



.comQ: Dimensionalizing, Measuring, and Predicting Quality of the E-tail Experience

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What do consumers really want from their online shopping experiences? What determines their judgments of quality, satisfaction, and loyalty? While previous research has addressed specific attributes of the online shopping experience or compared consumer perceptions of online and offline shopping experiences, only recently have scholars begun to develop a framework for defining and measuring online quality from the beginning to the end of the transaction, including information search, website navigation, ordering, customer service, delivery, and satisfaction with the ordered product.

In this report, authors Wolfinbarger and Gilly address the measurement and prediction of consumer ratings of online quality through three studies. The first study uses online and offline focus groups to identify attributes important to online consumers. The second—a sorting task—categorizes and ranks these attributes according to consumer perceptions. The third, an online survey utilizing Harris Interactive's consumer panel, offers quantitative evidence of the role of these attributes in consumer ratings of online quality.

Findings

The authors find that consumers categorize the attributes of online shopping into four categories or dimensions:

- ❑ *Reliability/fulfillment* ratings are the strongest predictor of customer satisfaction and quality, and the second strongest predictor of loyalty/intentions to repurchase.
- ❑ *Website design*—in particular, website functionality—ratings are the strongest predictor of loyalty/intentions to repurchase, and the second strongest predictor of quality and customer satisfaction.
- ❑ *Security/privacy* ratings are related to quality only for customers who have used a website four or more times. It appears that customers initially judge security/privacy from the overall appearance of professionalism at the website and reputation of the company.

- ❑ *Customer service* ratings predict quality, loyalty/intentions to repurchase, and customer satisfaction, but not as strongly as do fulfillment and website design.

Advice about how to attract and retain online customers frequently focuses on experiential aspects such as community-building and creating a sense of fun and excitement through graphics. In contrast, this analysis suggests that the most basic building blocks of a “compelling online experience” are reliability and outstanding website functionality in terms of time savings, easy transactions, good selection, in-depth information, and the “right level” of personalization.

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Introduction

Despite the recent shakeout in Internet retailing, online shopping continues to grow, from \$42.4 billion in 2000 to \$47.6 billion in 2001 (Forrester 2002). Over the next four years, the number of online shoppers is predicted to grow from the current 67 million to 132 million (Tedeschi 2002). Importantly, the demographics of online shoppers are increasingly expected to reflect offline demographics; as well, shoppers will eventually “move up the food chain,” making higher-priced expenditures and buying items like apparel which in the past have been considered too risky to purchase online (Tedeschi 2002).

Inarguably, online and offline environments present different *shopping experiences* even when the same products can be purchased. For example, Grewal, Iyer, and Levy (2001) suggest that e-commerce offers the convenience of time, location, and delivery while offline environments offer personalized human contact, pre-purchase trial, and low cost returns. Although many writers and scholars have touted the unique capabilities of the online medium to provide interactivity, personalized experiences, and community as well as content and information, to date none has developed a conceptual framework for defining and measuring online quality from the beginning to the end of the transaction, including information search, website navigation, ordering, customer service interactions, delivery, and satisfaction with the ordered product.

In addition, with consumer experience, expectations of online businesses appear to be increasing. But what do consumers really want from their online shopping experiences? What attributes are most important in their judgments of quality, satisfaction, and loyalty? Answering these questions is critical as online buyers' perceptions of quality, as in other settings, are likely to play a role in “e-loyalty,” market share, and profitability (Reichheld and Schefter 2000). In addition to the managerial importance of this topic, the ability to advance marketing theory in the area of e-commerce quality depends on the development of valid measures (Cote and Buckley 1988; Peter 1981).

The purpose of this research is to systematically develop an e-commerce quality (.comQ) measurement instrument. The development of such an instrument will facilitate (1) tracking changes in satisfaction/delight/quality as well as importance ratings of various factors over time as e-commerce and its customers “mature,” (2) identification of consumer segments with different needs and desires, (3) comparison of those dimensions important to consumers in online as compared to offline experiences, (4) diagnoses of differences between actual and desired online buying experience outcomes on dimensions of importance, and (5) identification of the relative impact of various factors on repurchase, loyalty, and profit.

Our research involved three steps: (1) online and offline focus groups to identify attributes important to online consumers, (2) a sorting task resulting in hierarchical clustering of items related to online quality, and (3) an online survey utilizing Harris Interactive's consumer panel.

Background

We first address the question of the motivations of consumers who shop online. We next develop a conceptual framework that draws on the literature from information systems and marketing in computer-mediated environments, retailing, and service quality to suggest issues and attributes to investigate in our effort to understand and model the perceived quality of online purchase experiences. We then describe the multimethod measurement development process that was used.

Why Consumers Shop Online

Scholars and market researchers have suggested several factors that make it more likely for a consumer to shop online. Perhaps not surprisingly, technology attitudes, skills, and experiences predict likelihood of shopping. A “wired lifestyle,” time spent online, degree of Internet usage to search for product information, strong technology readiness, technology optimism, perceived online skill, longer online experience, and possessing an internal rather than external locus of control all predict an increased likelihood of online shopping (Bellman, Lohse, and Johnson 1999; Lohse, Bellman, and Johnson 2000; Modahl 2000; Novak, Hoffman, and Yung 2000; Parasuraman 2000). Perhaps not surprisingly, consumers who desire to see and touch products are less likely to shop online (Li, Kuo, and Russell 1999).

Additional research has focused on demographic and lifestyle variables, with higher income, career-oriented lifestyle, convenience orientation, time starvation, and previous use of catalogs all predisposing consumers to shop online (Cyberatlas.com 1999; Li, Kuo, and Russell 1999; Lohse, Bellman, and Johnson 2000; Modahl 2000; Parasuraman 2000; Swaminathan, Lepkowska-White, and Rao 1999). Situational factors also enter the picture, including type of product (commodities are more likely to be purchased online) and shopping mood, as consumers are more likely to choose online shopping when their motivations are goal-directed rather than experiential (Wolfenbarger and Gilly 2001).

While studies of predictors of online shoppers suggest a number of factors related to tendencies to shop online, and begin to create a picture of attributes that are important to online consumers, they largely do not address the issue of measuring the quality of online customer experiences. To fill this gap information systems and marketing scholars, as well as market researchers and consulting businesses, have attempted to understand what attributes customers desire in their online purchase experiences (Jarvenpaa and Todd 1997; Lohse and Spiller 1998; Lohse and Spiller 1999; Novak, Hoffman, and Yung 2000; Zeithaml, Parasuraman, and Malhotra 2000). While these efforts are illuminating, to date, no scholars have attempted to holistically and systematically undertake the construct development and validation required to advance theory and practice in the area of e-commerce quality (Churchill 1979).

Market research and consulting firms have been particularly interested in measuring e-commerce quality. A prominent example is BizRate.com: measurements are based on intercept surveys customers receive after making an online purchase and include the following attributes: ease of ordering, product selection, product information, price, on-time delivery, product representation, customer support, privacy policies, and shipping and handling. Another research firm, Gomez.com, rates e-commerce websites on 30 to 50 criteria under five major headings in order to produce overall website ratings; the five dimensions are ease of use, customer confidence, onsite resources, relationship services, and costs. While much of both the managerial and academic research makes useful and interesting suggestions about what customers desire in their online purchase experience, an overarching framework, grounded in how consumers actually conceptualize their online experiences (not just how they rate particular attributes), appears to be missing. As well, validity and reliability of construct measures have not been established.

The only published scholarly marketing effort at scale development on the topic of online site evaluation is Chen and Wells (1999) “attitude toward the site” or AST. The measure includes five items: website relationship building, intentions to revisit, satisfaction with service, comfort in surfing, and the judgment that surfing the website is a good way to spend time. However, the authors concede that the measure is unlikely to convey a complete picture concerning online buyers’ judgments of their online experiences. While the items appear to possess sufficient reliability, the items may not be a valid measure of quality, as the researchers did not attempt to define the domain of items or attributes of importance to consumers (Churchill 1979).

Developing a Conceptual Framework

What is needed is a broad conceptual framework that will facilitate the development of a reliable and valid instrument specifically for online retail experiences. A customer’s online buying experience consists of everything from information search, product evaluation, decision making, making the transaction, delivery, returns, and customer service (Montoya-Weiss, Voss, and Grewal 2000). Three pre-existing literatures are relevant to our development of .comQ: retail image, computer-mediated environments (from both marketing and information systems), and services marketing.

With regard to the retailing literature, online shopping is a form of retailing, or, as it is called, “e-tailing.” Rather than developing measures of retailing quality per se, researchers have focused on a related concept, store image, and have developed a number of scales (e.g., Berry 1969; Lindquist 1974-75; Reardon, Miller, and Coe 1995; Samli, Kelly, and Hunt 1998). Clearly, e-tailers do have “store images,” whether clicks-and-mortar or pure-play. Some of the attributes identified by store image scholars can be expected to apply to online store quality, including merchandise assortment, service policies, layout, and institutional factors (i.e., reputation and community involvement). Others are clearly not directly applicable to the online retail environment, such as clientele.

The ability to purchase a product at a website and have it delivered, along with any customer service or after-sales help, are all services functions, which suggests

the relevance of services quality scholarship. Unlike the retailing literature regarding store image, the services marketing literature has one scale of service quality used predominantly. While certainly not without its critics, SERVQUAL (Parasuraman, Zeithaml, and Berry 1988, 1994a,b; Parasuraman, Berry, and Zeithaml 1991; Zeithaml, Berry, and Parasuraman 1996) is a widely used measure of service quality in the field, with more than 100 published articles using the measure. Service quality is conceptualized as the difference between expectations and performance. While the number of dimensions has been disputed, Zeithaml, Berry, and Parasuraman continue to find support for five factors: tangibles, responsiveness, empathy, reliability, and assurance (Parasuraman, Zeithaml, and Berry 1994a). The recent efforts of Zeithaml, Parasuraman, and Malhotra (2000) to address the specific context of e-commerce service quality have resulted in a conceptual framework that includes 11 dimensions.

Rust, Zahorik, and Keiningham's (1995) Return on Quality (ROQ) model attempts to link customer evaluation of quality, satisfaction, and/or retention to quality efforts in specific business processes. While more managerially implementable than SERVQUAL, this model does not develop a universal measure of quality, but rather, a means for each company to assess their investments in quality. Gale (1994) also takes a more "customized" approach in his Customer Value Management approach, tailoring measures to specific companies. Because our interest is in developing a measure applicable across online shopping experiences which will aid theory development, SERVQUAL, despite its deficiencies, is most relevant.

Scholars in the area of computer-mediated environments have focused on the experience of "flow" (being immersed while surfing online), information availability and display, interactivity, and graphic style (Ariely 2000; Hoffman and Novak 1996; Hoque and Lohse 1999; Lynch and Ariely 2000; Montoya-Weiss, Voss, and Grewal 2000; Novak, Hoffman, and Yung 2000; Schlosser and Kanfer 1999). As well, usability, including navigation, ease of use, search functions, overall site design and organization, and order processing have been studied (Jarvenpaa and Todd 1997; Lohse and Spiller 1998; Lohse and Spiller 1999; Montoya-Weiss, Voss, and Grewal 2000; Nielsen 2000; Novak, Hoffman, and Yung 2000; Spiller and Lohse 1998).

Thus, while retailing, services marketing, and scholarship on computer-mediated environments are useful starting points for developing a scale to measure e-commerce quality, concepts from these fields need to be significantly re-defined and extended for the online e-tailing environment. Based on these literatures, Table 1 provides the expected dimensions of e-commerce quality to investigate in our research. These dimensions include usability, information content, reliability/fulfillment, customer service, selection, security/privacy, and experiential/atmospheric qualities. Each of these expected dimensions is discussed briefly in Appendix 1.

Table 1. Expected Dimensions of E-Commerce Quality Based on Three Literatures

Expected Dimensions	Service Quality	Store Image	Computer-mediated Environments
Usability	Tangibles	Layout, convenience	Usability, ease of use, interactivity, layout, navigation, checkout, search
Information Content	Assurance (knowledge of provider)	Salespeople	Recency, accuracy, comprehensiveness, organization
Reliability/Fulfillment	Reliability	Not addressed	Trust
Customer Service	Responsiveness, empathy	Service policies, courtesy of salespeople	Technical support
Selection	Not addressed	Merchandise assortment	Not addressed
Security/Privacy	Assurance (safety)	Institutional factors (e.g., reputation)	Security, trust
Experiential/ Atmospheric Qualities	Not addressed	Atmosphere, store appearance	Flow, personalization, graphics

These seven dimensions were only a starting point for a program of research on consumer perceptions of the quality of online purchase experiences. The literature suggested dimensions and attributes for us to investigate in our research; however, the research itself was grounded very strongly in consumer perceptions of their online experiences, as well as their categorization of those experiences. In the next section, this program of research is described.

Program of Research: Three Studies

This research was supported by the Center for Research on Information Technology and Organizations (CRITO) at the University of California, Irvine. The purpose of the project is to develop a measure of e-commerce quality that incorporates the attributes that contribute to consumers having a satisfying, high quality online shopping experience. Thus, current users (rather than potential users) were the focus of our research. A multimethod, iterative process was used to develop the research instrument and to refine it with the goal of obtaining a concise and valid scale applicable to a broad spectrum of online shopping experiences. In step one, we used focus groups to generate statements to include in the other two phases of the study. In a second step, subjects sorted the statements so that the domain of online e-commerce quality could be conceptualized and dimensionalized according to consumer rather than researcher perceptions. Trochim and Linton (1986) refer to this process as “structured conceptualization.” In the third step, the dimensions of e-commerce quality are defined using exploratory and confirmatory factor analysis of online survey data. The three phases of the research are described below.

Study 1: Focus Group Research

Given our interest in consumer perception and experiences of online quality, and the current lack of data to address the subject, we undertook nine focus groups of online buyers (64 consumers altogether). Each focus group lasted 90 minutes to two hours. Three focus groups included MBA students and staff, a group likely to be technology “fast forwards” (Modahl 2000) and thus early adopters of online shopping. In addition, we conducted two offline focus groups in Southern California recruited from Harris Interactive’s online panel. Finally, we worked with Harris Interactive to conduct four online focus groups (including participants from across the U.S. and Canada), which broadened the geographical representation of focus group participants and ensured that a wider variety of viewpoints would be considered. Harris Interactive recruited both online and offline participants with the aim of creating groups who were diverse with respect to age, sex, online experience, and products purchased online. Our sample included participants aged 19 to 81; they purchased CDs, books, software, hardware, toys, and travel, and engaged in online auctions, all common online buying categories. Outside these major categories, a wide variety of purchases included ammunition, lingerie, groceries, camping equipment, and even a house.

Our moderator guide contained questions about participants’ typical online shopping experiences, where and when they do their online shopping, what makes the online and offline shopping experiences enjoyable or difficult, and if there are products they will not purchase online. During a 10-minute section, we investigated selected website usability issues and experiences; in online focus groups we did

so by “spawning” EddieBauer.com, Amazon.com, eBay, and/or MySimon.com on participant computers; participants could then investigate the websites and answer questions about them. In offline groups, focus group members wrote down their favorite sites along with three reasons why they liked that site. This exercise served as a basis for further exploration of specific issues. After completing these exercises, we discussed security, trust, reputation, merchandise selection, personalization issues, delivery, informativeness, pricing, community, and customer service.

While there was a protocol for the focus group questions, each focus group covered unique ground as participants’ comments and answers would prompt follow-up into different areas; the offline protocol had to be adapted somewhat for the online focus groups. In the four online groups, a professional moderator ran the groups, while both researchers “lurked,” being present without being visible to participants. Thus, researchers could communicate with the moderator behind-the-scenes, suggesting questions or probes. The online groups were held in real time in a “chat room” format. Offline focus groups were transcribed while online group transcriptions were automatically generated. We analyzed the transcripts by systematically categorizing and labeling attributes of online shopping for the next stage in our research. Importantly, one attribute suggested by writers as important, community, was rarely of importance to our online buyers, so it did not appear as a suggested scale item for follow-up attention.

These focus groups were important to increase the probability of producing valid measures (Churchill 1979). Relatedly, the choice of items to be used in cluster analysis (performed in step two of our analysis) has been described as “one of the most critical steps in the research process” and thus this first step maximized the chances of performing a useful cluster analysis (Aldenderfer and Blashfield 1984). More detailed results of our focus group research appear in Wolfinbarger and Gilly (2001).

Study 2: Sorting Exercise/Structured Conceptualization

E-commerce quality is an incompletely understood area and the dimensions of quality are imperfectly defined and understood. While researchers typically move directly from exploratory research to development of a questionnaire, we felt that the items utilized on the questionnaire would provide better coverage of important e-tail quality concepts if an intermediate step was undertaken to improve conceptualization. Understanding how online shoppers (rather than researchers) conceptualize and categorize their experiences improves the validity of the resulting scale. And investigating items and constructs in two studies with different methodologies results in a multimethod investigation, thus increasing our confidence in our findings.

The second phase of data collection involved utilizing the data from focus groups and carefully culling every statement related to online e-tail quality from the transcripts. These 375 statements were added to 22 items from SERVQUAL (re-worded slightly for the online context), and to items obtained from published online surveys of customer satisfaction and quality of several marketing research firms. The researchers then performed an initial categorization of statements representing several dimensions of interest based on the literature. This categorization facilitated

the choice of 100 items to adequately cover the wide variety of issues identified as important to consumers during our focus groups.

A sorting task was then utilized in order to understand how online shoppers conceptualize and categorize their online experiences. Seventy-one graduate and 19 undergraduate students who had made online purchases sorted 100 cards into piles of similar cards, each of which contained one of the statements that had been chosen from our transcripts and other research instruments to measure e-commerce quality. This task is appropriate for determining conceptual categories because judgments of similarity are central to the process of categorization (cf. Shaver, Schwartz, Kirson, and O'Connor 1987; Rosch 1975). Graduate students were paid \$20 for their participation, while undergraduates received extra credit points. Instructions for the participants appear in Appendix 2. After receiving the instructions, each subject performed the sorting and rating tasks, finishing in an hour or less. Card sets were shuffled in order to reduce the possibility of order effects.

Study 2: Results. The data from the sorting task were entered into a group similarity matrix (entries in the matrix show how often a particular pair of items was sorted together with the maximum possible entry being 90, the number of subjects). The data were then submitted to hierarchical cluster analysis in SPSS 10.0, which uses non-metric multidimensional scaling to transform the data into a two-dimensional proximity matrix (Kruskal and Wish 1978). Multidimensional scaling takes the group similarity matrix and develops a map wherein each statement is a point on the map and statements placed together by more people are closer to each other on the map. Then, hierarchical cluster analysis takes the proximity matrix and partitions the map into groups or clusters of statements (Trochim 1989), which are represented on a dendrogram (Gordon 1999; Punj and Stewart 1983) (see portion of dendrogram in Appendix 3). Cluster analysis is both analytically and conceptually appropriate for this analysis, as the techniques are most frequently utilized as classification tools (Aldenderfer and Blashfield 1984; Gordon 1999; Punj and Stewart 1983).

Two solutions were generated using both Ward's minimum variance and the centroid method. Comparing the two solutions creates more confidence in the solution, as they are quite similar (Gordon 1999; Punj and Stewart 1983). For both methods, 3 outliers and 11 negatively worded statements (that largely clustered together in a "negatives" cluster) were removed from further consideration, leaving 86 statements, including 4 pricing items. Excluding the pricing items (which are not part of the quality construct), the centroid method results in a 5-cluster solution, with the clusters composed of website design, customer service, personalization, reliability, and security/privacy (see solution, along with their associated importance ratings, and comparison to Ward's solution in Appendix 4). Solutions beyond the 5-cluster solution break off only one or two items into new clusters, an indication that the 5-cluster solution is most appropriate (Hair, Anderson, Tatham, and Black 1998).

The Ward's minimum variance method solution breaks down the large website design cluster from the centroid solution into four smaller clusters including selection, information, experiential/atmospheric qualities, and usability, ultimately resulting in an eight- rather than a five-cluster solution, perhaps because Ward's

method is known to have a bias towards producing clusters of approximately equal size (Aldenderfer and Blashfield 1984). The agglomeration coefficients show large increases going from three to four clusters and again from seven to eight clusters, suggesting that four- and eight-cluster solutions should be considered (Aldenderfer and Blashfield 1984). The four-cluster solution conflates personalization and selection items although these seem to be conceptually distinct dimensions; thus, the nine-dimension solution is preferred. See the first two columns of Table 2 for a comparison of the Ward's method and centroid method clusters.

Each cluster can be viewed as a measurement construct with the individual statements suggesting specific operationalizations of measures within constructs (Davis 1989; Trochim 1989). Collectively, the cluster solutions suggest that items should be chosen from among the 86 to allow adequate coverage of up to nine possible clusters: website design (including selection, information, experiential/atmospheric qualities, and usability), customer service, personalization, security/privacy, reliability/fulfillment, and pricing. We selected items for our follow-up online survey by balancing four criteria: (1) providing sufficient coverage of all dimensions identified by our cluster analyses, (2) evaluating the importance ratings of items provided by subjects, (3) avoiding redundancy, and (4) excluding items that appeared to be close to two different clusters. Ultimately, we chose 40 items related to quality for further data collection and analysis (items chosen are indicated in Appendix 4).

Study 3: Online Survey

The third phase of data collection involved an online survey conducted using the Harris Poll Online Panel. Harris Interactive randomly selected members age 18+ to receive e-mail invitations to participate in the study. Respondents were entered into a sweepstakes (two prizes of \$250) as compensation for their participation. A total of 1,013 completed questionnaires resulted from the invitations. Respondents were screened for those who had received a package as a result of an online purchase. Forty-seven percent of respondents had made their purchase within the last two weeks, 23 percent between two weeks and a month, 16 percent within one to three months, and 7 percent in three to six months; thus 86 percent of respondents had made purchases within the last three months and 93 percent within the last six months.

Because we are interested in the entire e-tail purchase experience, not just the interaction with the website, we restricted participants to those who purchased products rather than services (for example, financial services) and received packages rather than downloading products over the Internet (for example, software). The products most commonly purchased by our respondents were books (18 percent), clothing and apparel (15 percent), and music/video (11 percent). Respondents were asked whether their most recent purchase was from an auction or a retailer site. An overwhelming majority were purchased at a retailer site (85 percent) rather than an auction site (15 percent). As well, 71 percent reported they purchased what they set out to purchase while only 29 percent said they were "browsing" when they made their purchase. We obtained data about how many purchases they had made at the website used for their most recent purchase. Fully 37 percent were reporting on their first purchase at the particular website, while 30 percent had

made two to three purchases, 13 percent had made four to five purchases and 19 percent made five or more purchases.

Respondents answered a series of 44 statements in a two-column format regarding the desired and actual performance of their online purchase experience using 7-point scales ranging from 1, “strongly disagree” to 7, “strongly agree.” The option “not applicable” was included, and was rarely used except for the customer service items, where missing data made up from 18 percent to 43 percent of data, averaging 32 percent across five items. As a result of the missing data, mean replacement was used in our analysis; mean imputation outperforms pairwise and listwise deletion, although all methods do surprisingly well even when as much of 60 percent of data are missing, regardless of the reason for the missing data (Kamakura and Wedel 2000).

Twenty statements from pre-existing scales whose reliability has been established were included to assess the validity of the .comQ measure. These include six statements about satisfaction (Oliver 1980, 1997), six statements about attitude toward the website (Chen and Wells 1999), five statements from a behavioral intentions battery about loyalty (Zeithaml, Berry, and Parasuraman 1996) and two items measuring global quality (assessed using the same 7-point scale). The loyalty scale measures the intention to do more business with the website (purchase intentions) and the intention to encourage others to do business with the website. The online nature of the survey enabled us to randomly order the statements within sections for each respondent. Webographic (e.g., experience with the Internet, length and frequency of online purchase, connection type), and demographic characteristics were also obtained (see Appendix 5). Respondents were slightly more likely to be women than in the online population; women make up 63 percent of those who shop online more than once a week (Allen 2001) compared to 64 percent in our study. As well, our respondents were more likely to have broadband connections at home than the U. S. Internet population; broadband users are 14 percent of the online Internet population (Cohen 2001) but make up 22 percent of our sample. Perhaps this is not surprising, as broadband should make online shopping, and participation in online surveys, easier. While our sample is somewhat more upscale and educated than the general population, heavier online shoppers are more likely among higher socioeconomic groups (cf. Cyberatlas.com 1999; Modahl 2000).

Study 3: Results. Utilizing confirmatory factor analysis, we tested the eight- and five-dimension models (shown in Table 2) suggested by hierarchical clustering. The eight-dimension solution provides inadequate discriminant validity between usability, atmosphere, information, selection, and personalization, with correlations between all these factors running between .85 and .96, with most exceeding .90, despite the fact that items were deleted in order to improve unidimensionality. Customer service, reliability, and security/privacy are discriminable. The five-factor solution shows that website design (the factor composed of usability, atmosphere, information, and selection) correlates at .94 with personalization. Once again, customer service, reliability, and security/privacy are discriminable dimensions.

Table 2. Relationship Between Clusters Formed with Hierarchical Clustering (Ward's Method and Centroid Method) and .comQ Dimensions Suggested by Exploratory Factor Analysis

Hierarchical Clustering— Ward's Method (Sorting Data)	Hierarchical Clustering— Centroid Method (Sorting Data)	Exploratory Factor Analysis (Survey Data)
Security/privacy	Security/privacy	Security/privacy
Customer service	Customer service	Customer service
Reliability	Reliability	Reliability
Personalization	Personalization	Website design
Informativeness	Website design	Website design
Experiential/atmospheric Characteristics	Website design	Website design
Usability/ease of use	Website design	Website design
Selection	Website design	Website design

*Ward's method is known to have a tendency to produce clusters of equal size that may account for the fact that more clusters are produced by that method than the centroid method.

Because neither of the solutions suggested by hierarchical clustering were satisfactory, we utilized exploratory factor analysis as a useful preliminary technique for suggesting dimensions (Gerbing and Anderson 1988; Gerbing and Hamilton 1996). Exploratory factor analysis, using principles component with varimax rotation, was performed on the 40 attributes related to quality. Items were retained if they loaded .50 or more on a factor, did not load more than .50 on two factors, and if the reliability analysis indicated an item-to-total correlation of more than .40 (Hair, Anderson, Tatham, and Black 1998). We also deleted two items that were worded very similarly, as these items tend to produce large standardized residuals, reducing model fit in confirmatory factor analysis. Twenty-five items were retained according to these criteria; the items loaded on four factors, and accounted for 62 percent of the variance (see Table 3). The four factors were website design, customer service, reliability, and security/privacy. With the exception of personalization, which loaded with website design rather than being a separate factor, the four factors extracted matched those suggested by clustering using the centroid method; selection, informativeness, atmosphere, and usability items loaded together on one website design factor, rather than separately as in the Ward's method clustering solution.

The 25 items were then submitted to confirmatory factor analysis in LISREL XIII with the goal of investigating unidimensionality (Gerbing and Anderson 1988; Anderson and Gerbing 1988). Hattie (1985) has written on the topic of unidimensionality: "That a set of items forming an instrument all measure just one thing in common is a most critical and basic assumption of measurement theory" (p. 49). The constraints imposed by unidimensionality in confirmatory factor analysis tend to result in the reduction of the number of items that appear in a final scale, purifying the scale beyond the standard required by exploratory factor analysis, coefficient alpha, and item-total correlations (Gerbing and Anderson 1988).

Table 3. Items Retained Based on Exploratory Factor Analysis

Item	Website Design	Customer Service	Reliability	Security/Privacy
Website Design				
The organization and layout of the site facilitate searching for products.	.73	.13	.17	.24
The search function gives me useful results.	.71	.16	.22	.18
It's really fun to shop at this website.	.69	.20	.11	.16
The website is visually appealing.	.69	.23	.03	.21
The website has good selection.	.68	.10	.30	.12
The site almost says, "come in and shop."	.66	.23	.06	.16
The site has a wide variety of products that interest me.	.65	.09	.26	.19
I can go to exactly what I want quickly.	.64	.18	.25	.20
The website's appearance is professional.	.61	.16	.24	.27
The website provides in-depth information.	.57	.29	.23	.31
The level of personalization at this site is about right, not too much or too little.	.56	.37	.18	.24
The site doesn't waste my time.	.54	.28	.25	.33
It is quick and easy to complete a transaction at this website.	.52	.25	.24	.30
Customer Service				
When you have a problem, the website shows a sincere interest in solving it.	.22	.77	.17	.16
Customer service personnel are always willing to help you.	.24	.75	.18	.26
The company is ready and willing to respond to customer needs.	.29	.81	.11	.13
Inquiries are answered promptly.	.30	.64	.20	.15
Returning items is relatively straightforward.	.17	.67	.25	.12
Reliability				
The product that came was represented accurately by the website.	.28	.16	.69	.28
The product is delivered by the time promised by the company.	.22	.28	.67	.26
You get what you ordered from this website.	.21	.16	.83	.19
Security/Privacy				
I feel like my privacy is protected at this website.	.31	.18	.24	.79
The website has adequate security features.	.35	.21	.14	.74
I feel that I can trust this website.	.31	.32	.35	.65
I feel safe in my transactions with this website.	.32	.18	.24	.79
<i>Principle Components Analysis with Varimax Rotation</i>				

The data possess the characteristic negative skew that customer satisfaction (Peterson and Wilson 1992) and quality (Parasuraman, Zeithaml, and Berry 1994a) distributions generally show. As a result, unweighted least squares (ULS) is the appropriate estimation technique, and was used for investigating standardized residuals. Most notably, several of the website design items produced large standardized residuals with items from multiple latent constructs, indicating that the items did not satisfy the conditions imposed by unidimensionality, and thus were excluded from further consideration in the scale (Anderson and Gerbing 1988).

As well, one customer service and one security/privacy item produced multiple large standardized residuals with multiple constructs and were thus deleted from the scale. The final set of 14 items possessed construct reliabilities, average variance extracted (Fornell and Larcker 1981) and Cronbach's alphas that exceed commonly cited standards for assessing reliability and unidimensionality (see Table 4) (cf. Bagozzi and Yi 1988; Hair, Tatham, Anderson, and Black 1998). The retained elements for website design addressed all the issues found in the website design sub-clusters in the hierarchical analysis except for the experiential/atmospheric items that loaded on website design issues in the exploratory factor analysis, but tended to have large standardized residuals with items designed to measure security/privacy and reliability.

In order to validate the final 14 items, we ran analyses for the following subsamples: goal-oriented users versus browsers (shoppers who made unplanned purchases), e-tailing versus auction purchasers, respondents who had made at least four purchases at the particular website (and who should thus be more sophisticated judges of website quality), and respondents who had purchased music, books, or videos (the only product category with sufficient sample size for testing). Because the fit statistics associated with ULS have been questioned (Hu and Bentler 1995; Maruyama 1998), overall model fit was determined using maximum likelihood estimation (Bentler and Dudgeon 1996). Construct reliabilities and average variance extracted exceeded recommended standards except for the website design construct as rated by frequent buyers, which at .48 fell just below the cutoff of .50. Although the χ^2 for the confirmatory factor analysis was significant only for the browsing subsample, the chi-square statistic is known to be sensitive to sample size and model complexity (cf. Bagozzi and Yi 1988; Bearden, Sharma, and Teel 1982; Bollen 1990; Marsh, Balla, and McDonald 1988). Thus, other fit indices are examined, included the goodness of fit index (GFI) the adjusted goodness of fit index (AGFI), the non-normed fit index (NNFI), the comparative fit index (CFI) (Bentler 1980; Bentler and Bonett 1980), and RMSEA (Browne and Cudeck 1993). In almost all cases, the fit indices exceed the recommended levels. The most marginal numbers for GFI and AGFI are for the auction subsample that is a relatively small sample ($N = 147$). Taken together, the fit indices, reliabilities, and average variance extracted suggest that the measures and constructs generalize across a variety of e-commerce settings and customer motivations for online shopping.

Table 4. Standardized Loadings for .comQ Confirmatory Factor Analysis

Item Descriptions	Mean N = 1013 Max = 7	Full Sample N = 1013	Browsers N = 293	Goal- Oriented N = 720	Frequent Buyers N = 323	Books/ Music N = 296	Auctions N = 147	E-tail N = 866
Website Design, Cronbach's $\alpha = .83$								
The website provides in-depth information.	5.8	.73	.77	.77	.71	.77	.79	.76
The site doesn't waste my time.	6.1	.72	.78	.78	.76	.83	.74	.78
It is quick and easy to complete a transaction at this website.	6.2	.70	.77	.77	.77	.80	.85	.76
The level of personalization at this site is about right, not too much or too little.	5.9	.73	.76	.76	.70	.82	.72	.77
This website has good selection.	6.2	.64	.70	.70	.66	.78	.68	.71
<i>Construct Reliability</i>		.89	.87	.87	.84	.90	.86	.87
<i>Average Variance Extracted</i>		.50	.57	.56	.48	.64	.57	.58
Reliability, Cronbach's $\alpha = .79$								
The product that came was represented accurately by the website.	6.5	.78	.85	.85	.89	.87	.79	.85
You get what you ordered from this website.	6.6	.81	.87	.87	.81	.90	.88	.87
The product is delivered by the time promised by the company.	6.3	.66	.78	.78	.73	.83	.75	.78
<i>Construct Reliability</i>		.79	.87	.87	.75	.90	.85	.87
<i>Average Variance Extracted</i>		.56	.70	.69	.67	.75	.65	.70
Security/Privacy, Cronbach's $\alpha = .88$								
I feel that my privacy is protected at this site.	6.2	.85	.90	.90	.83	.89	.86	.90
I feel safe in my transactions with this website.	6.3	.88	.92	.92	.88	.92	.85	.93
This website has adequate security features.	6.4	.81	.87	.87	.88	.85	.95	.86
<i>Construct Reliability</i>		.88	.92	.93	.90	.92	.92	.93
<i>Average Variance Extracted</i>		.72	.81	.72	.75	.79	.79	.81
Customer Service, Cronbach's $\alpha = .84$								
The company is willing and ready to respond to customer needs.	6.1	.86	.88	.88	.89	.87	.91	.88
When you have a problem, the website shows a sincere interest in solving it.	5.7	.78	.82	.82	.81	.86	.78	.83
Inquiries are answered promptly.	5.9	.75	.80	.80	.80	.81	.77	.81
<i>Construct Reliability</i>		.84	.87	.87	.92	.88	.86	.88
<i>Average Variance Extracted</i>		.70	.70	.70	.79	.71	.67	.71
Fit Statistics								
Degrees of Freedom		71	71	71	71	71	71	71
χ^2		232	89	267	221	226	140	303
Goodness of Fit Index (GFI)		.97	.96	.91	.96	.90	.88	.95
Adjusted Goodness of Fit Index (AGFI)		.95	.94	.86	.94	.85	.82	.93
Non-normed Fit Index (NNFI or TLI)		.97	.99	.91	.97	.93	.92	.97
Comparative Fit Index (CFI)		.98	.99	.93	.98	.95	.94	.97
Root Mean Square Residual (RMR)		.03	.02	.04	.02	.04	.05	.03
Root Mean Square Error of Approximation (RMSEA)		.04	.05	.03	.08	.08	.08	.06

Table 5. Correlations Between .comQ Constructs, Standard Errors, and T-values

	Customer Service	Security/Privacy	Website Design	Reliability
Customer Service	1.0			
Security/Privacy	.61 (.02) 25.01	1.0		
Website Design	.76 (.02) 37.61	.79 (.02) 44.33	1.0	
Reliability	.63 (.03) 24.17	.66 (.02) 27.65	.74 (.02) 33.45	1.0

All correlations are significant at $p < .01$

Discriminant validity was assessed for the overall sample and all subsamples. In all cases, the confidence interval for each pairwise correlation estimate (+/- two standard errors) did not include the value of one (Gerbing and Anderson 1988) (see Table 5 for correlations between latent factors, standard errors, and t-values). As well, for every pair of factors in the overall sample as well as the subsamples, we compared the χ^2 value for a measurement model that constrains their correlation to equal one to a measurement model without this constraint (Bagozzi and Phillips 1982; Jöreskog 1971). A χ^2 difference test was performed for all pairs of factors, and in all cases resulted in a significant difference. Thus, we conclude that the constructs measure four distinct constructs. Table 2 summarizes the clusters identified by the two different hierarchical clustering methods and the confirmatory factor analysis.

Nomological Validity. Reliability and discriminant validity have been established. But, do the four constructs predict quality as they are designed to do? In Table 6, we present analyses of the relationship between the constructs and overall quality (measured by two items loading over .92 in all cases of this analysis) for a variety of settings and segments. Because quality is a global, across-transaction construct, respondents were specifically instructed to judge *all* their purchases and interactions with the website. Again, maximum likelihood (ML) estimation was used despite the fact that ULS estimation is indicated; in all cases ULS estimation produces fit indices of .99 and 1.00, but the value of these fitness indices has been questioned (Hu and Bentler 1995; Maruyama 1998).

Table 6. Relationships of .comQ Factors to Overall Quality

Construct	Full Sample N = 1013	Browsers N = 293	Goal-Oriented N = 720	Frequent Buyers N = 323	Books/Music N = 296	Auctions N = 147	e-tail N = 866
Website Design	.36*	.38*	.38*	.40*	.57*	.44*	.35*
Reliability	.38*	.42*	.42*	.22*	.22*	.34*	.42*
Security/Privacy	-.10*	-.04	-.04	.20*	.03	.22	-.05
Customer Service	.23*	.13	.13*	.08	.05	-.14	.15*
R ²	.64	.70	.70	.63	.63	.73	.70
df	94	94	94	94	94	94	94
χ ²	307	114	280	301	304	201	409
Goodness of Fit Index (GFI)	.96	.95	.95	.90	.89	.90	.94
Adjusted Goodness of Fit Index (AGFI)	.95	.93	.93	.85	.83	.85	.92
Comparative Fit Index (CFI)	.98	.99	.98	.91	.94	.93	.97
Non-normed Fit Index (NNFI or TLI)	.97	.99	.97	.92	.92	.91	.96
Root Mean Square Residual (RMR)	.03	.02	.02	.03	.03	.05	.02
Root Mean Square Error of Approximation (RMSEA)	.04	.02	.05	.08	.08	.08	.06

* $p < .05$

Taken together, the ML fitness indices suggest that the model fits, and the R²s are strong, between .63 and .70. Reliability and website design are the largest and most consistent predictors of quality. Customer service is significant for three of the seven settings. Perhaps most surprising is that the role of security/privacy is eclipsed by the other three factors, even becoming negative in the overall sample. Importantly, security/privacy is significantly related to quality for the subset of the sample, making at least four purchases at the specific website they were rating. Descriptive analysis of the three security/privacy items show that their ratings improve significantly across interactions with a specific e-commerce website, going from an average of 6.1-6.2 for first purchases to 6.4-6.6 for four or more purchases. In contrast, neither customer service nor reliability measures changed significantly, while only two of five website design issues (personalization and speed of transaction) were rated slightly, but significantly higher across transactions. These results may suggest that not having bad experiences, such as unwanted promotions or stolen credit card information, results in online customers rating a website more highly; thus, given greater experience, the judgment that a website is secure and protects their privacy does appear to directly affect overall quality ratings. Alternatively, customers who have bad experiences may abandon online shopping altogether and thus be underrepresented in our sample.

In addition to investigating the relationship with global quality, three additional constructs that should be related to the four quality factors are satisfaction, loyalty, and attitude toward the website. The satisfaction measure was developed by Oliver (1980), loyalty by Zeithaml, Berry, and Parasuraman (1996) and attitude toward the website by Chen and Wells (1999). All of the measures have been shown to be

reliable, and all exceeded recommended levels for construct reliability and average variance extracted. The results appear in Table 7. The quality measures are designed to be global, while the satisfaction measures are all specifically about the most recent purchase; this difference in focus probably explains why reliability (the item was as expected and delivered on time) is much more strongly related to satisfaction than to any of the other factors. As would be expected, the four .comQ factors explain more variance in overall quality than they do in satisfaction and intentions. However, almost as much variance is explained in overall attitude toward the website as in quality. Attitude toward the website was developed to measure overall image of the website and is not limited to purchases at a website; thus, the measure is not as strongly related to actual product and delivery (reliability) as is the global quality measure.

Table 7. Relationships of .comQ Factors to Overall Quality, Satisfaction, Loyalty, and Attitude Towards the Website

Construct	Quality	Satisfaction	Loyalty Intentions	Attitude Towards Website
Website Design	.36*	.16*	.37*	.39*
Reliability	.38*	.49*	.21*	.20*
Security/Privacy	-.10*	.02	.04	.09
Customer Service	.23*	.14*	.15*	.21*
R ²	.64	.55	.48	.63
df	94	160	142	142
χ^2	307	523	605	595
Goodness of Fit Index (GFI)	.96	.95	.94	.94
Adjusted Goodness of Fit Index (AGFI)	.95	.94	.92	.92
Comparative Fit Index (CFI)	.98	.97	.96	.96
Non-normed Fit Index (NNFI or TLI)	.97	.97	.95	.95
Root Mean Square Residual (RMR)	.03	.03	.03	.03
RMSEA	.04	.04	.05	.05

* $p < .05$

In summary, the 14 items are reliable, valid, and unidimensional. They explain 63 to 70 percent of the variance in quality ratings across a wide variety of settings. As would be predicted, the factors are also significantly related to satisfaction, loyalty, intentions, and attitude toward the website.

Discussion

Limitations of our research must be acknowledged. The sample used in our online survey is not a random sample; rather, it comes from an online panel that is more upscale and technologically sophisticated than the general Internet population. Perhaps this is not a liability as heavier online shoppers are likely to be upscale technology optimists (Modahl 2000). However, as less techno-savvy consumers begin to engage in online shopping, their needs and preferences will need to be compared to those found here, that is, using participants who likely reflect the “early majority” of online shoppers (Modahl 2000). Moreover, it remains to be seen whether or not international populations perceive quality in the same fashion as American consumers. Further, our sample is restricted to purchasers of products to investigate fulfillment issues; further research must be done on online services to see if .comQ is equally applicable.

Importantly, consumer desires and expectations may change over time. Consumer experiences are likely to change as technologies such as broadband and information appliances are increasingly available to the mass market. In particular, with the advent of broadband, experiential/atmospheric elements of website design may be experienced as separable from the features oriented more towards usability. Additionally, young people who have grown up with the Internet may be somewhat different in their needs, expectations, and shopping behaviors when they bloom into adult online shoppers. Currently, the experience of being present online, or “telepresence” (Steuer 1992), is far less compelling than the three-dimensional, multi-sensory possibilities offered by offline shopping. It remains to be seen if online shopping can eventually become more stimulating and experiential, and if it does, whether or not shoppers will demand shopping experiences that are “immersive,” or simultaneously involving and entertaining, like online game environments.

Despite these limitations, our research offers important implications for the measurement of consumer perceptions of an online shopping experience. Our analyses suggest that judgments concerning the quality of an online site are most strongly related to website design factors and reliability. Customer service also is related to overall quality in some settings, and is significantly related to satisfaction, intentions, and attitude towards the website. Perhaps most surprising is the role of security/privacy, which is largely not significant in predicting quality, except among the most frequent buyers at the website. However, it is important to note that security/privacy is correlated with website design at .79 in the overall sample; it may be that inferences of security/privacy are largely made from other quality factors, particularly website design. In our focus groups, online consumers suggested that they had difficulty judging the privacy and security of a site, even after checking that the site was secure when making transactions and after reading a statement of privacy that in their minds was legalistic. It appears that initially consumers judge security/privacy based on elements such as the professional look and feel of the website (Montoya-Weiss, Voss, and Grewal 2000), as well as functionality of a

website, and company reputation. Usable and professional sites are probably seen as having required greater resources and investment, thus inspiring greater consumer trust (Jarvenpaa and Tractinsky 1999). Similarly, in the brick-and-mortar context, consumer trust is affected by a seller's investments in physical building and facilities (Doney and Canon 1997). Importantly, across transactions at a particular website, judgments of security/privacy increase, and appear to play an independent role in predicting quality.

This work extends that of Zeithaml, Parasuraman, and Malhotra (2000) on e-commerce service quality. They identify 11 dimensions of "e-SQ" based on their focus groups and qualitative analysis. However, qualitative analyses tend to suggest more dimensions than are later confirmed by quantitative analysis; for instance, Parasuraman, Zeithaml, and Berry (1985) initially posited 10 dimensions for SERVQUAL based on focus groups and in-depth interviews, but ultimately reduced the number of dimensions to 5 after quantitative analysis. Table 8 shows the relationship between the 11 dimensions suggested by e-SQ and the 4 dimensions suggested by .comQ. Important differences include our more narrow definition of reliability to fulfillment issues. The other reliability issues identified by Zeithaml, Parasuraman, and Malhotra (2000) also surfaced in our analyses, but items related to correct product information and correct technical functioning straddled both website design and reliability, thus impeding the goal of unidimensional measurement. Moreover, we lack a separate assurance/trust dimension in .comQ. Rather, our findings and those of other authors suggest that assurance/trust appears to be a higher order outcome that results from reliability, customer service, website design, security/privacy, and reputation (cf. Jarvenpaa and Tractinsky 1999; Montoya-Weiss, Voss, and Grewal 2000). We do suggest that two issues identified by Zeithaml, Parasuraman, and Malhotra are included in future tests of .comQ: having items in stock (a reliability issue identified in our hierarchical cluster analyses but not followed up in our survey) and price knowledge (most likely a website design issue).

The final 14 items chosen for our scale measure the four factors at a global level. Like SERVQUAL, this scale is open to the criticism of not promoting "drill-down" into specific attributes to improve (Finn and Kayande 1997). For managers, the extended list of 40 quality and 4 pricing items used in this study will provide useful diagnostic information, as they include issues consumers indicated in our focus groups, and in their expectations measures of the online survey, are important to them: for example, download speed, reputation, and easy return. These attributes are more concrete than those included in the final scale, but contribute to higher scores on the more global statements included in our final measure. As well, additional concrete attributes important in a specific e-tail context can be developed, and their relationship to the more global .comQ constructs and to overall quality can be modeled.

Table 8: Relationship Between eSQ Dimensions and .comQ Dimensions

e-SQ (Zeithaml, Parasuraman, and Malhotra) (based on focus groups and qualitative analysis) 11 dimensions	.comQ ((Wolfenbarger and Gilly) (based on three-step study— focus groups, hierarchical clustering and CFA) 4 dimensions
Reliability*	Reliability and website design
Responsiveness	Customer service
Access	Customer service
Flexibility	Website design and customer service
Ease of navigation	Website design
Efficiency	Website design
Assurance/trust**	Reliability, customer service, website design, and security/privacy
Security/privacy	Security/privacy
Price knowledge	Website design***
Site aesthetics	Website design
Customization/personalization	Website design

* The e-SQ formulation of reliability includes correct technical functioning and product information. In our .comQ analyses, correct technical functioning correlates strongly with both website design and reliability and thus was not included in the final 14 items. As well, information appears to be a website design issue in .comQ, while it is a reliability issue in e-SQ. Reliability issues in the final .comQ scale are restricted to fulfillment.

** The assurance/trust dimension in e-SQ does not translate directly to .comQ; rather in .comQ, this dimension appears to be a higher order outcome that is a result of reliability, customer service, website design, security/privacy, and reputation.

*** Price knowledge was not investigated in .comQ; however, we believe it is likely to be website design issue.

For managerial purposes, including expectations and desire measures also provides useful diagnostic information for managers (Parasuraman, Zeithaml, and Berry 1994b). For example, in our study, the largest gap in consumer expectations compared to outcomes was in shipping and handling charges. Importantly, negative performance on attributes has been shown to have a greater impact on overall satisfaction and repurchase intentions than does positive performance (Mittal, Ross, and Baldasare 1998), a phenomenon that may be true with respect to e-tail quality; this issue deserves further investigation. However, in the data we collected on 40 quality and 4 price attributes, negative performance or conformance with expectations was the rule; on all but 3 attributes, less than 5 percent of respondents reported positive performance (outcomes exceeding expectations) on a given attribute. A larger sample or a research design focused on collecting and comparing data on positive as compared to negative performance on attributes is needed to further investigate this issue.

Pronouncements on what online businesses need to do in order to attract customers, and more importantly, to get customers to buy and then re-purchase have been frequent. A spate of books has been written explaining how to be successful in the “new economy” (e.g., Kelly 1998; Schwartz 1997; Seybold 1998; Shapiro and Varian 1998). Frequent advice includes focusing on “customers, content, and community.” Yet very few focus group members suggested that “community” was important to their experience. Moreover, immersiveness (a term that hails from

gaming environments) has been described as important; yet the experiential aspects, including graphic design, fun, and excitement, were rated low in importance by online consumers compared to other online factors. Similarly, Parasuraman (2000) reports that attractive graphics did not correlate with any technology-related behaviors in his study. Instead, our analysis suggests that the most basic building blocks of a “compelling online experience” are reliability and providing outstanding website functionality in terms of time savings, easy transactions, good selection, in-depth information, and the “right level” of personalization. While these pronouncements are perhaps less sexy than those counseling feature-filled e-commerce sites that are fun, immersive, and community oriented, they are nevertheless currently the attributes of greatest weight to online consumers.

Conclusion

The Internet population is already beginning to mirror the general population, at least in the U.S. (Lohse, Bellman, and Johnson 2000). Internet users typically start by utilizing e-mail, then progress to information search, and then finally, to online shopping and buying. Online shoppers are attracted to the information, selection, and convenience online shopping affords them; shoppers explicitly link these attributes of online shopping to increased freedom and control. The research reported here provides a means to understand the online consumer and the dimensions that contribute to a quality online shopping experience.

Appendix 1. An Extended Discussion of the Expected Dimensions of E-Commerce Quality Based on the Literature

Usability

Usability, which includes navigation and ease of use, is important to online consumers and is a key factor in realizing the promise of e-commerce (Swaminathan, Lepkowska-White, and Rao 1999). Usability is analogous to the retailing concepts of store layout and design (Lohse and Spiller 1998), ease of navigating through the store, and fast checkout (Arnold, Tae, and Tigert 1983). Usability elements affect the ease of use and amount of effort required to browse and buy at an e-tailing site; after all, “diligence in browsing a store is not a virtue Internet marketers should expect from their customers” (Lohse and Spiller 1999, p. 2). A three-click rule has frequently been suggested in the popular business press, assuming that consumers will leave a site if they don’t find what they want within three clicks (Nielsen 2000). Web waiting time or download speed negatively affects evaluation, especially when information is not provided to users concerning waiting times (Dallaert and Kahn 1999). Additionally, making transactions easily is important to consumers, but many find the checkout process unduly complicated (Lohse and Spiller 1998).

Information systems scholars and practitioners have studied usability as it applies to computer systems long before the Internet appeared, examining user/technology interfaces in order to improve design (cf. Nielsen 1993; Nielsen 2000; Cooper 2000; Lohse and Spiller 1998). As well, a cross-disciplinary stream of research in the area of man/computer interactions, the technology adoption model (TAM), is relevant to usability: scholars have found that in work environments, both usefulness and ease of use increase intentions to use and actual usage behavior of computer systems (cf. Davis 1989, 1993; Davis, Bagozzi, and Warshaw 1989).

In the context of the Internet, navigational ease, download speed, and order processing are all elements of usability, or in terms of TAM, ease of use. Both managerial research and scholarship find that navigational structure can facilitate or inhibit online shopping visits and sales because it affects ease of use (Baty and Lee 1995; Ha and James 1998; Hoque and Lohse 1999; Lohse and Spiller 1999; Nielsen 2000). A recent Pew Internet study (Horrigan, Rainie, Fox, Lenhart, Spooner, Lewis, and Carter 2000) found that fully 41 percent of Internet users who are not buyers believe that some sites are too complicated to use. Consistent with the predictions of TAM, ease of use and perceived channel advantage (TAM’s “usefulness”

in the Internet context) have been shown to predict adoption of Internet financial services (Montoya-Weiss, Voss, and Grewal 2000).

Information Content

An important advantage of online shopping is the availability of information (Wolfenbarger and Gilly 2001), including the reduction in search costs for products and product-related information (Alba et al. 1997; Ariely 2000; Bakos 1997; Lynch and Ariely 2000). The easy availability of in-depth information (as long as it is well-organized and easy to access) is frequently mentioned by consumers to be an important reason for shopping online (Swaminathan, Lepkowska-White, and Rao 1999; Li, Kuo, and Russell 1999; Van den Poel and Leunis 1999; Wolfenbarger and Gilly 2001; Zellweger 1997). Such information does not just simply “replace” the salesperson as scholars have suggested (Lohse and Spiller 1998); online buyers report they appreciate and prefer that they can obtain information directly without having to go through a salesperson or retail worker, and explicitly link this quality of the online environment with a sense of increased freedom and control (Wolfenbarger and Gilly 2001). As well, online information is perceived as superior to catalog shopping, as more information is available online (Van den Poel and Leunis 1999) and queries can be answered (Ariely 2000; Venkatesh 1998).

The ability of online consumers to search price and quality information across websites increases their liking of the shopping experience, satisfaction with the purchased product, and intentions to revisit the website and to re-purchase (Häubl and Trifts 2000; Lynch and Ariely 2000). Further, control of the content, order, and duration of product-relevant information improves consumers’ ability to integrate and remember and thus to use information more effectively (Ariely 2000).

In a study utilizing perceived relative channel advantage as a dependent measure, Montoya-Weiss, Voss, and Grewal (2000) investigate the relative contribution of information content (including recency, comprehensiveness, and accuracy), navigation, and graphic style. The authors find that information content is by far the most important of the three factors to financial services consumers. Chen and Wells (1999) consider ratings of entertainment value, informativeness, and organization, and find that of the three, informativeness has the strongest effect on overall website ratings.

Reliability/Fulfillment

Reliability, a key services quality concept typically rated as the most important to consumers (Parasuraman, Zeithaml, and Berry 1988), is likely to be important in consumer perceptions of online transaction quality. Online e-tailers need to convince buyers that they can deliver products and services reliably and at the promised level of quality (Palmer, Bailey, and Faraj 1999). In services, reliability is defined as the “ability to perform the promised service dependably and accurately” (Parasuraman, Zeithaml, and Berry 1988, p. 23). In the online arena, qualities associated with fulfillment, including on-time delivery and the degree to which the

item received was as represented on a website, are likely to be an important component of the reliability dimension as well.

Interestingly, the retailing literature typically does not consider reliability to be a dimension of store image. An exception is Dabholkar, Thorpe, and Rentz (1996) who find reliability (keeping promises and “doing it right”) to be one of five dimensions of retail service quality. Scholars in the area of computer-mediated interactions suggest that reliability together with security/privacy are qualities strongly related to trust (Jarvenpaa and Tractinsky 1999; Palmer, Bailey, and Faraj 1999). Further, across consumers in three countries, Jarvenpaa and Tractinsky (1999) found reputation to be a good predictor of trust for first-time buyers at a website.

Customer Service

In the retailing literature, the level of service received by customers is frequently noted as a component of store image. Some researchers include service as a general component of retail store image (e.g., Louviere and Johnson 1990; Reardon, Miller, and Coe 1995); others consider service as the helpfulness or courtesy of personnel (Dickson and Albaum 1977; Hildebrandt 1988); still others include service policies, such as returns and warranties (Samli, Kelly and Hunt 1998). Dabholkar, Thorpe, and Rentz (1996) include both store policies and personal interaction (employees inspiring confidence and being courteous) in their proposed hierarchical structure for retail service policy.

Parasuraman, Zeithaml, and Berry’s (1985) original conceptualization of service quality included customer service dimensions of responsiveness (similar to the helpfulness of salespeople in the retailing literature), courtesy, and understanding/knowing the customer. Subsequently, their SERVQUAL scale (Parasuraman, Zeithaml, and Berry 1988) included the customer-service-related dimensions of responsiveness (willingness to help customers) and empathy (caring, individualized attention). While courtesy collapsed into the assurance dimension of SERVQUAL, the other elements of assurance are more related to privacy and security, and are likely to be a separate dimension in the online context.

Neither the retailing nor the service quality literature focus on the post-transaction customer service component. On the other hand, the literature on computer-mediated environments has focused on technical and user support, applying SERVQUAL to information systems environments (see especially Pitt, Watson, and Kavan 1995). It is expected that the retailing and service quality concept of courtesy will be less relevant to consumer perceptions of the online purchase experience than will responsiveness during and after the purchase. Moreover, customer service is not likely to be confined to voice interaction, as response to email inquiries is an important attribute of online customer service (Wolfenbarger and Gilly 2001). Ease of returning items is especially important to consumers in online environments and is thus likely to be a factor in their rating of online customer service.

Selection

While retailers offer services, they differ from other service providers in that physical products are exchanged; thus, they are closer to the “tangible-dominant” end of

Shostack's (1977) continuum than are many other services. In the development of SERVQUAL, Parasuraman, Zeithaml, and Berry (1988) collected data from customers of banking, credit card, repair and maintenance, and long distance telephone firms, all of which are closer to "pure" services than are retailers. The lack of goods retailers in the development of the scale may account for the difficulties faced by the few scholars who have tried to apply it in a retail setting (Carman 1990; Finn and Lamb 1991; Gagliano and Hathcote 1994). In addition, because researchers of computer-mediated environments focus on Internet use generally, rather than e-tailers specifically, online selection has not been addressed.

Because selection has been found to be consistently important in the literature concerning bricks-and-mortar retailers (e.g., Reardon, Miller, and Coe 1995; Samli, Kelly, and Hunt 1998), it is expected that selection will be important to customers of online retailers as well. Moreover, online shoppers have suggested that increased selection is a motivation for online shopping (Wolfenbarger and Gilly 2001). Interestingly, a few retailing scholars have not included selection in their measures of store image. Dabholkar, Thorpe and Rentz's (1996) effort to measure the service quality of retail stores did not include selection, likely because of their reliance on the service quality literature rather than the store image literature, and Hildebrandt (1988) and Baker, Grewal, and Parasuraman (1994) only considered merchandise and quality and not selection.

Security/Privacy

Assurance is the term given in the services world to describe to a sense of safety and a belief by consumers that a provider is knowledgeable (Parasuraman, Zeithaml, and Berry 1988). In the online arena, assurance is likely to be defined by security and privacy (Culnan and Armstrong 1999; Culnan 1999; Montoya-Weiss, Voss, and Grewal 2000; Hoffman, Novak, and Peralta 1999; Quelch and Klein 1996). *Security risk* is the risk that credit card information is not safe. Three out of four online shoppers say that security is important to them; in fact, security received the highest average importance rating among 13 attributes of online shopping (Novak, Hoffman, and Yung 2000). A second online risk is *privacy risk*, which involves the possibility that personal information shared with a website will be used for a secondary purpose (Culnan 1993; Hoffman, Novak, and Peralta 1999), raising issues of anonymity and informed consent (Friedman, Kahn, and Howe 2000). Online shoppers are largely aware that very detailed information can be collected concerning their search and purchase behaviors (Hoffman, Novak, and Peralta 1999).

Security risk perceptions have been shown to have a strong impact on attitude toward use of the online financial services (Montoya-Weiss, Voss, and Grewal 2000); people who buy online are slightly more likely to trust than others (Uslaner 2000). Because consumers do not have the expertise to determine whether a website is safe, symbols such as the padlock-and-key icon or the TRUSTe seal of approval are used to infer security (Friedman, Kahn, and Howe 2000).

While the store image literature does not include security/privacy dimensions per se, some researchers (e.g., Lindquist 1974-75) include "institutional factors" as one

component. The reputation of the retailer is one such institutional factor, and consumers' perceptions of privacy and security risks are likely to rely heavily on the e-tailer's reputation for trustworthiness (Jarvenpaa and Tractinsky 1999; Landon and Smith 1997).

Experiential/Atmospheric Qualities

More experiential shopping is desirable for e-tailers as it has been associated with playfulness, focused attention, positive affect, and amount of time spent online (Novak, Hoffman, and Yung 2000). As well, in offline environments, experiential shopping has been associated with more impulsive and increased spending (Babin, Darden, and Griffen 1994). Hoffman and Novak (1996) write extensively on the possibility for online "flow," which involves loss of self-focus, intense involvement during an Internet session, and loss of a sense of time. Importantly, the authors suggest that flow underlies a "compelling online customer experience"; as well, flow is positively correlated with fun and recreational uses of the Web in general and the amount of time consumers spend online (Novak, Hoffman, and Yung 2000). Based on a uses and gratifications perspective, Eighmey and McCord (1998) suggest that entertainment is important to consumers even when the strategic purpose of a website is to provide product-related information. Marketers have speculated that creating "a compelling online experience" is likely to be strategically important, given that increasingly transparent information environments have been created on the Internet (Häubl and Trifts 2000; Lynch and Ariely 2000).

Nevertheless, it is not clear what attributes consumers associate with having a compelling online experience. Usability and informativeness (already discussed) have occasionally been included as part of a compelling experience (Häubl and Trifts 2000; Lynch and Ariely 2000; Novak, Hoffman, and Yung 2000). It is unclear whether or not usability and informativeness will prove to be separate issues from attributes that seem more atmospheric, experiential, and emotional, including personalization, graphic style, and communities (cf. Kelly 1998; Montoya-Weiss, Voss, and Grewal 2000; Seybold 1998).

Personalization has been defined as providing "users with what they want or need without requiring them to ask for it explicitly" (Mulvenna, Anand, and Büchner 2000, p. 123). Personalization has been examined by retailing researchers, with the focus being the interaction between retail employees and their customers; personalization in this setting significantly influences customer experience with the store (Mittal and Lassar 1996). In the online setting, personalization includes recommendation systems based on collaborative filtering or observational techniques, customization, and adaptive websites. However, a survey of Web users indicates that 70 percent find online solicitation a hindrance, suggesting that e-tailers must walk a fine line between personalization and personal intrusion (Mulvenna, Anand, and Büchner 2000). Personalization may also relate to usability, as personalization which results in making the site more intuitive to the individual user in terms of content, Web page design, and overall site design should make the site easier for that individual to use (Spiliopoulou 2000).

The graphic style and layout of a website are close to the tangible dimension of service quality, the physical evidence of the service (Montoya-Weiss, Voss, and Grewal 2000; Parasuraman, Zeithaml, and Berry 1985). In the retailing literature, it has been suggested that store environment is one of several inputs into store image and consumers' shopping experiences (Baker, Grewal, and Parasuraman 1994). Not surprisingly, online design has been described as the virtual equivalent of retail atmospherics (Lohse and Spiller 1998).

Business writers (cf. Kelly 1998) have suggested that building user communities or "hobby tribes" of the most involved, loyal customers, will be key to success on the Internet. Yet, none of the sites evaluated by Eighmey (1997) succeeded in creating a sense of community. Nevertheless, the frequent discussion of community in an online environment does suggest that it should be investigated as a potential element of experiential qualities.

Appendix 2. Instructions for Participants in the Sorting Task

Sorting Cards: This study has to do with customer satisfaction from online purchasing. Specifically, we want to find out what statements about online purchases people think are similar to each other (which “go together”), and which statements seem different and therefore belong in different categories. We’ve prepared 100 cards, each containing one statement related to online buying satisfaction. We’d like you to sort these cards into categories representing your best judgments about which statements are similar to each other and which are different from each other. There is no one correct way to sort the cards—so make as few or as many categories as you wish and put as few or as many cards in each group as you see fit. Spread the cards out on the table and keep moving them around until the groupings make sense to you. This requires careful thought; before you stop, be sure you are satisfied that each statement fits best in the category where you have placed it. There are only the following restrictions on the sorting task: you should *not* sort statements so that (a) every pile has only one item, (b) one pile consists of all items, or (c) a “miscellaneous” pile is created (any item thought to be unique should be put in its own separate pile).

Rating Importance: All 100 items you have just sorted are listed on the following pages. Please rate each item on the 7-point scale indicating how important each item is to your overall satisfaction with online purchases.

Appendix 4. Hierarchical Cluster Analysis and Importance Ratings of .comQ Items

Reliability/Fulfillment	Average Importance
*+ You get what you ordered from this site.	6.8
* This website gets orders correct.	6.7
The online receipt informs me of the total charges that will be debited against my credit card.	6.6
* Transactions at this website are error-free.	6.5
*+ The product that came was represented accurately by the website.	6.5
*+ The product is delivered by the time promised by the company.	6.4
My order is delivered by the date promised.	6.2
* Returning items is relatively straightforward. ^a	6.1
The return policy at this site is reasonable. ^a	6.1
You get your merchandise quickly when you order.	6.0
* The website has reasonable shipping and handling costs.	6.0
It's easy to track the shipping and delivery of items purchased at this website.	5.9
Products on the site are almost always in stock.	5.9
The website provides shipping options.	5.7
The items sent by the site are well packaged.	5.6
Customer Service	
*+ The company is ready and willing to respond to customer needs.	6.1
* Customer service personnel are always willing to help you.	6.1
*+ Inquiries are answered promptly.	6.1
*+ When you have a problem, this website shows a sincere interest in solving it.	5.9
After-sale support at this site is excellent.	5.8
This website has customers' best interests at heart.	5.8

^a Items appeared in the customer service cluster in Ward's clustering.

* One of 40 quality and 4 pricing items utilized in the online survey.

+ One of 14 items recommended for the final .comQ scale.

Customer Service (cont.)

I feel like the company wants to provide me with a good buying experience.	5.2
This website appreciates my business.	5.1

Personalization

This website gives you personal attention.	5.0
*+ The level of personalization at this site is about right, not too much or too little.	4.7
* This website understands my specific needs.	4.5
* This site has features that are personalized for me.	4.3
This website stores all my preferences and offers me extra services or information based on my preferences.	4.1
This site does a pretty good job guessing what kinds of things I might want and making suggestions.	3.9

Price

* The site has competitive prices.	6.3
* You get good value for the money spent at this website.	6.3
* I like the special promotions and deals on this website.	5.5
This site has great specials.	5.5
The promotions for this site seem to beckon me.	4.6

Usability Factors

(One cluster with centroid method, and separate cluster with Ward's method)

Experiential/Atmospheric

* The site almost says, "come in and shop."	4.3
The website has good surprises.	4.1
* It's really fun to shop at this website.	3.8
There are features at this site that are entertaining to use.	3.8
* Buying at this website is exciting.	3.8
* The site's appearance is professional.	5.4
* The website is visually appealing.	5.2
The website has useful interactive features (for instance, being able to look at the product from all angles, building the product I want, or trying on items virtually).	5.2
The website appears to use the best technology.	4.7
The website has innovative features.	4.1
The home page provides a link to order status.	5.6

Usability/Ease of Use

- * The organization and layout of the website facilitate searching for products. 6.2
- It's easy to get around and find what you want at this site. 6.2
- *+ This site doesn't waste my time. 6.2
- The site has well-arranged categories. 6.1
- The website is laid out in a logical fashion. 6.1
- * I can go to exactly what I want quickly. 6.1
- *+ It is quick and easy to complete a transaction at this website. 6.1
- * Download at this website is quick. 6.0
- * The website has good pictures of products. 6.0
- You can find what you want with a minimum number of clicks. 5.9
- * The site always works correctly. 5.9
- * The search function at this website is helpful. 5.9
- The website functions as it should. 5.8
- I know what all my options are when I shop at this website. 5.8
- The layout of the site is clean and simple. 5.7
- The site is organized in a way that is intuitive, like your thinking. 5.7
- Every process at this site moves like a well-oiled machine. 5.5

Informativeness

- * At this site, I have the full information at hand. 6.2
- *+ The website provides in-depth information. 6.2
- * The site gives me enough information so that I can identify the item to the same degree as if I am in the store. 6.2
- The website has comprehensive information. 5.8
- The website is a very good source of information. 5.7
- * This site helps me research products. 5.7

Selection

- You know exactly what you're buying at this website. 6.2
- The website lets me know about product availability during search. 6.1
- *+ The website has good selection. 5.7
- * The site has a wide variety of products that interest me. 5.4
- * The website has products I can't find in stores. 5.3
- * The website is updated often with new products. 5.2

- * There are hard-to-find products on this site. 4.9
- I can find items that are unique or different at this site. 4.7

Security/Privacy

- *+ This website has adequate security features. 6.4
- I feel secure giving out credit card information at this site. 6.3
- *+ I feel safe in my transactions with this website. 6.3
- *+ I feel like my privacy is protected at this site. 6.2
- I trust this site will not misuse my personal information. 6.1
- * I feel that I can trust this website. 6.1
- * The company behind the site is reputable. 5.8
- I trust that this site will not give my information to other sites without my permission. 5.7
- The website instills confidence in customers. 5.7
- The company is well-established. 5.2
- I am worried about this site knowing everything about me. 4.9

Appendix 5. Sample Characteristics of Online Survey Respondents

Sex

Male	36 percent
Female	64 percent

Age

18–24	4 percent
25–34	18
35–44	23
45–54	33
55–65	21
65+	1

Type of Internet Connection on Your Home Computer

14.4k modem	1 percent
28.8k modem	8
33.6k modem	8
56k modem	48
Cable modem	15
T1/T3	3
ISDN	1
ADSL/DSL	3
Not Sure	13

When did you make your first online purchase?

Within last month	3 percent
1–3 months	5
3–6 months	6
6 months–1 year	17
More than 1 year	67
Not sure	2

Education

Less than high school graduate	2 percent
High school graduate	13
Some college	41
College graduate	23
Some graduate school	7
Graduate school completed	14

How often do you make purchases online?

Once a week or more	5 percent
1–3 times a month	27
Less than once a month	63
Not sure	6

Household Income

Less than \$15,000	3 percent
\$15,000 to \$24,999	7
\$25,000 to \$34,999	11
\$35,000 to \$49,999	15
\$50,000 to \$74,999	24
\$75,000 to \$99,999	13
\$100,000 to \$124,999	5
\$125,000 to \$149,999	3
\$149,999 or more	3
Decline to answer	17

Other Online Activities (in last 3 months)

Searching the Web	94 percent
Getting News	87
Getting Local Weather	79
Getting Sports Scores	38
Tracking Stocks/Mutual Funds	36
Online Chatting	3 5
Playing Online Games with Others	26

References

- Alba, Joseph, John Lynch, Barton Weitz, Chris Janiszewski, Richard Lutz, Alan Sawyer, and Stacy Wood (1997), "Interactive Home Shopping: Consumer, Retailer and Manufacturer Incentives to Participate in Electronic Marketplaces." *Journal of Marketing*, 61 (3), 38-53.
- Albaum, Gerald, and J. Dickson, "A Method for Developing Tailormade Semantic Differentials for Specific Marketing Content Areas." *Journal of Marketing Research* 14 (February), 87-91.
- Aldenderfer, Mark S., and Roger K. Blashfield (1984), *Cluster Analysis*. Newbury Park, Calif.: Sage Publications.
- Allen, Darren (2001), "Women on the Web." E-marketer.com, www.emarketer.com/analysis/ecommerce_b2c/20010228_b2c.html, Feb. 28.
- Anderson, James C., and David W. Gerbing (1988), "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach." *Psychological Bulletin* 103 (3), 411-23.
- Ariely, Dan (2000), "Controlling the Information Flow: Effects on Consumers' Decision Making and Preferences." *Journal of Consumer Research* 27(2), 233-48.
- Arnold, S. J., H. O. Tae, and Douglas J. Tigert (1983), "Determinant Attributes in Retail Patronage: Seasonal, Temporal, Regional and International Comparisons." *Journal of Marketing Research* 20, 149-57.
- Babin, Barry J. , William R. Darden, and Mitch Griffen (1994), "Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value." *Journal of Consumer Research* 20 (March), 644-56.
- Bagozzi, Richard P., and Lynn W. Phillips (1982), "Representing and Testing Organizational Theories: A Holistic Construal." *Administrative Science Quarterly* 27 (September), 459-89.
- Bagozzi, Richard P., and Youjae Yi (1988), "On the Evaluation of Structural Equation." *Journal of the Academy of Marketing Science* 16 (1), 74-97.
- Baker, Julie, Dhruv Grewal, and A. Parasuraman (1994), "The Influence of Store Environment on Quality Inferences and Store Image." *Journal of the Academy of Marketing Science* 22 (4), 328-39.
- Bakos, Yannis (1997), "Reducing Buyer Search Costs: Implications for Electronic Marketplaces." *Management Science* 43 (12) (December), 1-25.

- Baty, James B., II, and Ronald M. Lee (1995), "Intershop: Enhancing the Vendor/Customer Dialectic in Electronic Shopping." *Journal of Information Systems* 11 (4), 9-31.
- Bearden, William O., Subhash Sharma, and Jesse E. Teel (1982), "Sample Size Effects on Chi-Square and Other Statistics Used in Evaluating Causal Models." *Journal of Marketing Research* 19 (November), 425-30.
- Bellman, Steven, Gerald L. Lohse, and Eric J. Johnson (1999), "Predictors of Online Buying Behavior." *Communications of the ACM* 42 (December), 32-8.
- Bentler, Peter M. (1980), "Comparative Fit Indexes in Structural Models." *Psychological Bulletin* 107 (2), 238-46.
- Bentler, Peter M., and Douglas G. Bonett (1980), "Significance Tasks and Goodness of Fit in the Analysis of Covariance Structures." *Psychological Bulletin* 88 (3), 588-606.
- Bentler, Peter M., and Chih-Ping Chou (1987), "Practical Issues in Structural Modeling." *Sociological Methods and Research* 16 (August), 78-117.
- Bentler, Peter M., and Paul Dudgeon (1996), "Covariance Structure Analysis: Statistical Practice, Theory and Directions." *Annual Review of Psychology* 47, 563-92.
- Berry, Leonard (1969), "The Components of Department Store Image: A Theoretical and Empirical Analysis." *Journal of Retailing* 45, 3-20.
- Bollen, Kenneth A. (1990), "Overall Fit in Covariance Structure Models: Two Types of Sample Size Effects." *Psychological Bulletin* 107 (2), 256-9.
- Boulding, Kenneth (1956), *The Image*. Ann Arbor, Mich.: University of Michigan Press.
- Browne, M. W., and R. Cudeck (1993), "Alternative Ways of Assessing Model Fit." In *Testing Structural Equation Models*, eds. K. A. Bollen and J. S. Long, 136-62. Newbury Park, Calif.: Sage Publications.
- Carman, James M. (1990), "Consumer Perceptions of Service Quality: An Assessment of the SERVQUAL Dimensions." *Journal of Retailing* 66 (1) (Spring), 33-55.
- Chen, Qimei, and William D. Wells (1999), "Attitude Toward the Site." *Journal of Advertising Research* 39 (September/October), 27-37.
- Churchill, Gilbert A. (1979), "A Paradigm for Developing Better Measures of Marketing Constructs." *Journal of Marketing Research* 16 (February), 64-73.
- Cohen, Joel, and Kunal Basu (1987), "Alternative Models of Categorization: Toward a Contingent Processing Framework." *Journal of Consumer Research* 13 (March), 455- 72.

- Cohen, Nevin (2001), "Broadband Technology." E-marketer.com, www.emarketer.com/bin/AT-emarketersearchcgi?sum=d525, July 11.
- Cooper, Alan (2000), *The Inmates are Running the Asylum: Why High-Tech Products Drive Us Crazy and How to Restore the Sanity*. Indianapolis, Ind.: SAMS, A Division of Macmillan Computer Publishing
- Cote, Joseph A., and M. Ronald Buckley (1988), "Measurement Error and Theory Testing in Consumer Research: An Illustration of the Importance of Construct Validity." *Journal of Consumer Research* 14 (March), 579-82.
- Cronin, J. Joseph, Jr., and Steven A. Taylor (1992), "Measuring Service Quality: A Reexamination and Extension." *Journal of Marketing* 56 (3), 55-68.
- Cronin, J. Joseph, Jr., and Steven A. Taylor (1994), "SERVPERF Versus SERVQUAL: Reconciling Performance-Based and Perceptions-Minus-Expectations Measurement of Service Quality." *Journal of Marketing* 58 (January), 125-31.
- Culnan, Mary J. (1993), "How Did They Get My Name?,' An Exploratory Investigation of Consumer Attitudes toward Secondary Information Use." *MIS Quarterly* 17 (3), 341-63.
- Culnan, Mary J. (1999), *Georgetown Internet Privacy Policy Study: Privacy Online in 1999: A Report to the FTC*. Washington, D.C.: Georgetown University.
- Culnan, Mary J., and Pamela K. Armstrong (1999), "Information Privacy Concerns, Procedural Fairness and Impersonal Trust: An Empirical Investigation." *Organization Science* 10 (1), 104-15.
- Dabholkar, Pratibha A., Dayle I. Thorpe, and Joseph O. Rentz (1996), "A Measure of Service Quality for Retail Stores: Scale Development and Validation." *Journal of the Academy of Marketing Science* 24 (1) (Winter), 3-16.
- Dallaert, Benedict, and Barbara E. Kahn (1999), "How Tolerable Is Delay? Consumers' Evaluations of Internet Web Sites after Waiting." *Journal of Interactive Marketing* 13 (1) (Winter), 41-54.
- Davis, Fred D. (1989), "Perceived Usefulness, Ease of Use and User Acceptance of Information Technology." *MIS Quarterly* 13 (3), 319-39.
- Davis, Fred D. (1993), "User Acceptance of Information Technology: System Characteristics, User Perceptions and Behavior Impacts." *International Journal of Man-Machine Studies* 38(3), 475-87.
- Davis, Fred D., Richard Bagozzi, and Paul Warshaw (1989), "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models." *Management Science* 35(8), 982-1003.
- Davis, John (1989), "Construct Validity in Measurement: A Pattern Matching Approach." *Evaluation and Program Planning* 12 (1), 31-6.

- Dickson, John, and Gerald Albaum (1977), "A Method for Developing Tailormade Semantic Differentials for Specific Marketing Content Areas." *Journal of Marketing Research* 14 (February), 87-91.
- Doney, Patricia M., and J. P. Canon (1997), "An Examination of the Nature of Trust in Buyer-Seller Relationships." *Journal of Marketing* 61 (April), 35-51.
- Dowling, Grahame R., and Richard Staelin (1994), "A Model of Perceived Risk and Intended Risk-handling Activity." *Journal of Consumer Research* 21 (June), 119-34.
- Eighmey, John (1997), "Profiling User Responses to Commercial Web Sites." *Journal of Advertising Research* 37 (May-June), 59-66.
- Eighmey, John, and Lola McCord (1998), "Adding Value in the Information Age: Uses and Gratifications of Sites on the World Wide Web." *Journal of Business Research* 41, 187-94.
- Finn, Adam, and Ujwal Kayande (1997), "Reliability Assessment and Optimization of Marketing Measurement." *Journal of Marketing Research* 34 (2) May, 262-75.
- Finn, David W., and Charles W. Lamb, Jr. (1991), "An Evaluation of the SERVQUAL Scales in a Retailing Setting." In *Advances in Consumer Research*, vol. 18, eds. Rebecca H. Holman and Michael R. Solomon, 483-90. Provo, Utah: Association for Consumer Research.
- Fornell, Claes, and David F. Larcker (1981), "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error." *Journal of Marketing Research* 28 (February), 39-50.
- Forrester Research, Inc. (2002), "December Shopping Up from Last Year in Spite of Rough Economy, According to Forrester Research Online Retail Index, January 24." www.forrester.com/ER/Press/Release/0,1769,678,00.html.
- Friedman, Batya, Peter H. Kahn, Jr., and Daniel C. Howe (2000), "Trust Online." *Communications of the ACM* 43 (December), 34-40.
- Gagliano, Kathryn Bishop, and Jan Hathcote (1994), "Customer Expectations and Perceptions of Service Quality in Retail Apparel Specialty Stores." *Journal of Services Marketing* 8(1), 60-9.
- Gale, Bradley T. (1994), *Managing Customer Value: Creating Quality and Service that Customers Can See*. New York, N.Y.: The Free Press.
- Gerbing, David W., and James C. Anderson (1988), "An Updated Paradigm for Scale Development Incorporating Unidimensionality and Its Assessment." *Journal of Marketing Research* 25 (May), 186-92.
- Gerbing, David W., and G. J. Hamilton (1996), "Validity of Exploratory Factor Analysis as a Precursor of Confirmatory Factor Analysis." *Structural Equation Modeling* 3, 62-72.

- Gordon, A. D. (1999), *Classification*, 2nd ed. Boca Raton, Fla.: Chapman and Hall.
- Grewal, Dhruv, Gopalkrishnan R. Iyer, and Michael Levy (2001), "Internet Retailing: Enablers, Limiters and Market Consequences." Wellesley, Mass.: Babson College, Working Paper.
- Ha, Louisa, and E. Lincoln James (1998), "Interactivity Reexamined: A Baseline Analysis for Early Business Web Sites." *Journal of Broadcasting and Electronic Media* 42 (4), 457-74.
- Hair, Joseph F., Ralph E. Anderson, Ronald L. Tatham, and William C. Black (1998), *Multivariate Data Analysis*, 5th ed. Upper Saddle River, N. J.: Prentice Hall.
- Hattie, John (1985), "Methodology Review: Assessing Unidimensionality in Items." *Applied Psychological Measurement* 9, 139-64.
- Häubl, Gerald, and Valarie Trifts (2000), "Consumer Decision Making in Online Shopping Environments: The Effects of Decision Aids." *Marketing Science* 19 (1) (Winter), 4-21.
- Hildebrandt, Lutz (1988), "Store Image and the Prediction of Performance in Retailing." *Journal of Business Research* 17, 91-100.
- Hoffman, Donna L., and Thomas P. Novak (1996), "Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations." *Journal of Marketing* 60 (July), 50-68.
- Hoffman, Donna L., Thomas P. Novak, and Marcos Peralta (1999), "Building Consumer Trust Online." *Communications of the ACM* 42(4) (April), 80-5.
- Hoffman, Donna L., Thomas P. Novak, and Ann Schlosser (2000), "Consumer Control in Online Environments." Nashville, Tenn.: Vanderbilt University, Working Paper.
- Hofstede, Geert (1998), "Identifying Organizational Subcultures: An Empirical Approach." *Journal of Management Studies* 35(1)(January), 1-12.
- Hoque, Abeer Y., and Gerald L. Lohse (1999), "An Information Search Cost Perspective for Designing Interfaces for Electronic Commerce." *Journal of Marketing Research* 36 (August), 387-94.
- Horrigan, John, Lee Rainie, Susannah Fox, Amanda Lenhart, Tom Spooner, Oliver Lewis, and Cornelia Carter (2000), "The Holidays Online: Emails and e-Greetings Outpace e-Commerce." Pew Internet and American Life Project. Washington, D. C., www.pewinternet.org.
- Hu, Li-tze, and Peter Bentler (1995), "Evaluating Model Fit." In *Structural Equation Modeling, Concepts, Issues and Applications*, ed. R. H. Hoyle, 76-99. Thousand Oaks, Calif.: Sage.

- Jarvenpaa, Sirkka L., and P. A. Todd (1997), "Consumer Reactions to Electronic Shopping on the World Wide Web." *International Journal of Electronic Commerce* 1 (2), 59-88.
- Jarvenpaa, Sirkka L., and Noam Tractinsky (1999), "Consumer Trust in an Internet Store: A Cross-Cultural Validation." *Journal of Computer-Mediated Communication* 5(2), December, www.ascusc.org/jcmc/vol5/issue2/jarvenpaa.html.
- Jöreskog, Karl G. (1971), "Statistical Analysis of Congeneric Tests." *Psychometrika* 36, 109-33.
- Kamakura, Wagner, and Michel Wedel (2000), "Factor Analysis and Missing Data." *Journal of Marketing Research* 37 (November), 490-8.
- Keaveney, Susan M., and Kenneth A. Hunt (1992), "Conceptualization and Operationalization of Retail Store Image: A Case of Rival Middle-Level Theories." *Journal of the Academy of Marketing Science* 20 (Spring), 165-74.
- Kelly, Kevin (1998), *New Rules for the New Economy: 10 Radical Strategies for a Connected World*. New York, N.Y.: Viking.
- Klein, Lisa R. (1998), "Evaluating the Potential of Interactive Media through a New Lens: Search Versus Experience Goods." *Journal of Business Research* 41, 195-203.
- Kruskal, Joseph B., and Myron Wish (1978), *Multidimensional Scaling*. London: Sage Publications.
- Landon, Stuart, and C. E. Smith (1997), "The Use of Quality of Reputation Indicators by Consumers: The Case of Bordeaux Wine." *Journal of Consumer Policy* 20 (3), 289-323.
- Li, Hairong, Cheng Kuo, and Martha G. Russell (1999), "The Impact of Perceived Channel Utilities, Shopping Orientations and Demographics on the Consumer's Online Buying Behavior." *Journal of Computer-Mediated Communication* 5(2) (December), www.ascusc.org/jcmc/vol5/issue2/hairong.html.
- Lindquist, Jay D. (1974-75), "Meaning of Image: A Survey of Empirical and Hypothetical Evidence." *Journal of Retailing* 50 (Winter), 29-38.
- Lohse, Gerald L., Steven Bellman, and Eric J. Johnson (2000), "Consumer Buying Behavior on the Internet: Findings from Panel Data." *Journal of Interactive Marketing* 14 (Winter), 15-29.
- Lohse, Gerald L., and Peter Spiller (1998), "Electronic Shopping." *Communications of the ACM* 41 (July), 81-8.
- Lohse, Gerald L., and Peter Spiller (1999), "Internet Retail Store Design: How the User Interface Influences Traffic and Sales." *Journal of Computer-Mediated Communication* 5(2) (December) www.ascusc.org/jcmc/vol5/issue2/lohse.htm.

- Louviere, Jordan J., and Richard D. Johnson (1990), "Reliability and Validity of the Brand-Anchored Conjoint Approach to Measuring Retailer Images." *Journal of Retailing* 66 (Winter), 359-82.
- Lynch, John G., and Dan Ariely (2000), "Wine Online: Search Costs Affect Competition on Price, Quality and Distribution." *Marketing Science* 19 (1), 83-103.
- Marsh, Herbert W., John R. Balla, and Roderick P. McDonald (1988), "Goodness-of-Fit Indexes in Confirmatory Factor Analysis: The Effects of Sample Size." *Psychological Bulletin* 103 (3), 391-410.
- Martineau, Pierre (1958), "The Personality of the Retail Store." *Harvard Business Review* 36 (January-February), 47-55.
- Maruyama, Geoffrey M. (1998), *Basics of Structural Equation Modeling*. Thousand Oaks, Calif.: Sage.
- Mervis, Carolyn B., and Eleanor Rosch (1981), "Categorization of Natural Objects." In *Annual Review of Psychology*, vol. 32, eds. Mark R. Rosenzweig and Lyman W. Porter, 89-115. Palo Alto, Calif.: Annual Reviews, Inc.
- Mittal, Banwari, and Walfried M. Lassar (1996), "The Role of Personalization in Service Encounters." *Journal of Retailing* 72 (1), 95-109.
- Mittal, Vikas, William T. Ross, Jr., and Patrick M. Baldasare (1998), "The Asymmetric Impact of Negative and Positive Attribute-Level Performance on Overall Satisfaction and Repurchase Intentions." *Journal of Marketing* 62 (January), 33-47.
- Modahl, Mary (2000), *Now or Never: How Companies Must Change Today to Win the Battle for Internet Consumers*. New York: Harper Business.
- Montoya-Weiss, Mitzi, Glenn B. Voss, and Dhruv Grewal (2000), "Bricks to Clicks: What Drives Customer Use of the Internet in a Multichannel Environment." Raleigh, N.C.: North Carolina State University, Working Paper.
- Mulvenna, Maurice D., Sarabjot S. Anand, and Alex G. Büchner (2000), "Personalization on the Net Using Web Mining." *Communications of the ACM* 43 (August), 123-5.
- Nielsen, Jakob (1993), *Usability Engineering*. Cambridge, Mass.: Academic Press.
- Nielsen, Jakob (2000), *Designing Web Usability: The Practice of Simplicity*. Indianapolis, Ind.: New Riders Publisher.
- Novak, Thomas P., Donna L. Hoffman, and Y. F. Yung (2000), "Measuring the Customer Experience in Online Environments: A Structural Modeling Approach." *Marketing Science* 19 (1), 22-42.

- Oliver, Richard L. (1980), "A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions." *Journal of Marketing Research* 17 (November), 460-9.
- Oliver, Richard L. (1997). *Satisfaction: A Behavioral Perspective on the Consumer*. New York, N.Y.: McGraw-Hill Companies, Inc.
- Ozanne, Julie L., Merrie Brucks, and Dhruv Grewal (1992), "A Study of Information Search Behavior during the Categorization of New Products." *Journal of Consumer Research* 18 (March), 452- 63.
- Palmer, Jonathon W., Joseph P. Bailey, and Samer Faraj (1999), "The Role of Intermediaries in the Development of Trust on the WWW: The Use and Prominence of Trusted Third Parties and Privacy Statements." *Journal of Computer-Mediated Communication*, www.ascusc.org/jcmc/vol5/issue3/palmer.html.
- Parasuraman, A. (2000), "Technology Readiness Index (TRI): A Multiple Item Scale to Measure Readiness to Embrace New Technologies." *Journal of Services Research* 2(4) (May), 307-20.
- Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1985), "A Conceptual Model of Service Quality and Its Implications for Future Research." *Journal of Marketing* 49 (Fall), 41-50.
- Parasuraman, A., Leonard L. Berry, and Valarie A. Zeithaml (1991), "Refinement and Reassessment of the SERVQUAL Scale." *Journal of Retailing* 67 (Winter), 420-50.
- Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1988), "SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality." *Journal of Retailing* 64 (Spring), 12-40.
- Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1994a), "Alternative Scales for Measuring Service Quality: A Comparative Assessment Based on Psychometric and Diagnostic Criteria." *Journal of Retailing* 70 (3), 201-30.
- Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry (1994b), "Reassessment of Expectations as a Comparison Standard in Measuring Service Quality: Implications for Further Research." *Journal of Marketing* 58 (January), 111-24.
- Peter, J. Paul (1981), "Construct Validity: A Review of Basic Issues and Marketing Practices." *Journal of Marketing Research* 28 (May), 133-45.
- Peterson, Robert A., Sridhar Balasubramian, and Bart J. Bronnenberg (1997), "Exploring the Implications of the Internet for Consumer Marketing." *Journal of the Academy of Marketing Science* 25(4), 329-46.
- Peterson, Robert A., and William R. Wilson (1992), "Measuring Customer Satisfaction: Fact and Artifact." *Journal of the Academy of Marketing Science* 20 (1) (Winter), 61-71.

- Pine, B. Joseph, and James H. Gilmore (1999), *The Experience Economy*. Boston, Mass.: Harvard Business School Press.
- Pitt, Leyland F., Richard T. Watson, and C. Bruce Kavan (1995), "Service Quality: A Measure of Information Systems Effectiveness." *MIS Quarterly* (June), 173-87.
- Punj, Girish, and David Stewart (1983), "Cluster Analysis in Marketing Research: Review and Suggestions for Applications." *Journal of Marketing Research*, 20 (May), 134-148.
- Quelch, John and Lisa Klein (1996), "The Internet and International Marketing." *Sloan Management Review* 15 (Spring), 60-75.
- Reardon, James, Chip E. Miller, and Barbara Coe (1995), "Applied Scale Development: Measurement of Store Image." *Journal of Applied Business Research* 11 (Fall), 85-93.
- Reichheld, F., and Phil Scheffer (2000), "E-Loyalty: Your Secret Weapon on the Web." *Harvard Business Review* (July-August), 105-13.
- Rosch, Eleanor (1975), "Cognitive Representations of Semantic Categories." *Journal of Experimental Psychology: General* 104, 192-233.
- Rosch, Eleanor, and Carolyn B. Mervis, "Family Resemblances: Studies in the Internal Structure of Categories." *Cognitive Psychology* 7 (October), 573-605.
- Rust, Roland T., Anthony J. Zahorik, and Timothy L. Keiningham (1995), "Return on Quality (ROQ): Making Service Quality Financially Accountable." *Journal of Marketing* 59 (April), 58-70.
- Samli, A. Coskun, J. Patrick Kelly, and H. Keith Hunt (1998), "Improving the Retail Performance by Contrasting Management- and Customer-Perceived Store Images: A Diagnostic Tool for Corrective Action." *Journal of Business Research* 43, 27-38.
- Schlosser, Ann E., and Alaina Kanfer (1999), "Interactivity in Commercial Web Sites: Implications for Web Site Effectiveness." Nashville, Tenn.: Vanderbilt University, Working Paper.
- Schwartz, Evan I. (1997), *Webonomics: Nine Essential Principles for Growing Your Business on the World Wide Web*. New York, N.Y.: Broadway Books.
- Seybold, Patricia (1998), *Customers.com: How to Create a Profitable Business Strategy for the Internet and Beyond*. New York, N.Y.: Random House.
- Shapiro, Carl, and Hal R. Varian (1998), *Information Rules: A Strategic Guide to the Network Economy*. Boston, Mass.: Harvard Business School Press.
- Shaver, Philip, Judith Schwartz, Donald Kirson, and Cary O'Connor (1987), "Emotion Knowledge: Further Exploration of a Prototype Approach." *Journal of Personality and Social Psychology* 52 (6), 1061-86.

- Shostack, G. Lynn (1977), "Breaking Free from Product Marketing." *Journal of Marketing* 41 (April), 73-80.
- Spiliopoulou, Myra (2000), "Web Usage Mining or Web Site Evaluation." *Communications of the ACM* 42 (August), 127-34.
- Spiller, Peter, and Gerald L. Lohse (1997-1998), "A Classification of Internet Retail Stores." *International Journal of Electronic Commerce* 2 (Winter), 29-36.
- Steuer, Jonathan (1992), "Defining Virtual Reality: Dimensions Determining Telepresence." *Journal of Communications* 42/4 (Autumn), 73-93.
- Sujan, Mita (1985), "Consumer Knowledge, Effects on Evaluation Strategies Mediating Consumer Judgments." *Journal of Consumer Research* 12 (June), 31-46.
- Sujan, Mita, and Christine Deklava (1987), "Product Categorization and Inference Making: Some Implications of Comparative Advertising." *Journal of Consumer Research* 14 (December), 372-8.
- Swaminathan, Vanitha, Elzbieta Lepkowska-White, and Bharat Rao (1999), "Browsers or Buyers in Cyberspace? An Investigation of Factors Influencing Electronic Exchange." *Journal of Computer-Mediated Communication* 5(2) (December), www.ascusc.org/jcmc/vol5/issue2/swaminathan.htm.
- Teas, R. Kenneth (1993), "Expectations, Performance Evaluation, and Consumers' Perceptions of Quality." *Journal of Marketing* 57 (October), 18-34.
- Teas, R. Kenneth (1994), "Expectations as a Comparison Standard in Measuring Service Quality: An Assessment of a Reassessment." *Journal of Marketing* 58 (January), 132-9.
- Tedeschi, Bob (2002), "E-commerce Report: Though There Are Fewer Internet Users, Experienced Ones, Particularly the Middle Aged, are Increasingly Shopping Online." *The New York Times* (March 4), C7.
- Trochim, William, and R. Linton (1986), "Conceptualization for Evaluation and Planning." *Evaluation and Program Planning* 9, 289-308.
- Trochim, William (1989), "An Introduction to Concept Mapping for Mapping for Planning and Evaluation." *Evaluation and Program Planning* 12 (1), 1-16.
- Urban, Glen L., John Hulland, and Bruce Weinberg (1996), "Pre-market Forecasting for New Consumer Durable Goods: Modeling Categorization, Elimination and Consideration Phenomena." *Journal of Marketing* 57 (April), 47-63.
- Uslaner, Eric M. (2000), "Social Capital and the Net." *Communications of the ACM* 43 (December), 60-4.

- Van den Poel, Dirk, and Joseph Leunis (1999), "Consumer Acceptance of the Internet as a Channel of Distribution." *Journal of Business Research* 45, 249-56.
- Venkatesh, Alladi (1998), "Cybermarkets and Consumer Freedoms and Identities." *European Journal of Marketing* 32(7-8), 664-76.
- Viswanathan, Madhubalan, and Terry L. Childers (1999), "Understanding How Product Attributes Influence Product Categorization: Development and Validation of Fuzzy Set-Based Measures of Gradedness in Product Categories." *Journal of Marketing Research* 36 (1), 75-94.
- Wolfenbarger, Mary (1999), "E-QUAL: A Proposal for the Development of the Measurement of Customers' Perceived Quality of E-Commerce Experiences." In *Electronic Commerce: Behaviors of Suppliers, Producers, Intermediaries & Consumers*, eds. Ruby Roy Dholakia and Solveig Wikström, COTIM Third International Conference, Providence, Rhode Island, October.
- Wolfenbarger, Mary F., and Mary C. Gilly (2001), "Shopping Online for Freedom, Control, and Fun." *California Management Review* 43 (2) (Winter), 34-55.
- Zeithaml, Valarie A., Leonard L. Berry, and A. Parasuraman (1993), "The Nature and Determinants of Customer Expectations of Service." *Journal of Academy of Marketing Science* 21 (1) 1-12.
- Zeithaml, Valarie A., Leonard L. Berry, and A. Parasuraman (1996), "The Behavioral Consequences of Service Quality." *Journal of Marketing* 60 (April), 31-46.
- Zeithaml, Valarie A., A. Parasuraman, and Arvind Malhotra (2000), "A Conceptual Framework for Understanding e-Service Quality: Implications for Future Research and Managerial Practice." Cambridge, Mass.: Marketing Science Institute, Report No. 00-115.
- Zellweger, Paul (1997), "Web-based Sales: Defining the Cognitive Buyer." *Electronic Markets* 7 (3), 10-6.



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