		Repurchase Intentions			
	Total (Direct on QUAL)	Direct (on SAT)	Indirect (via QUAL)	Total (Direct + Indirect)	Relative Importance	Direct (on RI)	Indirect (via SAT)	Total (Direct + Indirect)	Relative Importance
Efficiency	.267**	-.126**	.152**	.026	85.39%	.112**	.006	.118**	4.84%
Fulfilment	.149**	-.028	.084**	.057**	59.57%	-.184**	.031**	-.154**	16.76%
System Availability	-.187**	.503**	-.106**	.397**	21.07%	.082**	.262**	.344**	43.23%
Privacy	.113**	-.062**	.064**	.003	95.52%	.073**	-.003	.070**	4.11%
Responsiveness	.401**	-.253**	.227**	-.026	89.72%	.253**	-.032	.221**	12.65%
Contact	-.014	.187**	-.008	.179**	4.28%	.089**	.116**	.204**	36.25%
Overall E-Service Quality		.567**		567**		-.039	.365**	.324**	52.98%
Customer Satisfaction						.641**		.641**	
R^2	.438			.252				.286	

* p < .05; ** p < .01

TABLE 6: TESTING THE RELATIVE WEIGHTS OF EACH DIMENSION
(FOUR-DIMENSION E-SERVICE QUALITY MODEL BASED ON WOLFINBARGER AND GILLY, 2003)

Dependent Variable	Constrained Paths in Model		β_{IV1}	β_{IV2}	$\Delta\chi^2$	d.f.	p
	Independent Variable 1	Independent Variable 2					
Overall E-Service Quality	Website Design	Fulfilment	.196	.248	3.49	1	ns
	Website Design	Customer Service	.196	.211	.32	1	ns
	Website Design	Security	.196	.014	56.01**	1	<.01
	Fulfilment	Customer Service	.248	.211	1.99	1	ns
	Fulfilment	Security	.248	.014	82.50**	1	<.01
	Customer Service	Security	.211	.014	69.80**	1	<.01

* p < .05; ** p < .01

TABLE 7: MODERATOR ANALYSIS ON THE ASSOCIATION OF EACH DIMENSION OF E-SERVICE QUALITY AND OVERALL E-SERVICE QUALITY

Association	k	UA	MAS	PDI	IND	Rule of Law	Financial Secrecy	Services (Goods)	Retailing (Banking)	CONTROLS Year	Exper. Sample (other)	Panel (other)	Student (other)	E-S-QUAL (other)	R²(%)
Website Design → Overall E-Service Quality	66	.77**	.21	-.09	.05	.32	-.14	.43**	.11	.35**	-.35**	.02	-.19*	-.29**	50.25
Fulfilment → Overall E-Service Quality	19	.26	-.08	.25	-.65*	-.51	.17	-.40	-.42	.47*	.08	.02	-.01	-.28	62.08
Customer Service → Overall E-Service Quality	11	.48**	-.27**	.26	-.20	-.55	-.54**	-.22	-.31**	.68**	-.10	-.05	-.49**	–	97.32
Security → Overall E-Service Quality	14	.80**	-.77**	.82**	-.51	-.69**	.71**	.19	-.38*	.59**	-.02	-.08	-.78**	-.52**	89.79
All Dimensions → Overall E-Service Quality	110	.82**	.23	-.12	.09	-.04	-.15	.27**	-.16*	.36**	-.27**	-.03	-.18**	-.29**	48.69

* $p<.05$ (one-tailed); ** $p<.01$ (one-tailed). UA = uncertainty avoidance; MAS = masculinity; PDI = power distance; IND = individualism.

Note: Please note that we calculated separate models for PDI, IND, and rule of law due to often observed high correlations of cultural dimensions (see Samaha, Beck, and Palmatier 2014). For instance, we tested a model with all moderators and just examined PDI instead of MAS.

TABLE 8: SUB-GROUP ANALYSIS BY MODERATOR VARIABLE

Relationship	UA	MAS	PDI	IND	Rule of Law	Fin. Secrecy	Service (other)	Retail (other)	Year	Exper. Sample (other)	Panel (other)	Student (other)	E-S-QUAL (other)	SERVQUAL (others)
Website Design → Overall E-Service Quality	.36**	-.28**	.09**	-.11**	-.18**	-.13**	.61** a	.49**	.22**	.48** a	.44** a	.49**	.26** a	.26** a
							(.46**)	(.49**)		(.50**)	(.50**)	(.49**)	(.51**)	(.52**)
Fulfilment → Overall E-Service Quality	.38**	-.18**	.16**	-.22**	-.21**	.03**	.35** a	.47** a	.49**	.54** a	.46** a	.55** a	.41** a	.34** a
							(.55**)	(.59**)		(.50**)	(.55**)	(.53**)	(.55**)	(.56**)
Customer Service → Overall E-Service Quality	.42**	-.15**	-.11**	.07**	-.22**	-.38**	.43**	.31** a	.28**	.45** a	.51** a	.33** a	–	.24** a
							(.41**)	(.50**)		(.37**)	(.39**)	(.43**)	(.41**)	(.50**)
Security → Overall E-Service Quality	.18**	-.12**	.11**	.02	-.08**	-.01	.64 a	.23** a	.09**	.28** a	.33	-.04 a	.09* a	.23 a
							(.28**)	(.52*)		(.41**)	(.35**)	(.40**)	(.41**)	(.36**)
All Dimensions → Overall E-Service Quality	.33**	-.21**	.07**	-.08**	-.16**	-.12**	.57** a	.44** a	.25**	.47**	.44** a	.43** a	.26** a	.27** a
							(45**)	(.51**)		(.47**)	(.48**)	(.48**)	(.49**)	(.51*)

* $p<.05$ (two-tailed); ** $p<.01$ (two-tailed). UA = uncertainty avoidance; MAS = masculinity; PDI = power distance; IND = individualism.

[a] indicates that averaged correlations by side of moderator are significantly different from each other ($p<.05$).

Note: Please note that the significance tests take the sample size into account. For continuous variables (e.g. UA), we report the correlation between the moderator and the effect size. For dichotomous variables, we report the reliability-adjusted average-weighted correlation by side of moderator.

TABLE 9: SUB-GROUP ANALYSIS

RELIABILITY-ADJUSTED AVERAGE-WEIGHTED CORRELATIONS BY MEASUREMENT

Relationship	Yang, Jung, and Peterson (2004)	Loiacono, Watson, and Goodhue (2002)	Dhabolkar (1996)	Revised Parasuraman, Zeithaml, and Berry (1988)	Parasuraman, Zeithaml, and Malhotra (2005)	Szymanski and Hise (2000)	Yoo and Donthu (2001)	Wolfinbarger and Gilly (2003)	Janda, Trocchia, and Gwinner (2002)	Others
Website Design → Overall E-Service Quality	.68**	–	.43**	.26**	.26**	–	.32**	.42**	–	.57**
Fulfilment → Overall E-Service Quality	.69**	–	.35**	.34*	.41**	–	–	.47**	–	.63**
Customer Service → Overall E-Service Quality	.75**	–	–	.24**	-	–	–	.14**	–	.49**
Security → Overall E-Service Quality	.75**	–	–	.23	.09*	–	.21**	.04	–	.47**
All Dimensions → Overall E-Service Quality	.71**	–	.40**	.27**	.26**	–	.29**	.28*	–	.56**
Website Design → Customer Satisfaction	.74**	.71**	.50**	.68**	.38**	.33**	–	.33**	.14*	.35**
Fulfilment → Customer Satisfaction	.69**	–	.35**	.15	.24**	–	–	.45**	–	.38**
Customer Service → Customer Satisfaction	.76**	–	–	.63*	.21	–	–	.14	-.04	.22**
Security → Customer Satisfaction	.81**	–	–	.65**	.44	.25**	–	.16	.12**	.25**
All Dimensions → Customer Satisfaction	.75**	.71**	.44**	.57**	.35**	.31**	–	.27**	.09*	.32**
Website Design → Repurchase intentions	–	.67**	.54**	.31**	.45**	–	.16*	.47**	–	.46**
Fulfilment → Repurchase intentions	–	–	.38**	.16**	.33**	–	–	.22**	–	.35**
Customer Service → Repurchase intentions	–	.47**	–	.34**	.32**	–	–	.21**	–	.42**
Security → Repurchase intentions	–	.28**	–	.41**	.30*	–	.33**	.19	–	.34**
All Dimensions → Repurchase intentions	–	.63**	.48**	.28**	.38**	–	.20**	.28**	–	.43**
Overall E-Service Quality → Customer Satisfaction	.91**	–	.40**	.32**	–	–	–	–	–	.56**
Overall E-Service Quality → Repurchase intentions	–	–	.53**	.25**	–	–	.44**	–	–	.48**
Average	.75	.58	.44	.36	.32	.30	.28	.27	.08	.43
Rank	1.	2.	3.	4.	5.	6.	7.	8.	9.	

* p<.05 (two-tailed); ** p<.01 (two-tailed)

Note: Analyses are conducted on the level of dimensions since most established measures synthesize the various attributes and do not report effect sizes on an attribute-level.
As results of our SEM indicate, the attributes should be grouped into four instead of seven dimensions as proposed by Wolfinbarger and Gilly (2003). Hence, we compare the different measures of e-service quality using these dimensions.

TABLE 10: BEST PRACTICES IN E-SERVICE QUALITY RESEARCH

Finding	Best Practices
MEASUREMENT PRACTICES	
1. 15 of 16 attributes of the e-service quality construct show significant effects either on overall e-service quality, customer satisfaction, repurchase intentions, and word-of-mouth (Table 3).	• E-service quality measures should include the following attributes: information quality, website organization, purchase process, website convenience, product selection, merchandise availability, price offerings, website personalization, system availability, timeliness of delivery, order accuracy, delivery condition, service level, return policies, security, and privacy.
2. Comparing a four-dimension model to a six-dimension model to conceptualize e-service quality shows that the four-dimension model is superior (Table 5, panel A).	• The 16 attributes may be conceptualized as four dimensions: website design, fulfilment, customer service, and security.
3. Website design, fulfilment, and customer service each have an association with overall e-service quality which are equal in magnitude to each other. The association of security with overall e-service quality is smaller than the other three (Table 6).	• Though it is important to include all four dimensions, the most important dimensions for inclusion are: website design, fulfilment, and customer service.
4. As seen in Table 1, no single measurement scale uses all 16 items. Yet, at least 15 out of the 16 items are associated with key outcomes.	• Rather than using a single scale published in a specific paper, researchers may decide to selectively include items that represent the underlying dimensions of interest (review Tables 1 and 3).
5. As seen in Table 9, items in some scales—when conceptualized as part of the four-dimension model—have a relatively stronger association with overall e-service quality, customer satisfaction, and repurchase intentions.	• A comparative analysis of the different existing scales helps prioritize the scale they may wish to use. Yang, Jun, and Peterson (2004) for online banking and Loiacono, Watson, and Goodhue (2002) for online retailing have the highest statistical performance.
INTERRELATIONSHIP WITH KEY OUTCOMES	
6. Consistent with the means-ends-chain theory, overall e-service quality is a useful construct. Specific attributes are associated with e-service quality dimensions, which predict overall e-service quality. In turn, overall e-service quality predicts customer satisfaction. Customer satisfaction in turn predicts repurchase intentions. Thus, there are strong mediating effects in terms of key outcomes (Figure 1).	• Managers should clearly recognize the importance of managing and optimizing overall e-service quality as a core, mediating construct. The meta-analysis clearly quantifies these relationships, providing guidance on the relative investments that must be made in managing specific attributes to achieve outcomes—such as repurchase and satisfaction—via overall e-service quality.
7. The differential importance of different attributes and dimensions (Tables 3 and 4) provides guidance on the relative investments managers should make in optimizing overall e-service quality and its outcomes such as customer satisfaction and repurchase intentions (Table 8).	• Every attribute and dimension of overall e-service quality may not be treated equally. Rather, based on the differential weights, managers should carefully assess their investment in specific attributes and dimensions.
CONTEXTUALITY OF THE CONSTRUCT	
8. Contextual differences based on country-culture moderate the association of the four dimensions with overall e-service quality dimensions.	• Uncertainty avoidance and masculinity show strong and consistent moderating effects compared to individualism and power distance. Managers should pay more attention to these cultural dimensions. • Website characteristics were found to be of major importance in countries being high in uncertainty avoidance and they were of minor importance in more masculine cultures which might be more willing to take risks and enforce customer rights.
9. Consistent with prior literature, security is less important in countries with higher rule of law. Furthermore, financial secrecy shows both amplifying effects for some dimensions and buffering effects for others.	• Regulatory factors such as rule of law and financial secrecy are key to better understanding how and why country-level differences exist in the importance of quality dimensions.
10. Effectiveness of e-service quality dimensions was also found to differ for goods as compared to services.	• Service firms should put greater focus on security issues due to intangibility of the offering, while fulfilment is of greater relevance for goods since delays are less likely for services.
11. Website characteristics are less important for online retailing as compared to banking.	• When translating best practices from one industry to the other, managers should be very careful in understanding key differences among them. All online industries or contexts should not be treated as being the same.

TABLE 11: RESEARCH AGENDA ON E-SERVICE QUALITY

Issues	*Research questions and comments*
Measurement-related issues	**Evaluate the relative efficacy of existing and additional measures as new studies become available.**
	We find that 15 out of the 16 attributes matter for online customers. Attributes can be synthesized to four dimensions. Can new measures be developed by using these insights and combining items from existing measures? Do new measures outperform SITEQUAL (Donthu 2001), PIRQUAL (Francis and White 2002), WebQual (Barnes and Vidgen 2002; Loiacono, Watson, and Goodhue 2002), or eTailQ (Wolfinbarger and Gilly 2003)?
	How, if at all, do customer expectations change over time?
	Which additional items have to be considered in the future for a website to be perceived as an outstanding website? How do we modify scales to link the website to new types of social media? How do scales evaluate usability of the website on mobile devices and tablets?
E-service quality and its outcomes	**What other outcomes are related to e-service quality?**
	Current research has examined customer satisfaction and repurchase intentions. Additional outcomes such as cross-buying, share-of-wallet, willingness to pay, price premium, and word-of-mouth should be examined. More specifically, online reviewing activity—posting and utilizing reviews—needs to be examined, in addition to activities such as liking and following. How is e-service quality differentially related to these different outcomes?
	How does e-service quality affect decision making, information processing, and information search?
	Process-tracing studies should examine the effect of past e-service quality on information processing, website search, information search, and decision-making processes. In particular, drawing on research on consumer decision making and consumer choice—researchers should more deeply examine the role of e-service quality on decision processes. How does prior e-service quality affect the weight assigned to different attributes and dimensions? What are the differences in information processing among those experiencing very high versus very low levels of e-service quality?
	What factors mediate the observed processes linking e-service quality to its antecedents and consequences?
	The means-ends-chain theory incorporates cognitive and affective routes to evaluation. What cognitive (e.g., technology readiness, efficacy, need for uniqueness) and/or affective (brand attachment, happiness, anger, disgust) factors mediate the different links?
Context-related issues	**Does relevance of e-service quality differ across customers?**
	Which customer characteristics act as moderators of the e-service quality-loyalty outcomes link? How do expertise, familiarity, risk orientation, moral identity, gender identity etc. affect a customer's e-service quality evaluation?
	Does relevance of e-service quality differ across products and markets?
	Does e-service quality differ for (i) hedonic/utilitarian, (ii) luxury/non-luxury, or (iii) high/low involvement products and services? Does it differ for contractual relationships compared to non-contractual relationships? Why do these differences exist?
	What role do external events play in affecting e-service quality?
	When do security and privacy issues gain importance? Which role do media play in formation of privacy concerns? Do we observe an increase of importance after certain events (political crises, economic downturn)? Do events such as security breaches for a single company (such as the one for Target in 2013-14) affect customers of non-affected brands? How and why?
Method-related issues	**Which hidden needs drive website choice?**
	Do customers have needs which they are not aware of when being asked what their needs are (e.g., habit-driven behavior)? Which further insights can be gained by Hidden Needs Analysis (HNA)?
	What are the relative advantages and disadvantages of different sampling methods?
	Do convenience samples differ from non-convenience samples? Does sampling based on familiarity (compared to expertise) affect quality of results? Should firms post a link on a website or write an invitation email to their customers to stimulate participation?
	What additional research methodologies can be used to gain better insights?
	Currently, the dominant research methodology is survey-based with a reliance on regression methods. What additional insights can be gained from experimental designs that can compare a control group to additional treatment groups based on a factorial design? Using process tracing studies which document and analyze actual browsing and buying behaviors, what can we learn about e-service quality? What about cohort analysis where specific groups of customers are followed and analyzed over a long period of time?

Web Appendix A

STUDIES INCLUDED IN THE META-ANALYSIS

Sample	Author(s)	Year	Journal	N	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Szymanski and Hise	2000	Journal of Retailing	1,007	1	0	0	1	0	0	1	0	0
2	Liu and Arnett	2000	Information & Management	119	1	0	1	0	0	1	0	0	0
3	Yoo and Donthu	2001	Quarterly Journal of Electronic Commerce	187	1	0	0	1	0	1	0	1	0
4	Aladwani and Palvia	2002	Information & Management	127	1	0	0	0	0	1	0	0	0
5	Janda, Trocchia, and Gwinner	2002	International Journal of Service Industry Management	450	1	0	1	1	0	0	1	0	1
6	Loiacono, Watson, and Goodhue	2002	Marketing theory and applications	311	1	0	1	1	0	0	0	1	0
7	Yang and Jun	2002	Journal of Business Strategies	271	1	1	1	1	0	1	0	0	0
8	Devaraj, Fan, and Kohli	2002	Information Systems Research	134	1	1	1	0	0	0	1	1	0
9	Kwon, Kim, and Lee	2002	Behaviour and Information Technology	1,009	1	0	0	0	0	1	0	1	0
10	Cai and Jun	2003	Managing Service Quality	110	1	1	0	1	0	1	0	0	0
11	Cai and Jun	2003	Managing Service Quality	61	1	1	0	1	0	1	0	0	0
12	Montoya-Weiss, Voss, and Grewal	2003	Journal of the Academy of Marketing Science	1,137	1	0	0	0	0	1	1	1	0
13	Montoya-Weiss, Voss, and Grewal	2003	Journal of the Academy of Marketing Science	493	1	0	0	0	0	1	1	1	0
14	Wolfinbarger and Gilly	2003	Journal of Retailing	1,013	1	1	1	1	0	1	1	1	0
15	van Iwaarden et al.	2003	International Journal of Quality and Reliability	293	1	1	1	0	0	0	0	1	0
16	Negash, Ryan, and Igbaria	2003	Information and Management	726	1	0	1	0	0	0	1	0	0
17	Evanschitzky et al.	2004	Journal of Retailing	298	1	0	0	1	0	0	1	0	0
18	Evanschitzky et al.	2004	Journal of Retailing	297	1	0	0	1	0	0	1	0	0
19	Jayawardhena	2004	Journal of Marketing Management	249	1	0	1	1	0	1	0	0	0
20	Long and McMellon	2004	Journal of Services Marketing	477	1	1	1	0	0	1	0	0	1
21	Ribbink et al.	2004	Managing Service Quality	184	1	0	1	0	0	0	1	1	0
22	Yang, Jun, and Peterson	2004	International Journal of Operations & Production Management	235	1	1	1	1	0	1	1	0	0

23	Lee and Lin	2005	International Journal of Retail & Distribution Management	297	1	1	1	1	0	1	1	1	0
24	Parasuraman, Zeithaml, and Malhotra	2005	Journal of Service Research	653	1	1	1	1	0	1	0	1	0
25	Parasuraman, Zeithaml, and Malhotra	2005	Journal of Service Research	205	1	1	1	1	0	1	0	1	0
26	Semejin et al.	2005	Managing Service Quality	150	1	0	1	0	0	0	1	1	0
27	Semejin et al.	2005	Managing Service Quality	150	0	0	1	0	0	0	1	0	0
28	Yang et al.	2005	Information and Management	1,992	1	0	1	0	0	1	0	0	0
29	Yen	2005	The Service Industries Journal	133	1	1	0	0	0	0	1	0	0
30	Yen	2005	The Service Industries Journal	159	1	1	0	0	0	0	1	0	0
31	Yen	2005	The Service Industries Journal	167	1	1	0	0	0	0	1	0	0
32	Zhang and Prybutok	2005	IEEE Transactions on Engineering Management	418	1	0	0	0	0	0	1	0	0
33	Bauer, Falk, and Mammerschmidt	2006	Journal of Business Research	384	1	1	1	0	0	0	0	1	0
34	Collier and Bienstock	2006	Journal of Service Research	334	1	1	0	0	0	0	1	1	0
35	Fassnacht and Koese	2006	Journal of service research	1,258	1	1	0	0	0	1	0	0	0
36	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	23	1	0	1	1	0	0	1	0	0
37	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	38	1	0	1	1	0	0	1	0	0
38	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	24	1	0	1	1	0	0	1	0	0
39	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	79	1	0	1	1	0	0	1	0	0
40	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	62	1	0	1	1	0	0	1	0	0
41	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	48	1	0	1	1	0	0	1	0	0
42	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	68	1	0	1	1	0	0	1	0	0
43	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	148	1	0	1	1	0	0	1	0	0
44	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	99	1	0	1	1	0	0	1	0	0
45	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	104	1	0	1	1	0	0	1	0	0

46	Trabold, Heim, and Field	2006	International Journal of Retail & Distribution Management	33	1	0	1	1	0	0	1	0	0
47	Shamdasani, Mukherjee, and Malhotra	2008	Service Industries Journal	240	1	1	0	0	0	1	1	1	0
48	Yen and Lu	2008	Managing Service Quality	619	1	0	0	1	0	0	1	1	0
49	Chang, Wang, and Yang	2009	Total Quality Management and Business Excellence	330	1	1	1	1	0	0	1	1	1
50	Santouridis, Trivellas, and Reklitis	2009	Total Quality Management and Business Excellence	184	1	1	1	0	0	0	1	1	1
51	Swaid and Wigand	2009	Journal of Electronic Commerce Research	557	1	1	1	0	0	1	0	1	0
52	Yilmazsoy, Saad, and Cicmil	2009	Service Industries Journal	1,035	1	1	0	1	0	0	1	1	1
53	Collier and Bienstock	2009	Journal of Marketing Theory & Practice	334	1	1	0	0	0	0	1	1	0
54	Carlson and O'Cass	2010	Journal of Services Marketing	112	1	0	0	0	0	0	1	1	0
55	Carlson and O'Cass	2010	Journal of Services Marketing	406	1	0	0	0	0	0	1	1	0
56	Chen and Kao	2010	Service Industries Journal	240	1	1	0	0	0	0	1	1	0
57	Finn	2010	Canadian Journal of Administrative Science	40	1	1	1	1	0	0	1	0	0
58	Fuentes-Blasco et al.	2010	Service Industries Journal	191	1	1	1	1	0	0	0	1	0
59	Gounaris, Dimitriadis, and Stathakopoulos	2010	Journal of Services Marketing	240	1	0	0	0	0	0	1	1	1
60	Liu, Guo, and Hsieh	2010	Service Industries Journal	135	1	0	1	1	0	0	1	0	0
61	Tsang et al.	2010	Journal of Travel and Tourism Marketing	266	1	1	0	1	0	0	1	0	0
62	Udo, Bagchi, Kirs	2010	International Journal of Information Management	211	1	0	0	1	0	1	1	1	0
63	Suh and Pedersen	2010	Sport Marketing Quarterly	279	1	0	0	1	0	1	0	0	0
64	Carlson and O'Cass	2011	Managing Service Quality	518	1	1	0	0	0	1	1	1	0
65	Ding, Hu, and Sheng	2011	Journal of Business Research	311	1	1	1	0	0	0	1	1	0
66	Hernandez-Maestro and Gonzalez-Benito	2011	Service Industries Journal	103	1	0	0	0	0	0	0	1	0
67	Dai, Haried, and Salam	2011	Journal of Computer Information Systems	772	1	1	1	0	0	1	1	1	0
68	Meng and Mummalaneni	2011	Journal of Marketing Channels	326	1	1	1	1	0	0	0	1	0
69	Park, Chung, and Rutherford	2011	Journal of Business Research	343	0	0	1	0	0	0	1	1	0

#	Author	Year	Journal	N	1	2	3	4	5	6	7	8	9
70	Rao et al.	2011	Journal of Business Logistics	260	0	1	0	0	0	0	1	0	0
71	Yaya et al.	2011	Industrial Management & Data Systems	428	1	0	1	0	0	0	1	1	0
72	Ding, Huang, and Verma	2011	Journal of Service Management	258	1	0	1	0	0	0	0	1	0
73	Ganguli and Roy	2011	International Journal of Bank Marketing	325	1	0	1	1	0	0	1	1	0
74	Liang	2012	Total Quality Management & Business Excellence	485	1	1	0	1	0	0	1	0	0
75	Kim, Moon, and Kim	2012	Canadian Journal of Administrative Science	319	1	1	1	1	0	0	1	1	0
76	O'Cass and Carlson	2012	Journal of Services Marketing	112	1	1	1	1	0	0	0	1	1
77	O'Cass and Carlson	2012	Journal of Services Marketing	406	1	1	1	1	0	0	0	1	0
78	Rafiq, Lu, and Fulford	2012	Journal of Marketing Management	491	1	1	0	1	0	1	0	0	0
79	Pearson, Tadisina, and Griffin	2012	Information Systems Management	158	1	0	0	0	0	0	0	1	0
80	Barrutia and Gilsanz	2013	Journal of Service Research	472	1	1	0	1	0	1	1	1	0
81	Benlian, Koufaris, and Hess	2011	Journal of Management Information Systems	172	1	1	1	1	0	0	1	1	0
82	Bernardo, Marimon, and Alonso-Almeida	2012	Information & Management	1,201	1	0	0	0	0	0	0	1	0
83	Lin	2012	The Service Industries Journal	102	1	1	1	0	0	0	0	1	0
84	Marimon, Yaya, and Fa	2012	Total Quality Management	123	1	1	1	1	0	0	0	1	0
85	Águila-Obra, Padilla-Meléndez, and Al-dweeri	2013	Total Quality Management & Business Excellence	359	1	0	0	0	0	0	1	1	0
86	White, Joseph-Mathews, and Voorhees	2013	Journal of Services Marketing	234	1	0	0	0	0	1	0	0	0
87	Xu, Benbasat, and Cenfetelli	2013	MIS Quarterly	128	1	0	1	0	0	1	0	0	0
88	Yaya et al.	2013	Total Quality Management & Business Excellence	428	1	0	1	1	0	0	1	1	0
89	Hsieh and Tsao	2014	Journal of Risk Research	325	1	0	0	0	0	0	0	1	0
				31,264									

Notes: (1) Web design, (2) fulfilment, (3) customer service, (4) security, (5) mixed measures, (6) overall e-service quality, (7) customer satisfaction, (8) repurchase intentions, and (9) word-of-mouth.

Web Appendix B

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