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Identifying the dimensions of logistics service quality in an online B2C context

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IDENTIFYING THE DIMENSIONS OF LOGISTICS SERVICE QUALITY IN AN ONLINE B2C CONTEXT

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ABSTRACT

There is theoretical and practical evidence indicating the existence of significant differences between the needs and wants of firms and end consumers, as well as the existence of significantly different needs between offline and online environments. Therefore, it is not clear how effectively measures of logistics service quality developed in an offline, B2B context can be applied to an online, B2C environment. This manuscript explores the elements of logistics service quality that end consumers value in an online context. The literature on logistics service quality in B2B and the literature on online consumer satisfaction are integrated. This results in the development of a set of dimensions for measuring online logistics service quality in online, B2C environments. Specifically, the dimensions of a new scale for measuring online logistics service quality (labeled oLSQ) were identified and defined. Managers can use the dimensions of logistics service quality identified in the oLSQ scale as a guide when designing and managing online retail stores.

INTRODUCTION

Research, corroborated by industry data, suggests the existence of significant business growth potential for the provision of products and services via the Internet (Bauer *et al.*, 2006). Online retail sales reached $231 billion in 2012 representing eight percent of total retail revenues. Online sales outpace sales growth at traditional stores and are expected to grow at a compound annual rate of 9% between 2012 and 2017 (Mulpuru et al., 2013). The opportunity to exploit this potential is a function of the Internet retailer's ability to meet customers' expectations in the virtual shopping environment (Zeithaml *et al.*, 2002). Studies highlight the presence of a significant number of dissatisfied online customers as a result of service breakdowns (including stock-outs), lost orders, or inadequate order handling (Meuter *et al.*, 2000). As a result, dissatisfied consumers lead to online sales losses of several billion dollars per year (Rust & Lemon, 2001).

The quality of logistics service performance is a key marketing component that helps create customer satisfaction (Bienstock *et al.*, 1997; Mentzer *et al.*, 1998) and has been recognized accordingly for some time (Perrault & Russ, 1974). Research suggests many interpretations of how logistics creates customer satisfaction, with the most traditional being based on the creation of time and place utility (Perreault & Russ, 1974). The so-called seven Rs describe the firm's ability to deliver the right amount of the right product at the right place at the right time in the right condition at the right price with the right information (Ackerman, 1996).

While logistics researchers have developed an important body of literature on the various ways that logistics can contribute to customer satisfaction, the majority of the work has been done in a B2B context, with the customer being a firm, not the end consumer. Furthermore, very few studies explore customers' perception of logistics services in an online context (for exceptions please see Esper *et al.*, 2003; Rabinovich & Bailey, 2004; Rabinovich, 2007; Xiang et al., 2010). There is theoretical evidence indicating the existence of significant differences between the needs of firms and end consumers, as well as the existence of significanty different needs across offline and online environments

(Esper *et al.*, 2003). Therefore, it is not clear how effectively measures of logistics service quality developed in an offline, B2B context can be applied to an online, B2C environment. This manuscript begins to address this gap by exploring the elements of logistics service quality that end consumers value in an online context. Specifically, the dimensions of a new scale for measuring online logistics service quality (labeled oLSQ) were identified and defined.

The rest of this paper is organized as follows. A literature review of physical distribution and logistics service quality in B2B is first conducted in order to identify the dimensions of logistics service quality that can be adapted to an online, B2C context. Second, the literature on contributors to online consumer satisfaction is examined in order to establish what shoppers value and what logistics service elements lead to satisfaction. Third, these two distinct bodies of literature are integrated, which culminates in the development of a set of relevant dimensions for measuring logistics service quality in online, B2C environments. Finally, the implications for both managers and consumers are put forth and directions for future research are discussed.

LITERATURE REVIEW

The following sections review first the logistics service quality literature, and then the online customer satisfaction literature.

Exploring the Concept of Logistics Service Quality

As early as the twentieth century Shaw (1915) acknowledged the role of physical distribution by classifying business activities into "three great divisions": activities of production (which change the form of materials), activities of distribution (which change the place and ownership of the commodities produced) and facilitating activities (which aid and supplement the operations of production and distribution). Clark (1922) further separated the activity of physical distribution into its transportation and storage functions reflecting the various ways that physical distribution creates value. While the domain of physical distribution was not clearly defined yet, Stewart (1965) reported the importance of minimizing out-of-stock occurrences, gaining effective advantage with shorter customer order cycles, and reduced prices through distribution efficiencies as potential contributors to additional sales volumes. Similarly, LeKashman and Stolle (1965) argued that stockouts, excess delivery time, or excess variability of delivery time can result in lost sales. These studies provide the first logistics service quality criteria.

Perreault and Russ (1976) explored the role of physical distribution service (PDS) in industrial purchase decisions (the importance of PDS, the determinants of its importance and the determinants of purchaser satisfaction with it). In their seminal work the authors went on to further investigate PDS by asking respondents to indicate their satisfaction with several aspects of PDS provided by their suppliers such as billing procedures, order methods, accuracy in filling orders, delivery time, and delivery time variation. Gilmour (1977) investigated the service provided by major suppliers in the scientific instrument and supplies industry in Australia. Respondents were shown a list of 17 customer service elements and asked to rank order the five most important for their industry. The emergent five most important purchasing elements for all customers were: availability, after-sales service, delivery reliability, delivery time, and technical competence of the representatives.

Anderson *et al.* (1978) examined the relative importance of physical distribution elements. Their results revealed the following rankings: order cycle time reliability, percent orders filled, minimum PDS cost, minimum order cycle time, and minimum damage in transit. Luce (1982) surveyed purchasing managers on the subject of physical distribution service. Respondents were asked to rank order the five PDS elements which they perceived as most important. The five PDS

elements most often cited were: accuracy in filling orders, average delivery time, rush services and billing, action on complaints, and order status information. Jackson *et al.* (1986) explored the perceived importance of six physical distribution service components and how the importance varied across five product types and three buy classes. The physical distribution service components ranked in the following order (most to least important): consistent delivery, in-stock, lead time, cooperation, and order processing information. At this point, it would seem that most of the traditional measures of logistics service quality have emerged.

A seminal work in the arena of physical distribution quality is the comprehensive literature review by Mentzer *et al.* (1989) that reveals the existence of three major dimensions of PDS: *availability, timeliness,* and *quality*. The *availability* dimension is represented by in-stock rate and percent orders, units, and lines filled. Consistent delivery, lead time, average delivery time, order cycle time reliability, and minimum order cycle time form the *timeliness* dimension. Finally, the *quality* dimension is represented by minimum damage in transit and order-filling accuracy. The authors further suggest that these PDS dimensions and indicators are somewhat robust across products and firms.

While the importance of various elements of PDS has been considered before, the first scale for physical distribution service quality (PDSQ) was developed by Bienstock and Mentzer (1997). To develop an instrument for measuring PDSQ an initial set of 23 items was generated by reviewing prior research on physical distribution service. The further refined instrument through exploratory factor analyses contained 15 items. Mentzer *et al.* (1989) argue that two elements exist in service delivery: marketing customer service and physical distribution service (PDS). In this view PDSQ is considered a component of logistics service quality (LSQ). Building on the previous work on PDSQ, Mentzer *et al.* (2001) developed the most comprehensive scale for LSQ, which in fact provides the building blocks for the development of oLSQ in this study. A review of extant literature combined with depth interviews and focus groups yielded nine dimensions for the concept of LSQ. The dimensions were subsequently tested via surveys. Another contribution of the study by Mentzer *et al.* (2001) is the conceptualization of LSQ as a process. The following nine dimensions were identified: personnel contact quality, order release quantities, information quality, ordering procedures, order accuracy, order condition, order quality, order discrepancy handling, and timeliness.

Personnel contact quality refers to the customer orientation of the supplier's logistics contact people. Specifically, it is a measure of whether customer service personnel are knowledgeable, empathize with their situation, and help them resolve their problems (Bitner *et al.*, 1994; Parasuraman *et al.*, 1985). Order release quantities refer to the concept of product availability. It measures whether the product the customer desires is available. The importance of product availability has long been considered a key component of logistics excellence (Mentzer *et al.*, 1989; Novack *et al.*, 1994). Customers are expected to be most satisfied when they are able to obtain the desired quantity, therefore stockouts are believed to have a significant impact on customer satisfaction and loyalty. Information quality is related to customers' perception of the information provided by the supplier regarding products from which customers may choose (Mentzer *et al.*, 1999; Rinehart *et al.*, 1989). Customers should be able to make better decisions when information is available and of adequate quality.

Ordering procedures refer to the efficiency and effectiveness of the procedures followed by the supplier (Bienstock *et al.*, 1997; Mentzer *et al.*, 1999). Specifically, order placement procedures need to be both effective and easy to use. Order accuracy refers to how closely shipments match customers' orders upon arrival (Bienstock *et al.*, 1997; Mentzer *et al.*, 1997). This measure

includes having the right items in the order, the correct number of items, and no substitutions for items ordered.

Order condition is a measure of the lack of damage to orders (Bienstock *et al.*, 1997; Mentzer *et al.*, 1989). Damaged orders is suggested to lower the customers' level of satisfaction with the firm's logistics service. Order quality refers to how well products work (Novack *et al.*, 1994). This measure includes how well products conform to specifications and customers' needs. Order discrepancy handling refers to how well the firm addresses any discrepancies in orders after the orders arrive (Novack *et al.*, 1994; Rinehart *et al.*, 1989). If customers receive orders that fall short of their expectations they will seek corrections, and how well these issues are handled will impact the customers' perception of the quality of the firm's services.

Finally, timeliness refers to whether orders arrive at the customer's location when promised. In a broader sense, it also refers to the length of time between order placement and receipt (Hult, 1998; Hult *et al.*, 2000). The delivery time can be affected by transportation time, as well as back-order time when products are unavailable (Bienstock *et al.*, 1997; Mentzer *et al.*, 1999).

To summarize, this section provides a comprehensive review of the various dimensions of logistics service quality previously suggested in the B2B, offline research. It further shows the chronologic progression of the logistics service quality dimensions and culminates with the introduction of the traditional LSQ scale on which this paper builds.

Exploring the Determinants of Consumer Satisfaction With E-Commerce Services

In this section the literature on online consumer satisfaction is explored chronologically in order to establish what online shoppers value and what the elements of logistics service are that lead to consumer satisfaction. Particular emphasis is placed on studies that actually provide a scale for measuring consumers' satisfaction with online retail experiences, also referred to as e-commerce. Consistent with Oliver (1999) in this study satisfaction is defined as the perception of pleasurable fulfillment of a service.

The seminal work on quality by Juran and Gryna (1970) suggests four quality dimensions: capability (does the product perform as expected), availability (is the product usable when needed), reliability (is the product free from failure) and maintainability (is the product easy to repair when broken). Parasuraman *et al.* (1988, 1991) conducted empirical studies in several industry sectors to develop and refine SERVQUAL. This scale measures service quality along five dimensions: reliability, responsiveness, assurance, empathy, and tangibles. The generic dimensions of quality developed in these two studies are at least partially reflected in the majority of subsequently suggested quality scales.

Using a survey of web site visitors Rice (1997) attempted to determine the factors that would induce revisit. Good content/information and having and enjoyable experience were found to be the most important drivers. Their examination of the top 100 U.S. retailers (Griffith & Krampf, 1998) revealed that access and responsiveness of the web site were key indicators of service quality delivered through the web. Ho and Wu (1999) also explored the antecedents of online customer satisfaction using an empirical study.

Five antecedents were identified in this study: logistical support, technological characteristics, information characteristics, homepage presentation, and product characteristics. Of the five antecedents, logistical support emerged as the most significant antecedent for electronic commerce.

Liu and Arnett (2000) surveyed Webmasters for Fortune 1000 companies to assess the factors critical to web site success with consumers. Five dimensions were found to be most salient to consumers: quality of information (relevant, accurate, timely, customized and complete

information presentation), service (quick response, assurance, empathy, and follow-up), system-use (security correct transaction, customer control on transaction, order-tracing facility, and privacy), playfulness (customers' sense of enjoyment, interactivity, attractive features, and enabling customer concentration), and design of web site system/interface (involved organized hyperlinks, customized search functions, speed of access, and ease of correcting errors).

In an attempt to adapt the SERVQUAL dimensions to online services, Kaynama and Black (2000) evaluated the online services of 23 travel agencies on seven dimensions derived from SERQUAL: responsiveness, content and purpose (derived from reliability), accessibility, navigation, design and presentation (derived from tangibles), background (assurance), and personalization and customization (derived from empathy). One of the most cited scales on online consumer satisfaction was developed by Szymanski and Hise (2000) who evaluated the impact on customer satisfaction of customer perceptions of online convenience, merchandising (product offerings and product information), site design, and financial security.

Lociacono *et al.* (2000) also developed a scale called WEBQUAL with 12 dimensions: information fit to task, interaction, trust, response time, design, intuitiveness, visual appeal, innovativeness, flow (emotional appeal), integrated communication, business processes, and substitutability. Informational fit to task refers to appropriateness of information, quality of information and presentation of information. Interactivity refers to the extent to which web site users can: communicate with the people behind the web site, interactively search for information, and conduct transactions through the web site. Trust is determined by the privacy of information offered by the web site. Response time refers to the time it takes for the web page to load in a user's browser and also the required time to complete various transactions. Design refers the aesthetics of the web site such as information organization and navigability. Intuitiveness refers to the ability of the shoppers to easily navigate the web site. Visual appeal refers to the graphics and text on the site. Innovativeness is conceptualized as the "aha" or surprise element associated with the web site, including its creativity and uniqueness. The flow dimension is addressed by the level of enjoyment and engrossing associated with the site. Integrated communication refers to the seamlessness of communication with users through multiple channels. The business process dimension measures the fit of the web strategy with the general business strategy. Lastly, substitutability is a measure of the effectiveness of the web site interaction compared to other means such as physical stores. Overall, WEBQUAL is created to guide web site designers and help them better create web sites. One of the drawbacks of this scale is that it involved students visiting web sites to evaluate them rather than actual online consumers reporting their experiences. As a result, the authors excluded a dimension called customer service because it could not be measured. The dimension of fulfillment was also not included in WEBQUAL for the same reason.

In their highly referenced study on Web site quality Zeithaml *et al.* (2000) identified a large number of web site features at the perceptual-attribute level and categorized them into 11 service quality dimensions: (1) reliability refers to the correct technical functioning of the site and the accuracy of service promises, such as having items in stock, delivering what is ordered, delivering when promised, accurate billing and accurate product information, (2) responsiveness refers to quick response and the ability to get help if there is a problem or question, (3) access refers to the ability to get online quickly and contact the company when needed, (4) flexibility refers to having choice of ways to pay, ship, buy, search for, and return items, (5) ease of navigation refers to whether the site contains functions that helps shoppers find what they need without difficulty, has good search functionality, and allows shoppers to

maneuver easily and quickly back and forth through the pages, (6) Efficiency refers to whether the site is simple to use, has a proper structure, and whether it requires a minimum of information to be input by customer, (7) assurance/trust refers to whether the customer has confidence in dealing with the site as a result of the reputation of the site and the products and services it sells, as well as whether clear and truthful information is presented, (8) security/ privacy refers to the degree to which customers believe the site to be safe from intrusion and personal information is protected, (9) price knowledge refers to the extent to which customers can determine shipping price, total price, and comparative prices during the shopping process, (10) site aesthetics refers to the appearance of the site, (11) and customization - personalization refers to how much and how easily the site can be tailored to individual customers' preferences, histories, and ways of shopping.

Also building on the SERVQUAL model, Barnes and Vidgen (2001) created a scale also called WebQual. In their study in the field of online book trade, the authors identified five key dimensions each of which encompasses two subdimensions: tangibles (aesthetics, navigation), reliability (reliability, competence), responsiveness (responsiveness, access), assurance (credibility, security), and empathy (communication, understanding the individual). As conceptualized in WebQual: aesthetics refers to the appearance of the web site including style and audiovisual impact; navigation refers to the ease of finding a site and getting around it to find specific items; reliability, refers to the provision of reliable information and reliable service; competence refers to the right knowledge and capability to provide the good or service; responsiveness refers to prompt service and timeliness via the site; access refers to approachability and ease of access; credibility refers to the trustworthiness of the site; security refers to freedom from risk or doubt in transacting with the site to purchase a good; communication refers to provision of the correct information in an appropriate format; and, understanding the individual refers to empathy with the customer to provide the right products, prices, and content.

Overall, the main focus of WebQual is on the technical aspects of the online shopping experience.

Yoo and Donthu (2001) created a nine-item SITEQUAL scale for measuring site quality. Four quality dimensions are suggested in this scale: ease of use, aesthetic design, processing speed, and security. Similar to the WebQual, SITEQUAL was developed and tested using a convenience sample therefore it doesn't constitute a comprehensive assessment of a site's service quality. In their study examining Internet pharmacies, Yang *et al.* (2001) identified and evaluated six dimensions of consumer perceptions of service quality: ease of use (user friendliness, loading/transaction speed, search capability, and easy navigation), web site content (information that matches the needs of the consumer), accuracy of content, timeliness of response, aesthetics (attractiveness of the site and catalog pictures), and privacy. Heim and Sinha (2002) developed a taxonomy of the e-service process. Their study suggested that website navigation, product information and representation, order processing, and fulfillment are the major dimensions of an e-service process.

Zeithaml *et al.* (2002) synthesized the previous literature on online service quality by conducting a comprehensive literature review. Five broad sets of criteria for evaluating service quality in an online context are suggested: information availability and content, ease of use or usability, privacy/security, graphic style, and reliability/ fulfillment. Research suggests that availability and depth of information is important because when users can control the content, order and duration of exposure to information their ability to integrate, remember and use information improves (Ariely 2000). Ease of use has been considered relevant because Internet-based

transactions can be complex and intimidating to some customers. Privacy (the protection of personal information) and security (the protection of users from the risk of fraud and financial loss) have been empirically proven to have a strong impact on attitude toward use of online financial services (Montoya-Weiss *et al.*, 2003). Graphic style refers to issues such as color, layout, print size and type, graphics and animations, and has been suggested to affect customer perceptions of online shopping (Hoffman & Novak, 1996; Hoque & Lohse, 1999). Lastly, reliability/fulfillment has been argued to be an important aspect of online service quality (Wolfinbarger & Gilly, 2003). Furthermore, Wolfinbarger and Gilly (2003) found that reliability/fulfillment was the strongest predictor of customer satisfaction and quality.

Wolfinbarger and Gilly (2003) examined the dimensions of service quality in internet retailing through the use of online and offline focus groups, a sorting task and an online survey. Four quality dimensions emerged in their study: fulfillment/reliability (involving accurate representation of the product, on-time delivery, and accurate orders), web site design (involving some attributes associated with design as well as an item dealing with personalization and another dealing with product selection), customer service (combining interest in solving problems, willingness of personnel to help, and prompt answers to inquiries) and security/privacy (feeling safe and trusting of the site). The resulting quality scale labeled eTailQ was represented by 14 items.

Montoya-Weiss *et al.* (2003) conducted two large-scale studies in different service contexts to explore antecedents to online service quality. Research on technology adoption shows that user perception of usefulness and ease of use determine the adoption of a new information system (Venkatesh & Davis, 2000). Furthermore, consistent with information search theory and human-computer interaction research (Hoque & Lohse, 1999) the authors propose that customers' assessment of three web site design characteristics will influence their evaluations of online channel service quality. The three suggested characteristics are: navigation structure, information content, and graphic style. Navigation structure refers to the organization and hierarchical layout of the content and pages in a web site.

Web site information content is defined as the material that appears on a web site. Finally, graphic style is defined as the tangible aspect of the online environment that reflects the perceived attractiveness of a web site.

Kim *et al.* (2004) developed an index of customer satisfaction using a Korean sample. His study revealed ten antecedents to customer satisfaction which in turn was linked to repurchase intentions. The ten antecedents were: delivery and after sales service, purchase result and price attractiveness, product information, customer service, site design, process convenience, product attractiveness, payment method, site information, and log-on convenience. In a subsequent study, Schaupp and Belanger (2005) proposed that three categories of factors impact online consumer satisfaction: technology factors (security, usability and side design), shopping factors (convenience, trust and trustworthiness, and delivery), and product factors (merchandising, product value, and product customization). Convenience is often found to be the most important determinant of online shopping (Jiang et al., 2013). Online shopping allows individuals to save time and effort by making it easy to locate items and purchase products (Peterson *et al.*, 1997).

Using Zeithaml *et al.*'s (2002) explorative study as a starting point, Parasuraman *et al.* (2005) developed one of the most comprehensive works on e-service quality. The result of their empirical test suggested the need for two different scales to accurately measure electronic service quality: E-S-QUAL and E-RecS-QUAL. The first scale, E-S-QUAL measures core service quality aspects and consists of four quality dimensions:

efficiency, fulfillment, system availability and privacy. The second scale, E-RecS-QUAL is suggested to be relevant when consumers face "nonroutine encounters" (e.g. product returns, problems) during the online-shopping process. This scale is composed of three quality dimensions: responsiveness, compensation and contact.

Bauer *et al.* (2006) argued that affective reactions are of crucial importance for the evaluation of e-services, as fun and enjoyment are major determinants of Internet usage behavior (Van Riel *et al.*, 2001). Their study suggested that transferring this quality criterion to online shopping is essential. The perceived fun of using the web site along with personalization of content features appear to be an important quality criteria (Zeithaml *et al.*, 2002). Bauer *et al.* (2006) considered a four-stage transaction model in their investigation of electronic service quality: information phase, agreement phase, fulfillment phase, and the after-sales phase. The resulting scale, eTransQual, had five quality dimensions: functionality/design, enjoyment, process, reliability, and responsiveness.

To summarize, this section provides an extensive review of the various determinants of consumer satisfaction with e-commerce services. It further shows the variety of dimensions and subdimensions of quality that previous authors have introduced in a B2C context. While different authors have suggested different, and arguably contradictive interpretations of the dimensions of service quality, this comprehensive review provides the basis for identifying what aspects of the logistics service that online consumers value.

IDENTIFYING THE DIMENSIONS OF ONLINE LOGISTICS SERVICE QUALITY (OLSQ)

In this section the literature reviewed is integrated, and this results in the identification of the dimensions of online logistics service quality (oLSQ). Specifically, we adopt the quality dimensions from the traditional LSQ that we believe would apply to an online B2C context, and further combine those dimensions with the quality dimensions suggested by the review of the online consumer satisfaction literature that we believe apply to logistics services.

Similar to Mentzer *et al.*'s (2001) conceptualization of logistics service quality, oLSQ was examined as a process consisting of two distinct stages: order placement and order receipt.. The idea of improving the measurement of service quality by grouping user activities into a set of discrete stages is supported by the task completion approach (Sismeiro & Bucklin, 2004). Considering that web site users are able to separate their evaluations of the online shopping experience according to discrete stages, a process-based approach provides richer diagnostic information and managerial implications for improving service quality (Bauer *et al.*, 2006).

Order Placement Stage Dimensions

The first dimension of oLSQ is *customer service* and it represents a combination of elements from the traditional LSQ and the literature on online satisfaction. Specifically, we draw upon the personnel quality dimension from LSQ which refers to the customer orientation of the supplier's logistics contact people (Bitner *et al.*, 1994; Parasuraman *et al.*, 1985). However, in an online setting consumers interact with websites and personnel, therefore the dimension of customer service is conceptualized here as prompt answers to inquiries, online retailer's interest in solving consumer problems, willingness of personnel to help, as well as the ability of website functions/features to automatically assist with consumer problems (Wolfinbarger & Gilly, 2003).

The second dimension of oLSQ, *ordering procedure* is adopted from the traditional LSQ scale. It refers to the efficiency and effectiveness of the procedures established by the online

retailer (Bienstock *et al.*, 1997; Mentzer *et al.*, 1999). This dimension also includes ease of use which emerged as an important criteria in the review of online consumer satisfaction literature (Yoo & Donthu, 2001; Zeithaml, Parasuraman & Malhotra, 2002; Yang *et al.*, 2001).

The third dimension, *hedonic aspect* emerged from the literature on consumer satisfaction. It is argued that affective reactions are of crucial importance in the evaluation of e-services, as fun and enjoyment are major determinants of Internet usage behavior (Van Riel *et al.*, 2001). Specifically, this measure refers to customers' sense of enjoyment with the shopping experience.

Website design is the fourth dimension that has emerged from the literature on consumer satisfaction (Yoo & Donthu, 2001; Szymanski & Hise, 2000; Montoya-Weiss *et al.*, 2003; Liu & Arnett, 2000). It is conceptualized here as a measure of the web site's navigation structure and graphic style. Navigation structure refers to the organization and hierarchical layout of the content and pages in a web site. Finally, graphic style is defined as the tangible aspect of the online environment that reflects the perceived attractiveness of a web site (Montoya-Weiss *et al.*, 2003).

Order Release Quantity/Availability is a measure adopted from the traditional LSQ scale. It measures whether the product the customer desires is available. The importance of product availability has long been considered a key component of logistics excellence (Mentzer *et al.*, 1989; Novack *et al.*, 1994). It is expected that product availability and stockouts will have a significant impact on customer satisfaction.

Flexibility is the sixth dimension of oLSQ. As defined here it refers to having choice in ways to pay, ship, buy, search for, and return items (Zeithaml *et al.*, 2000). This dimension emerged as important in the review of online consumer satisfaction. To some extent, it overlaps with what's referred to as customization in the consumer satisfaction literature (Srinivasan *et al.*, 2002; Schaupp & Belanger, 2005; Kaynama & Black, 2000). The ability to return items is a critical component of this dimension.

Information quality is a measure adopted from the traditional LSQ scale. It is related to customers' perception of the information provided by the supplier regarding products from which customers may choose (Mentzer *et al.*, 1999; Rinehart, Cooper, & Wagenheim, 1989). Customers should be able to make better decisions if information is available and of adequate quality. While the measure is adopted from the traditional LSQ, research on online consumer satisfaction emphasizes the importance of information quality as well (Bauer *et al.*, 2006; Barnes and Vidgen, 2001; Yoo & Donthu, 2001; Zeithaml *et al.*, 2002; Zeithaml *et al.*, 2000; Ho & Wu, 1999; Montoya *et al.*, 2003; Rice, 1997; Liu & Arnett, 2000; Lociacono *et al.*, 2000; Ariely, 2000). An important aspect of information quality is the availability of accurate tracking information.

Merchandising is the eighth measure for oLSQ and it refers to the depth and breadth of the retailer's product offering. Sometimes referred to as selection, this dimension has been found important to online shoppers' satisfaction in a number of studies (Yoo & Donthu, 2001; Schaupp & Belanger, 2005; Wolfinbarger & Gilly, 2003).

Order Value is the ninth measure for oLSQ . It captures the dimensions of product value (Schaupp & Belanger, 2005) and delivery value (Heim & Sinha, 2002; Ba & Johansson, 2008). Both aspects of order value are important contributors to online shoppers' satisfaction.

Assurance/Trust has emerged as an important dimension of oLSQ. It refers to whether the customer has confidence in dealing with the site as a result of the reputation of the site and the products and services it sells (Zeithaml *et al.*, 2000). Since customers have to disclose personal financial information when shopping online,

assurance/trust is a critical component of oLSQ (Liu & Arnett, 2000; Zeithaml *et al.*, 2000; Zeithaml *et al.*, 2002; Kaynama & Black, 2000; Barnes & Vidgen, 2001).

System availability/Reliability is the last dimension in the order placement stage. This measure refers to whether the website is available for use and whether it can consistently be used without technical problems (Zeithaml *et al.*, 2002; Parasuraman *et al.*, 2005; Zeithaml *et al.*, 2002; Bauer *et al.*, 2006).

Order Receipt Stage Dimensions

Order accuracy refers to how closely shipments match customers' orders upon arrival (Bienstock *et al.*,1997; Mentzer *et al.*, 1997). This measure includes having the right items in the order, the correct number of items, and no substitutions for items ordered. Its importance has been recognized for online transactions considering it can be time consuming for shoppers to have errors corrected (Zeithaml *et al.*,2000; Zeithaml *et al.*, 2002).

Order condition is a measure of the lack of damage to orders (Bienstock *et al.*, 1997; Mentzer *et al.*, 1989). Damaged orders has been found to significantly lower the customers' level of satisfaction with the firm's logistics service. *Order quality* refers to how well products work (Novack *et al.*, 1994). This measure includes how well products conform to specifications and customers' needs.

Timeliness refers to whether orders arrive at the customer's location when promised. In a broader sense, it also refers to the length of time between order placement and receipt (Hult, 1998; Hult *et al.*, 2000). Its importance has been recognized in the consumer satisfaction literature as well (Yang *et al.*, 2001; Barnes & Vidgen, 2001).

Order discrepancy handling is the last dimension in the order receipt stage of oLSQ. It refers to how well the firm addresses any discrepancies in orders after the orders arrive (Novack *et al.*, 1994; Rinehart *et al.*, 1989). If customers receive orders that fall short of their expectations they will seek corrections, and how well these issues are handled will impact the customers' perception of the quality of the firm's services.

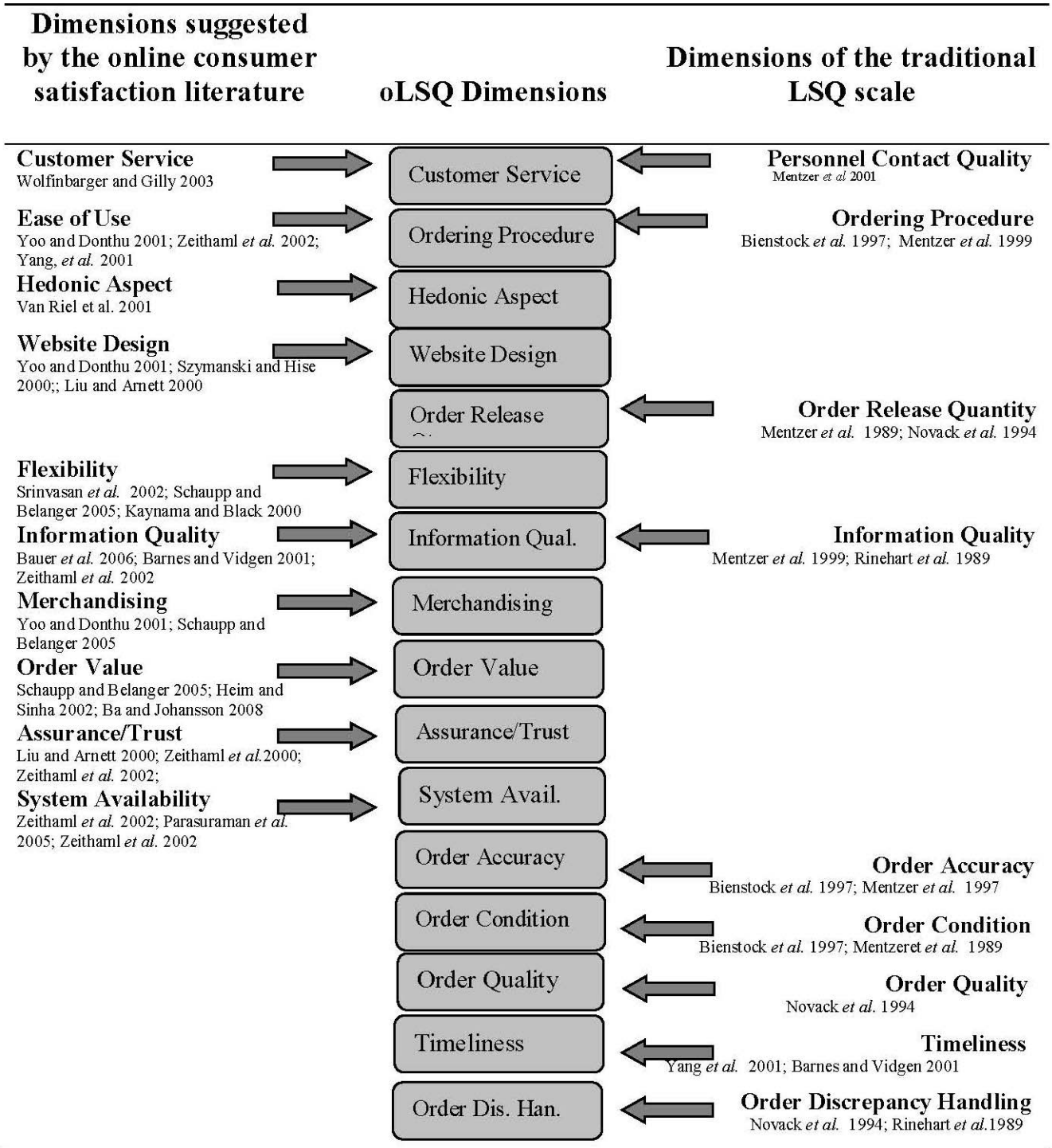
Table 1 identifies and summarizes the dimensions for a new scale of online logistics service quality, or oLSQ.

CONCLUSIONS AND FUTURE RESEARCH

The quality of logistics service performance is a key marketing component that helps create customer satisfaction and has been recognized accordingly for some time (Perrault & Russ, 1974). Although extensive academic research has examined the various dimensions of logistics service quality it has done so primarily in an offline B2B environment. Very few studies explored facets of logistics service in an online B2C environment and even fewer explored how online retailers can use logistics services to create consumer satisfaction. This study acknowledges the limitations in the literature and takes a first step towards building theory in this area.

Specifically, dimensions for a new scale for logistics service quality labeled oLSQ were identified to capture the logistics elements that contribute to the creation of satisfaction for online shoppers. A comprehensive review of the literature on logistics service quality and online consumer satisfaction was conducted. The two distinct areas of literature were then integrated in order to determine the appropriate dimensions of oLSQ. This research contributes to the body of knowledge in a number of ways. The results of the comprehensive literature review suggests that logistics service paradigms that worked well in offlline B2B contexts are not always applicable,, in online B2C environments. End consumers have different expectations as compared to business customers, and online environments present different logistics requirements as compared to offline contexts.

TABLE 1
ORIGIN OF THE OLSQ DIMENSIONS



Another contribution of this research is the identification of the specific aspects of logistics services that contribute to online shopper's satisfaction - these are the dimensions of the oLSQ scale.

This study has managerial implications as well. Managers can use the dimensions of logistics service quality identified in the oLSQ scale as a guide when designing their online retail stores. It is possible that some managers might have exceeded customer expectations according to traditional LSQ guidelines, and despite that sales revenues are still not what the firm would expect/desire, and customers are not coming back for return purchases. Perhaps such firms completely ignored "non-traditional" aspects of oLSQ such as the *hedonic* dimension. The service provided might have been as efficient and effective as possible, but a lack of fun, playfulness, and enjoyment of the ordering process might have driven some shoppers away from the online outlet.

The purpose of this paper was to identify the dimensions of the online logistics service quality scale. What is required next is the development and adoption of scale items. Qualitative interviews should first be conducted in order to confirm the dimensions of oLSQ, as well as potentially add new ones that didn't emerge through this integrative literature review. Next, the resulting scale should be tested. Future research can address other aspects of logistics services in an online B2C context as well. For instance it would be interesting to explore whether the experience of the delivery service itself can influence consumer satisfaction and loyalty. This would carry significant implications. Currently, most firms deliver items in an impersonal manner, usually by leaving the package in front of the customer's door. If the delivery process has the potential to influence consumer's loyalty and satisfaction, would firms invest in innovative ways to make the delivery process more personal? Considering the significant lack of logistics research in the area of online retailing to consumers, we conclude by emphasizing the need for more studies to analyze logistics services from the end consumer's perspective.

REFERENCES

Ackerman, K.B. (1996), "Pitfalls in Logistics Partnerships," *International Journal of Physical Distribution and Logistics Management,* 26: 35-37.

Anderson, R.D., Jerman, R.E. & Constantin, J.A. (1978), "Buyer and Seller Perceptions of Transportation Purchasing Variables," *Industrial Marketing Management,* 7: 60-78.

Ariely, D. (2000), "Controlling the Information Flow: Effects on Consumers' Decision Making and Preferences," *Journal of Consumer Research,* 27: 233-248.

Ba, S. & Johansson, W.C. (2008), "An Exploratory Study of the Impact Of E-Service Process on Online Customer Satisfaction," *Production and Operations Management,* 17: 107-119.

Barnes, S.J. & Vidgen, R. (2001), An Evaluation of Cyber-Bookshops: The Webqual Method," *International Journal of Electronic Commerce, 6*: 11-30.

Bauer, H.H., Falk, T. & Hammerschmidt, M. (2006), "Etransqual: A Transaction Process-Based Approach for Capturing Service Quality in Online Shopping," *Journal of Business Research,* 59: 866-875.

Berkowitz, E.M., Walker, O.C. & Walton, J.R. (1979), "In-Home Shopers: The Market for Innovative Distribution Systems," *Journal of Retailing*, 55: 15-33.

Bienstock, C.C., Mentzer J.T. & Bird, M.M. (1997), "Measuring Physical Distribution Service Quality," *Journal of the Academy of Marketing Science*, 25: 31-44.

Bitner, M.J., Booms, B.H. & Mohr, L.A. (1994), "Critical Service Encounters: The Employee's Viewpoint," *Journal of Marketing,* 58: 95-112.

Clark, F.E. (1922), *Principles of Marketing*. The Macmillan Company, New York, NY.

Esper, T.L., Jensen, T.D., Turnipseed, F.L. & Burton, S. (2003), "The Last Mile: An Examination of Effects of Online Retail Delivery Strategies on Consumers," *Journal of Business Logistics,* 24: 177-203.

Gilmour, P. (1977), "Marketing Transport Services," *European Journal of Marketing,* 11: 383-402.

Griffith, D.A. & Krampf, R.F. (1998), "An Examination of The Web-Based Strategies of The Top 100 U.S. Retailers," *Journal of Marketing Theory and Practice,* 6: 12-23.

Heim, G.R. & Sinha, K.K. (2002), "Service Process Configurations in Electronic Retailing: A Taxonomic Analysis of Electronic Food Retailers," *Production and Operations Management,* 11: 54-74.

Ho, C. &Wu, W. (1999). "Antecedents of Customer Satisfaction on The Internet: An Empirical Study of Online Shopping," paper presented at Thirty-Second Annual Hawaii International Conference on System Science, Hawaii, available at http://origin-www.computer.org/csdl/proceedings/hicss/1999/0001/05/00015027.pdf

Hoffman, D.L. & Novak, T.P. (1996), "Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations," *Journal of Marketing,* 60: 50-67.

Hoque, A.Y. & Lohse, G.L. (1999), "An Information Search Cost Perspective for Designing Interfaces for Electronic Commerce," *Journal of Marketing Research,* 36: 387-394.

Hult, G.T. (1998), "Managing The International Strategic Sourcing Process as a Market-Driven Organizational Learning System," *Decision Sciences,* 29: 193-216.

Hult, G.T., Hurley, R.F., Giunipero, L.C. & Nichols, E.L.Jr. (2000), "Organizational Learning in Global Purchasing: A Model and Test of Internal Users and Corporate Buyers," *Decision Sciences,* 31: 293-325.

Jackson, D.W.Jr., Keith, J.E. & Burdick, R.K. (1986), "Examining the Relative Importance of Physical Distribution Service Elements.," *Journal of Business Logistics,* 7: 14-31.

Jiang, L., Yang, Z., & Jun, M. (2013), "Measuring Consumer Perception of Online Shopping Convenience," *Journal of Service Management,* 24: 191-214.

Juran, J.M. & Gryna, F.M. (1970), *Quality, Planning, and Analysis*, McGraw-Hill, New York, NY.

Kaynama, S.A. & Black, C.I. (2000), "A Proposal to Assess the Service Quality of Online Travel Agencies: An Exploratory Study," *Journal of Professional Services Marketing,* 21: 63-88.

Kim, M.K., Park, M.C. & Jeong, D.H. (2004), "The Effects of Customer Satisfaction And Switching Barrier on Customer Loyalty in Korean Mobile Telecommunication Services," *Telecommunications Policy*, 28: 145-159.

LeKashman, R. & Stolle, J.F. (1965), "The Total Cost Approach to Distribution," *Business Horizons,* 8: 33-46.

Liu, C. & Arnett, K.P. (2000), "Exploring the Factors Associated with Web Site Success in the Context of Electronic Commerce," *Information and Management*, 38: 23-33.

Lociacono, E.T., Watson, R.T. & Goodhue, D.L. (2002), "WebQual: A Measure of Website Quality," *Marketing Theory and Applications*, 13: 432-438.

Luce, F.B. (1982), *Physical Distribution Service: A Comparative Study*, Unpublished Ph.D. Dissertation, Michigan State University.

Mentzer, J.T., Flint, D.J. & Kent, J.L. (1999), "Developing a Logistics Service Quality Scale," *Journal of Business Logistics*, 20: 9-32.

Mentzer, J.T., Flint, D.J., & Hult, T.G (2001), "Logistics Service Quality as a Segment Customized Process," *Journal of Marketing*, 65: 82-104.

Mentzer, J.T., Gomes, R. & Krapfel, R.E. (1989), "Physical Distribution Service: A Fundamental Marketing Concept?," *Journal of the Academy of Marketing Science*, 17: 53-62.

Mentzer, J.T., Rutner, S.M. & Matsuno, K. (1997), "Application of The Means-End Value Hierarchy Model to Understanding Logistics Service Value," *International Journal of Physical Distribution & Logistics Management*, 27: 630-643.

Meuter, M.L., Ostrom, A.L., Roundtree, R.I. & Bitner, M.J. (2000), "Self-Service Technologies: Understanding Customer Satisfaction with Technology-Based Service Encounters," *Journal of Marketing*, 7: 50-64.

Montoya-Weiss, M., Voss, G.B. & Grewal, D. (2003), "Determinants of Online Channel Use and Overall Satisfaction With a Relational, Multichannel Service Provider," *Academy of Marketing Science Journal*, 31: 448-458.

Mulpuru, S., Johnson, C., & Roberge, D. (2013), *U.S. Online Retail Forecast, 2012 to 2017*, available at *http://www.forrester.com/US+Online+Retail+Forecast +2012+To+2017/fulltext/-/E*Error! Hyperlink reference not valid.*RES93281?isTurnHighlighting=false&highlightTerm=US%20Online%20Retail.*

Novack, R.A., Rinehart, L.M. & Langley, C.J. (1994), "An Internal Assessment of Logistics Value," *Journal of Business Logistics*, 15: 113-124.

Oliver, R.L. (1999), "Value as Excellence in the Consumption Experience," *Consumer Value: A Framework For Analysis And Research*, 32: 43-62.

Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1985), "A Conceptual Model of Service Quality and Its Implications for Future Research," *Journal of Marketing*, 49: 41-50.

Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1988), "SERVQUAL: A Multiple-Item Scale For Measur-ing Customer Perceptions of Service Quality," *Journal of Retailing*, 64: 12-40.

Parasuraman, A., Berry, L.L. & Zeithaml, V.A. (1991), "Refinement and Reassessment of the SERVQUAL Scale," *Journal of Retailing*, 67: 420-431.

Parasuraman, A., Zeithaml, V.A. & Malhotra, A. (2005), "E-S-QUAL: A Multiple-Item Scale for Assess-ing Electronic Service Quality," *Journal of Service Research*, 7: 213-233.

Perrault, W.D. & Russ, F. (1974), "Physical Distribution Service: A Neglected Aspect of Marketing Management," *MSU Business Topics*, 22: 37-45.

Perreault, W.D.Jr. & Russ, F.A. (1976), "Improving Physical Distribution Service Decisions With Trade-Off Analysis," *International Journal of Physical Distribution & Logistics Management*, 7: 117-127.

Peterson, R.A., Balasubramanian, S. & Bronnenberg, B.J. (1997), "Exploring the Implications of the Internet for Consumer Marketing," *Academy of Marketing Science.Journal,* 25: 329-346.

Rabinovich, E. (2007), "Linking E-Service Quality And Markups: The Role of Imperfect Information in the Supply Chain," *Journal of Operations Management,* 25: 14-25.

Rabinovich, E. & Bailey J. (2004), "Physical Distribution Service Quality in Internet Retailing: Service Pricing, Transaction Attributes, and Firm Attributes," *Journal of Operations Management,* 21: 651-672.

Rice, M. (1997), "What Makes Users Visit A Website?," *Marketing News,* 31: 12-22.

Rinehart, L.M., Cooper, M.B. & Wagenheim, G.D (1989), "Furthering The Integration Of Marketing And Logistics Through Customer Service in the Channel," *Academy of Marketing Science Journal,* 17: 63-70.

Rust, R.T. & Lemon, K.N. (2001), "E-service and the Consumer," *International Journal of Electronic Commerce, 5*: 85-102.

Schaupp, L.C. & Bélanger, F. (2005), "A Conjoint Analysis of Online Consumer Satisfaction," *Journal of Electronic Commerce Research,* 6: 95-111.

Shaw, A.W. (1915), *Some Problems in Market Distribution*, Harvard University Press, Cambridge, MA.

Sismeiro, C. & Bucklin, R.E. (2004), "Modeling Purchase Behavior At An E-Commerce Web Site: A Task-Completion Approach," *Journal of Marketing Research,* 41: 306-323.

Srinivasan, S.S., Anderson, R. & Ponnavolu, K. (2002), "Customer Loyalty In E-Commerce: An Exploration of Its Antecedents and Consequences," *Journal of Retailing,* 78: 41-50.

Stewart, W.M. (1965), "Physical Distribution: Key To Improved Volume and Profits," *Journal of Marketing,* 29: 65-70.

Szymanski, D.M. & Hise, R.T. (2000), "E-Satisfaction: An Initial Examination," *Journal of Retailing,* 76: 309-322.

Van Riel, A.C.R., Veronica, L. & Petra, J. (2001), "Exploring Consumer Evaluations of E-Services: A Portal Site," *International Journal of Service Industry Management,* 12: 359-377.

Venkatesh, V. & Davis, F.D. (2000), "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Management Science,* 46: 186-204.

Wolfinbarger, M. & Gilly, M.C. (2003), "Etailq: Dimensionalizing, Measuring and Predicting Etail Qual-ity," *Journal of Retailing,* 79: 183-198.

Xing, Y., Grant, D.B., McKinnon, & A.C., Fergie, J. (2010), "Physical Distribution Service Quality in Online Retailing," *International Journal of Physical Distribution and Logistics Management*, 40: 415-432.

Yang, Z., Peterson, R.T. & Huang, L. (2001), "Taking The Pulse Of Internet Pharmacies," *Marketing Health Services,* 21: 4-10.

Yoo, B. & Donthu, N. (2001), "Developing A Scale To Measure The Perceived Quality Of An Internet Shop-ping Site (SITEQUAL). *Quarterly Journal of Electronic Commerce*, 2: 31-47.

Zeithaml, V.A., Parasuraman, A. & Malhotra, A. (2000), *E-service Quality: Definition, Dimensions and Conceptual Model*, working paper, Marketing Science Institute, Cambridge, MA.

Zeithaml, V.A., Parasuraman, A. & Malhotra, A. (2002), "Service Quality Delivery Through Web Sites: A Critical Review of Extant Knowledge," *Journal of the Academy of Marketing Science*, 30: 362-375.

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