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# Addressing the *What* and *How* of Online Services: Positioning Supporting-Services Functionality and Service Quality for Business-to-Consumer Success

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With the continued growth of business-to-consumer (B2C) e-business, online vendors are providing an increasing array of services that support and enhance their core products or services. For example, Amazon.com does not just sell books; it also enhances that core product with automated product recommendations, "wish list" tracking, order status updates, customer reviews, and many other valuable supporting services. These supporting services are made possible exclusively through the design and deployment of information technology (IT) to provide website *supporting services functionality* (SSF). In this paper, we define and develop the concept of B2C SSF and investigate how IT can support core products or services. We theorize the role that SSF plays in an environment where individuals who visit B2C websites are not only *customers* but also technology *users*. Given the unique online environment that amalgamates vendor services with information systems (IS), our model integrates theories from both services marketing and technology acceptance to help explain the behavior of these customers/users. In doing so, we investigate the role of the extensively researched concept of *service quality* in relation to SSF. Although service quality provides guidance for *how* supporting services should be provided (e.g., responsively and reliably), it does not address *what* those services are (e.g., product recommendations). SSF addresses this deficiency, thus providing both theoretical and practical benefits through a focus on IT design and deployment. The results of a field study support that SSF is an important predictor of customer beliefs and behavior, *beyond* that predicted by service quality alone. SSF is an important concept to consider—theoretically and practically—in IT-mediated B2C service.

*Key words*: e-business; online customer service; supporting services functionality; supporting services; service quality
*History*: Elena Karahanna, Associate Editor; Laurie Kirsch, Senior Editor. This paper was received on June 20, 2005, and was with the authors 10 months for 5 revisions.

## Introduction

Business-to-consumer (B2C) e-business has shifted the focus of IT use from internal management tools to customer-directed applications, and has compelled dramatic expansion of IT into the provision of all types of customer service (Straub and Watson 2001). A great deal of research has investigated B2C *service quality* (e.g., DeLone and McLean 2003, Devaraj et al. 2002, Gefen 2002, Loiacono et al. 2002, Zeithaml et al. 2002). While a service quality perspective is vitally important to B2C firms, an important question remains unanswered: *What* services should be provided? The online environment provides unique opportunities to use technology in providing services to help support or supplement a company's core products or services. For example, a customer purchasing a hammer might have the ultimate goal of hanging a painting. B2C vendors could support this product and goal by using IT to: suggest the correct size of hammer with the help of a recommendation agent; provide hyperlinks to videos for proper and safe tool use; and suggest complementary products such as nails. In some cases, IT can provide supporting services that would not be practical in the offline world. For example, Netflix.com uses IT to support their core service of DVD rentals with personalized movie recommendations for its customers based

on browsing and purchase history—a lucrative added feature that would be next to impossible to deliver in an offline store.

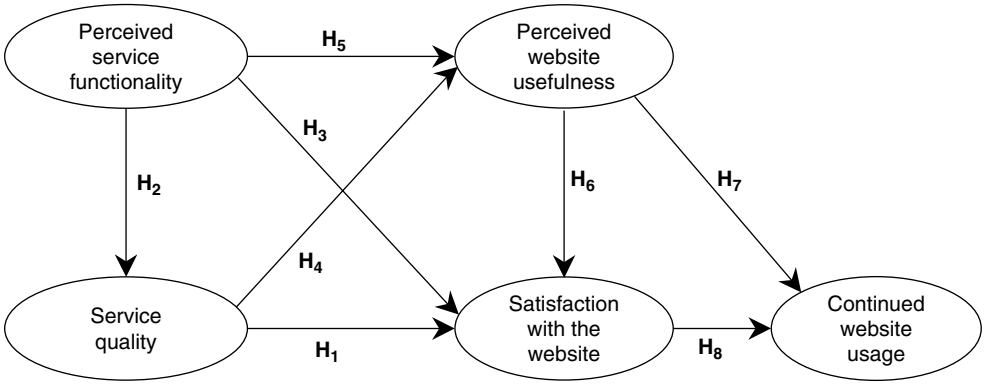
This paper focuses on the ways IT can be used to provide supporting services. We refer to these IT-mediated support services as supporting services functionality (SSF), *which is the extent to which a website uses IT to provide services that support a core product or service transaction, and to help customers reach their shopping goals.* Our research addresses several important research questions: How can SSF be fully realized; i.e., what IT-mediated supporting services are possible online? What are the salient effects of SSF in the B2C environment? How do these effects influence customers' perceptions of a website relative to the extensively researched service quality construct? What variables are salient when an individual is both a customer and a user of technology? To answer these questions, our investigation of SSF views users of B2C websites as both IT *users* as well as *customers*. We develop a theoretical foundation that integrates key constructs and theories from services marketing and technology acceptance research. We then outline an empirical study designed to test and validate the importance of the construct of SSF. Finally, we discuss the results of the study and implications for both theory and practice.

## Literature Review and Theoretical Model

Our overall theoretical model is illustrated in Figure 1. We first clarify the grounding of our theory within an individual beliefs-based perspective. We then describe the components of the model beginning with service quality and satisfaction; important concepts germane to the B2C service environment. We follow with an explication of SSF and its expected effects vis-à-vis service quality. The theory is further developed to explain the effects of service quality and SSF on satisfaction and usefulness. Ultimately, we propose SSF as an important and additional contributor to continued website usage beyond that predicted by service quality alone.

**Grounding a Theoretical Perspective.** Consistent with the extant literature in services marketing and B2C research, our theory is grounded in an individual-level perceptual model. We use the theory of reasoned action (TRA) (Ajzen 1991, Ajzen and Fishbein 1980) as a specific foundation for both deriving the theoretical role of SSF and integrating it within theories of service quality and technology acceptance. TRA posits that an individual forms beliefs salient to a context of interest and these beliefs influence one's attitude and behavior within this context. The salient perceptual constructs that we employ from past research are service quality, satisfaction, usefulness, and continued usage intentions. Two of these constructs—service quality and satisfaction—have been significantly debated with respect to their precise definition and application (Bagozzi et al. 1999, Cronin and Taylor 1992, Robinson 1999, Spreng and Page 2003), and so it is important that we clarify our application of these constructs. The primary debate has been whether to explicitly assess an individual's preservice expectations contributing toward their postservice assessments. With respect to satisfaction, Oliver's (1980) expectancy-disconfirmation

**Figure 1 Theoretical Model**



theory (EDT) proposed that an individual compares an actual performance outcome against a priori expectations, and that their satisfaction/dissatisfaction is a result of the positive/negative discrepancy between the two. Parasuraman et al. (1985, 1988) similarly apply Oliver's (1980) EDT with respect to the formation of service quality beliefs and the explicit role of expectations in influencing such beliefs. EDT has been well supported in information systems (IS) research for the formation of either service quality beliefs (e.g., Kettinger and Lee 2005) or satisfaction (e.g., Bhattacherjee and Premkumar 2004). However, there have been convincing arguments for strictly post hoc, performance-based assessments that are more accurate and explanatory than those based on explicit a priori expectation assessments (Cronin et al. 2000, Cronin and Taylor 1994, Robinson 1999, Spreng and Page 2003, Teas 1993, VanDyke et al. 1997). Criticisms of expectations assessment include: the existence of various types of expectations (e.g., ideal versus desired); the lack of discriminant validity between performance and expectations constructs; and measurement issues (e.g., difference score approaches). Although the debate between these two assessment positions is unresolved, we chose to employ a direct performance-based rather than an expectation-disconfirmation-based conceptualization (and measurement) for both the service quality and satisfaction constructs.

An additional point of theoretical clarification is with respect to our definition and use of satisfaction. Satisfaction has been widely defined, but there is general agreement that it is an immediate affective reaction to the appraisal of a specific referent, such as a product or service (Bhattacherjee 2001b, Bhattacherjee and Premkumar 2004, Oliver 1981, Parasuraman et al. 1988). As noted, EDT also purports that satisfaction is the result of a post hoc comparison of performance to a priori expectations, such that when these expectations are (dis)confirmed, (dis)satisfaction results. Though our theory is grounded in TRA, we will substitute satisfaction in the place of attitude. This substitution is based on two reasons. First, the context of our study involves B2C service and the role of service quality. As we will describe, there is a long tradition of linking service quality with satisfaction, making satisfaction a salient construct to consider in our theory. Second, our study involves time-accumulated satisfaction after many encounters with a given B2C website. As a result, the typically transient and more variable satisfaction held by an individual has reached an equilibrium that is congruent with the more stable and enduring attitude held by that individual (Bhattacherjee and Premkumar 2004). Although we substitute satisfaction in the place of attitude, we in no way claim that satisfaction and attitude are isomorphic constructs. Satisfaction and attitude are both types of affect (Bagozzi et al. 1999). However, there are important distinctions between them, such as each construct's transience and stability. Attitudes are longer lasting and more stable than satisfaction, and so are more resistant to change. Satisfaction has also been compared to an emotion (Bagozzi et al. 1999), which denotes that it has less stability and more intensity as compared to attitude. All of these points are consistent with cognitive dissonance theory (CDT). As noted by Bhattacherjee and Premkumar (2004), CDT proposes that individuals tend to confirm what they already know (or feel), and so attitudes change only gradually over time as a result of experience with the given target object or behavior and the influence of situation-specific satisfaction. However, over time, satisfaction and attitude reach a congruent steady state, and thus allow these two constructs to be treated isomorphically in contexts such as ours (Fournier and Mick 1999, Homburg et al. 2006).[1]

We next explicate the constructs of our model and their relationships.

**Service Quality.** Service quality is a customer's global subjective assessment of the excellence of her interaction with a vendor and how well her service needs have been met (Dabholkar et al. 2000; Parasuraman et al. 1985, 1988). The most widely applied service quality framework is SERVQUAL (Parasuraman et al. 1985, 1988) and its identification of customers' salient perceptions about a vendor's reliability; the assurance, empathy, and responsiveness that the vendor conveys to customers; and the tangible aspects of the vendor's infrastructure and/or appearance. SERVQUAL is typically considered as a customer's global assessment of service interactions

[1] We thank the associate editor for helping us to clarify the nature of these two constructs.

with the vendor rather than of a specific transaction or service (Parasuraman et al. 1988). With more than 1,600 citations to date, the vast amount of research into SERVQUAL attests to its usefulness for predicting customer reactions and responses, such as loyalty (Parasuraman and Grewal 2000), increased sales (Dabholkar 1996), willingness to pay a price premium (Zeithaml et al. 1996), and—most commonly—customer satisfaction (Cronin et al. 2000, Cronin and Taylor 1992, Robinson 1999). Service quality has also been studied extensively within IS, specifically the quality of service provided *directly* by a B2C website. Service quality has been shown to increase online channel usage (Devaraj et al. 2002), loyalty to websites (Gefen 2002), and—most importantly—to enhance customer satisfaction with a website, a key construct we discuss next.

**Service Quality and Satisfaction.** The dominant and most salient consequence of service quality, whether in general or in B2C, is satisfaction (Cronin et al. 2000, Cronin and Taylor 1992, Robinson 1999). Cronin et al. (2000) note that the influence of service quality on satisfaction can be derived from appraisal response theory, which posits that observations of external stimuli are processed cognitively and lead to an overall affective reaction (Bagozzi 1992). Satisfaction is an individual's *affective* reaction to the *cognitive* appraisal of service quality performance. Simply put, if a customer perceives that she has been well served by the B2C website, she is likely to be more satisfied with the website in general. Consistent with the extant literature linking service quality with satisfaction, we propose the following hypothesis.

Hypothesis 1. *A customer's perceptions of service quality associated with a website will positively influence the customer's overall satisfaction with that website*.

**Supporting Services Functionality (SSF).** We now turn our attention to the core construct of our paper, SSF. Our investigation of this construct builds on prior literature as summarized in Table 1. SSF is the use of IT to deliver services that support a core product or service. There are three pertinent models in the literature: (1) the *supplementary service* (Lovelock 1994, Lovelock and Yip 1996), (2) the *augmented service* (Kotler 1997, Levitt 1980), and (3) the *Customer Service Life Cycle* (CSLC) models (Ives and Learmonth 1984). All three models are based on the premise that vendors offering supporting services to a core product or service can help differentiate that product or service, thus making them more attractive to customers. These supporting services are primarily informational, and conducive to electronic mediation (Lovelock and Yip 1996, Piccoli et al. 2004).

Several studies have investigated the role IT can play in providing supporting services. In an early study, Sethi and King (1994) proposed *functionality* as a broad-level construct that contributes to the competitive advantage conferred by organizational IS (e.g., enterprise resource planning [ERP]). The authors defined functionality as a system's capability to give users what they want, and to help the organization meet its strategic objectives. They assessed organizational IS functionality by adapting 13 individual service dimensions of the CSLC. These supporting service models have also been applied specifically to B2C. Gonsalves et al. (1999) adapted the CSLC to measure manager perceptions of their websites along the broader aspects of the CSLC (*requirements*, *acquisition*, *ownership*, *retirement*). Cenfetelli and Benbasat (2002) also investigated B2C service using the CSLC, but used the individual dimensions and targeted B2C customers, rather than website managers, to validate measures of supporting services. Similarly, Lightner (2004) presented an atomic-level descriptive analysis of website features that deliver customer services. She compared two prevailing B2C firms using a list of 50 functional requirements based on the CSLC. Piccoli et al. (2004) investigated the general customer needs that can be met through online supporting services, in their case, using the Lovelock (1994) services model. Similar to the studies that used the CSLC as a foundation, Piccoli et al. (2004) developed a taxonomy of potential services that can be delivered online, such as order taking, billing, and payment. They made a key contribution by proposing that online firms evolve their service—and therefore interaction value—over time. They indicated that firms should begin with the most basic level of online service provision and evolve to providing supplementary and highly personalized services using technology. Their extensive descriptive data at both the firm and industry levels suggest that online firms are presently at a nascent stage of service development.

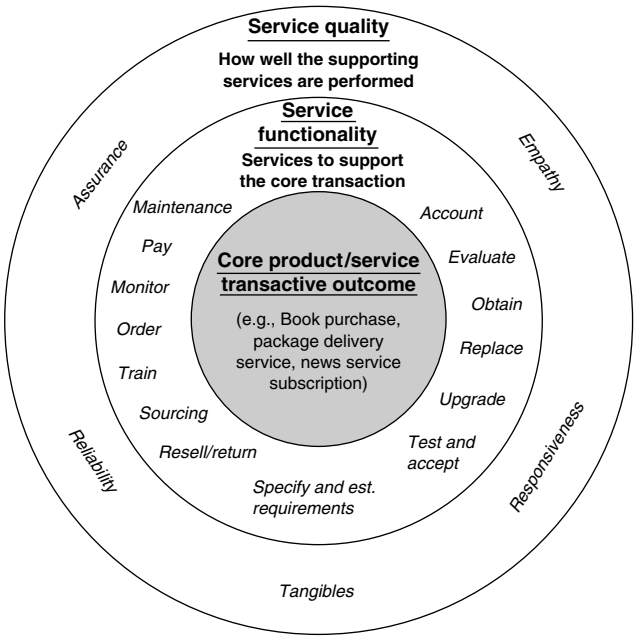
**Table 1 Prior Research on SSF or Related Concepts**

| Study | Core concept | Summary |
|---|---|---|
| Ives and Learmonth (1984) | CSLC | Proposal of a 15-dimensional framework for applying IT to externally oriented customer-focused IS. |
| Lovelock (1994), Lovelock and Yip (1996) | Supplementary service | Proposal of an eight-dimensional framework for opportunities to add value to a core product or service. |
| Levitt (1980) | Augmented service | Proposed that products that customers purchase are actually a bundle of product and augmenting services that facilitate the use of that product and/or add value to the product offering. No theory or empirical results proffered. |
| Kotler (1997) | Augmented service | As with Levitt (1980), proposed that customers gain value from services that provide additional value to a core product. Kotler (1997) further adds that there is a difference between the customer goal (mixing a drink) and the physical product (the blender). No theory or empirical results proffered. |
| Sethi and King (1994) | Functionality | Proposed functionality as a broad-level construct describing the general effectiveness of organizational systems (e.g., ERP). Functionality was defined as a system's capability to give users what they want and to help the organization meet its strategic objectives. |
| Gonsalves et al. (1999) | CSLC | Applied the CSLC as a broad measure of how managers perceived their Web presence to meet the aspects of the CSLC. |
| Cenfetelli and Benbasat (2002) | Functionality | Conceived and analyzed (service) functionality as a multidimensional construct within the context of consumer e-business. Developed and validated measures for the various facets of (service) functionality as perceived by customers. |
| Lightner (2004) | Functional requirements | Atomic-level descriptive analysis of website features that deliver customer services. Compared two prevailing websites using a list of 50 functional requirements, |
| Piccoli et al. (2004) | Supplementary service and functionality | Analyzed the relationship between Lovelock's (1994) supplementary services and customer needs in the context of consumer websites. Supplementary services were found to be a source of interaction value. Proposed a five-stage service model describing how firms evolve service provision over time. Data from both firm and industry levels suggest that online firms are at a nascent stage of service development. |

While all of these studies provide a valuable foundation, there does not yet exist a *theoretical* and *customer-focused* basis for understanding SSF and how it can help explain key consequences, such as continued website usage. Consequently, there has been no empirical testing of this theory and little validation of the construct of SSF. What is also unanswered is the role of SSF relative to service quality, both in terms of its nature and effects. Our goal is to address these lacunae in the literature, particularly with respect to the context of B2C websites. We next discuss this theoretical role of SSF.

**SSF and Service Quality.** One of the core contributions of this study is to theorize the effects of SSF. We posit that SSF is a key contributor to perceptions of service quality provided by a B2C website. Toward a theoretical justification of this relationship, it is useful to first distinguish SSF from service quality. These two constructs are distinct in that SSF is the extent to which IT artifacts exist to provide supporting services around a core product or service, whereas service quality is the evaluation of how well those supporting services are delivered (see Figure 2). Surrounding the core product or service that the customer is interested in are the various SSFs that can be provided through IT to enhance that core product or service, facilitate its use, or, in general, help the customer reach their shopping goals. Extending beyond SSF are the service quality criteria used to make an evalua-

**Figure 2 SSF, Service Quality, and Core Product or Service**




tive assessment of how well these supporting services are provided. In other words, SSF describes the *features*, *methods*, and/or *means* of providing supporting services, whereas service quality describes the *evaluative characteristics* of those features, methods and/or means. This distinction is also the foundation for the theoretical relationship between SSF and service quality. There are several theoretical justifications for the effect of SSF on service quality. First, supplementary services have been described as a source of customer value (Lovelock 1994, Lovelock and Yip 1996, Piccoli et al. 2004) and service quality is a value to be gained by customers (Parasuraman and Grewal 2000). Thus, as IT is used to provide an increasing array of supporting services, customers should perceive a greater sense of service quality being delivered. Second, fulfilling customers' needs is a key contributor to service quality, particularly in the online environment (Zeithaml et al. 2002), and supplementary services are recognized as an important means of fulfilling these needs (Piccoli et al. 2004). The more needs met, the more likely it is that the customer will perceive that the vendor is providing a higher degree of service quality. Third, SSF is the primary basis for the interaction between customers and vendors in B2C, and forms the primary basis for B2C website service quality assessment (Parasuraman et al. 1985, Parasuraman and Grewal 2000). Finally, it is important to note that unlike the core product or service provided by the vendor, SSF is, to a large extent, discretionary (e.g., Amazon.com does not have to provide personalized book recommendations to sell books). As well, SSF leverages IT to provide services that are not only discretionary, but also often impractical in the offline world. As a result, companies that offer a greater number of supporting services (and those otherwise infeasible in the offline context) will enhance the service quality that their customers receive.

Hypothesis 2. *A customer's perceptions of website SSF will increase that customer's perceptions of website service quality.*

**SSF and Customer Satisfaction.** In one of the few empirical studies of supplementary services, Homburg et al. (2002) found that the number and breadth of supporting services provided by a retailer was an important contributor to customer satisfaction in traditional offline retail environments. Within the context of B2C, satisfaction has been demonstrated to be highly dependent on providing customers a *means to an end*, specifically, meeting "means objectives" such as maximizing information access (Keeney 1999), and this is precisely what SSF provides. Using our earlier example, a customer is not purchasing a hammer so much as achieving the goal of hanging a painting. The purchase of the hammer (the core product) along with SSF provided online (e.g., automated recommendations for best hammer size) can help the customer reach this goal. As a website's SSF increases, so too does the website's ability to assist the customer in meeting their goals. Further, all three of the supporting service models discussed earlier have, as their purpose, the satisfaction of customers beyond the product itself by offering additional value-adding services. Satisfying a customer means more than just providing a core product or service. It means providing an array of supporting services, and assisting customers in reaching their shopping goals. As a result, we posit that higher levels of SSF will increase customer satisfaction.

Hypothesis 3. *A customer's overall perception of a website's SSF will positively influence the customer's overall satisfaction with that website.*

**Systems Salient Consequences.** Given the dual nature of B2C websites as both a vendor and an IS, *both* services marketing and technology usage variables are salient. Therefore, a systems perspective can reveal salient consequences of SSF and service quality beyond satisfaction alone. The technology acceptance model (TAM) (Davis 1989, Venkatesh et al. 2003), also derived from TRA, is the most widely cited model about perceptions, adoption, and usage of technology. TAM posits that a user's *perceived usefulness* (PU) of the system is one of the beliefs salient to technology usage. Although other variables are considered in the TAM model (e.g., ease of use), perceived usefulness is by far the strongest predictor of usage across multiple contexts (e.g., voluntary or mandatory usage) and experience levels ranging from initial adoption to continued usage (Bhattacherjee 2001b, Davis 1989, Venkatesh et al. 2003). In the context of B2C, perceived usefulness refers to the degree to which a customer believes a website helps them achieve their shopping goals.

An added reason to consider perceived usefulness as a theoretically relevant variable is its importance as a mediator between system-specific perceptions and behavior. TRA posits two types of beliefs that are influential of attitudes and behavior: external and behavioral (Ajzen and Fishbein 1980, Wixom and Todd 2005). Beliefs about an object of interest and its attributes can be salient drivers of behavioral beliefs on *performing* an action with respect to the object of interest (Wixom and Todd 2005). For example, an individual's belief about whether or not to purchase a house is a behavioral belief that is influenced by external beliefs about the price or the location of the house. In our study, both SSF and service quality are external beliefs about the attributes of a website as the object of interest. Thus, perceived usefulness is a behavioral belief about whether the person believes it is useful to use the website, and so mediates the effects of SSF and service quality on customer behavior. In summary, perceived usefulness is a key construct to consider in an individual-level perceptual model of B2C usage, both as being a salient belief to systems in general, as well as a key mediator of beliefs about attributes of the website, such as SSF.

**Service Quality as an Antecedent to Perceived Usefulness.** Both technology acceptance and service quality theories focus on benefits perceived by users/customers as predictors of behavior: individuals act in accordance with their goals. perceived usefulness applied in TAM is similar to the *value* construct developed in studies of service quality. Value is a frequently studied construct in marketing literature, given its proximal role to service quality, satisfaction, loyalty, purchase, and other key consumer phenomena (Bolton and James 1991, Cronin et al. 2000, Homburg et al. 2002, Oliver 1996, Parasuraman and Grewal 2000, Zeithaml 1988). Marketing researchers have typically defined value in a multidimensional way (Zeithaml 1988), with facets such as price (Zeithaml 1988); benefits relative to sacrifices (Bolton and James 1991); information and security (Keeney 1999); and convenience (Zeithaml 1988). Utility/usefulness is an often-cited facet of value and appears in several studies on the topic. For example, Zeithaml (1988) defines value as "the consumer's overall assessment of utility" (p. 14). perceived usefulness is an important facet of value and one that would dominate in B2C as an amalgamated environment of both vendor and IS. Inasmuch as service quality is recognized as a significant driver of value (Cronin et al. 2000, Parasuraman and Grewal 2000, Zeithaml 1988), logically it also should be a source of perceived usefulness.

Hypothesis 4. *A customer's overall perception of the service quality provided by a website will positively influence the customer's perceived usefulness of the website.*

**SSF as an Antecedent to Usefulness.** As a basis for conceptualizing SSF, we have referred to supporting service models, such as the CSLC. All of these models have been proposed as a means of increasing value to customers, although this assertion has received little empirical investigation, and hence support (Lovelock and Yip 1996, Piccoli et al. 2004). The basis of this proposition is that a core product or service that is offered with supporting services is more valuable than the core product or service alone (Kotler 1997, Levitt 1980, Lovelock 1994). The more SSF offered on a website to help customers reach their goals, the more useful the site becomes to its customers.

Hypothesis 5. *A customer's perception of the SSF provided by a website will positively influence the customer's perceived usefulness of the website.*

**Usefulness and Satisfaction.** Bhattacherjee (2001b) Bhattacherjee and Premkumar (2004) notes that satisfaction is a critical construct to consider in technology acceptance, particularly with respect to continued usage contexts, and that perceived usefulness is the most salient belief in predicting satisfaction consistent with TAM. perceived usefulness is a user's expectancy of system performance and one that dominates effort expectancies in predicting usage, particularly in postadoption contexts (Bhattacherjee 2001b, Venkatesh et al. 2003). Utilitarian benefits have been strongly supported as a driver of customer satisfaction within vendor contexts (Cronin et al. 2000), and specifically within B2C (Devaraj et al. 2002).

Hypothesis 6. *A customer's perceived usefulness of a website will positively influence the customer's overall satisfaction with that website.*

**Usefulness and Continued Website Usage.** A customer's utilitarian concerns can have a *direct* effect on continued usage of a B2C website in addition to the satisfaction-mediated indirect effect. Davis (1989) argued for this direct link between perceived usefulness and intention—as well as a connection between perceived usefulness and attitude—to account for the effects of extrinsic rewards, such as pay increases and promotions. Therefore, even if an individual is dissatisfied with a website, she may continue to use it because she finds it useful (Bhattacherjee 2001a). Examples of such extrinsic rewards in B2C e-business include loyalty programs such as frequent flyer miles (Bhattacherjee 2001a). The dual direct and indirect effects of perceived usefulness on usage has been previously theoretically described and supported (e.g., Wixom and Todd 2005).

Hypothesis 7. *A customer's perceived usefulness of a website will positively influence the customer's continued usage of that website.*

**Satisfaction and Continued Website Usage.** Satisfaction has a well-established impact on behaviors ranging from product purchase (e.g., Dabholkar et al. 2000) to B2C channel adoption (Devaraj et al. 2002). Satisfaction drives behavior given its role as an attitude (Bagozzi et al. 1999). A customer who is more satisfied with a website is more likely to continue using that site.

Hypothesis 8. *A customer's satisfaction with a website will positively influence the customer's continued usage of that website.*

## Methodology

**Overview.** To evaluate the nature of SSF and to test our theoretical model, we surveyed a panel of current B2C customers and collected data on perceptions of website SSF, service quality, perceived usefulness, satisfaction with the site, and intentions to continue using a given website.

**Item Development.** We derived our measures for *service quality*, *perceived usefulness*, *satisfaction*, and *continued website usage* from scales that have been applied and validated in earlier studies. *perceived usefulness* was adapted from scales used in both general IS empirical studies as well as those specifically within the context of B2C (Davis 1989, Devaraj et al. 2002, Gefen et al. 2003, Venkatesh et al. 2003). We measured satisfaction using a four-item semantic scale used both in IS and marketing research (e.g., Bhattacherjee 2001b), and prefaced this measure with the B2C website as the target object of the scale. We measured continued website usage with a three-item scale borrowed from leading IS studies, and employed in a similar B2C context (Bhattacherjee 2001b, Gefen et al. 2003). Our measures for service quality were also taken from well-established B2C SERVQUAL adaptations (Devaraj et al. 2002, Gefen 2002, Parasuraman et al. 1988). A complete list of measures is in Appendix A.

As a relatively new construct in the literature, we gave careful attention to the development of the measures of SSF. We chose the CSLC as a foundational model for describing the possible services available in B2C environments. The CSLC emphasizes the role of IT as a resource to provide supporting services, and describes a wider array of potential supporting services than the Lovelock (1994) or Kotler (1997) models. It is important to note, however, that we made use of the CSLC solely as an *initial seeding framework*. Past this initial grounding, we validated SSF *independent of any specific framework*. We generated 3 (4 in one instance) items for each of the 15 service dimensions

**Table 2 Summary of Ives and Learmonth (1984) CSLC**

| SSF | Description |
|---|---|
| Establish requirements | Assisting customers to estimate the quantity of a product that is required |
| Specify | Helping customers determine a product's attributes |
| Source | Where customers purchase a product |
| Order | Services to help customers express what and how much of a product is desired from a supplier |
| Pay | Services to transfer funds or extend credit |
| Obtain | Assisting customers to take possession of products |
| Test and accept | Services to ensure that products meets established specifications |
| Train | Helping customers to make use of products to their full extent |
| Monitor | Helping customers control access and use of products |
| Maintain | Repairing products and keeping them in proper working order |
| Upgrade | Services that alert customers to new and improved attributes, new products, or automatic upgrades to products when conditions have changed |
| Replace | Features that suggest substitute products for products that have been consumed or that are beyond repair |
| Resell/return | Helping customers to move, return, or dispose of products |
| Account | Helping customers track where and how much money has been spent with a company |
| Evaluate | The final "tally" by customers of the experience that they have had with a company (e.g., feedback) |

of the CSLC (Table 2) for a total of 46 items. To support construct validity and to evaluate how well the items tapped these dimensions, we conducted a card sorting exercise with the assistance of eight judges (Moore and Benbasat 1991). These judges were B2C consumers, selected with the help of a marketing research firm (56% female, average age = 34, average of 5.3 purchases made online in the previous year). Each judge was presented with the 15 CSLC dimensions, the definitions for each dimension, and a randomly sorted list of the 46 items. The judges were instructed to assign each item to 1 of the 15 dimensions, or to an "ambiguous" category if they were unsure of the best placement. We observed that all eight judges had difficulty discriminating between the *establish requirements* and *specify* dimensions, which are conceptually very similar. We thus consolidated them into a single dimension, ending with 14 dimensions. This resulted in an average "hit ratio" of 85% across the remaining 14 dimensions, and an average Kappa (Cohen 1960) of 0.77, both good indications of construct validity.[2] The SSF items are shown in Appendix A.

Given the potential for overlap between the constructs of SSF and service quality, we performed an additional card-sorting exercise. We recruited another 15 consumer judges (50% female, average age = 35, average of 10.4 purchases made online in the previous year) to sort the 46 items associated with the 14 SSF dimensions and the 17 items associated with the 5 SERVQUAL dimensions. The items were divided into three subsets to avoid participant fatigue. The aggregated results indicated confusion among the SERVQUAL dimensions, conflating *empathy* with *assurance*, for example. However, there were few crossover effects between the SSF dimensions and those of SERVQUAL (the average hit rate was 61% for the SERVQUAL items and 85% for the SSF items). We conducted an additional $\chi^2$ test for placement of items according to a $2 \times 2$ (SERVQUAL $\times$ SSF) categorization. The $\chi^2$ statistic was 228.2 ($p < 0.0001$) indicating that the SSF dimensions were sufficiently distinct from those of service quality, controlling for chance.

**Field Testing.** Using the construct measures, we developed an electronic survey instrument to test our theoretical model. We pretested the survey instrument with a convenience sample of 22 undergraduate and graduate students, both to clarify wording and to assure proper functioning of the survey. We gathered data from each respondent about a target website's performance with respect to the respondent's perceptions of the website's SSF,[3] service quality, usefulness, satisfaction with the website, and intention to use the site in the future.

**Sample.** An invitation to participate in the study was broadcast via e-mail to 4,100 members of a marketing research firm's U.S. nationwide panel, offering

[2] The hit ratio is a measure of how well the items target the constructs *intended by the authors* and is calculated as the ratio of "correct" item placements to total placements across all dimensions (Moore and Benbasat 1991). There are no strict guidelines for the hit ratio, but 80% is generally acceptable. Kappa assesses agreement *between judges*—regardless of what the authors intended—and does so with the possibility of chance agreement in mind. The commonly accepted threshold for Kappa is 0.70 (Boudreau et al. 2001).

[3] Our measures of SSF were designed to capture *performance*: the subjective determination of the *extent* to which a website provides functionality, not merely the presence of those functions.

**Table 3 Respondent Sample Demographic Data**

| | Present study (%) | Comparison study (Lenhart et al. 2003)[14] (%) |
|---|---|---|
| Gender | | |
| Men | 34 | 50 |
| Women | 66 | 50 |
| Age | | |
| 18–29 | 10 | 29 |
| 30–49 | 60 | 47 |
| 50–64 | 28 | 18 |
| 65+ | 2 | 4 |
| Household income | | |
| Less than $30,000 | 15 | 18 |
| $30,000–$49,999 | 24 | 23 |
| $50,000–$75,000 | 28 | 18 |
| More than $75,000 | 33 | 26 |
| Educational attainment | | |
| Not a high school graduate | 0 | 5 |
| High school graduate | 13.4 | 23 |
| Some college | 35.3 | 34 |
| College or graduate school degree | 51.4 | 37 |

[14]The numbers for the Pew study do not add up to 100% because of partial participant nonresponse in that study.

a point-based incentive for participation in the study. We received responses from 1,235 B2C customers. We deleted 154 responses because of data runs or incomplete responses, thus yielding an analysis sample of 1,081 respondents. Demographic data is presented in Table 3. Overall, the characteristics of this sample are similar to Internet users in general (Lenhart et al. 2003).[4]

The respondents were asked to evaluate a single retail B2C website from which they had made a purchase within the previous six months. There was no way to ensure adequate delivery to 4,100 panelists, given the possibility of disabled e-mail accounts, "spam" filtering, or other e-mail account blocks. It was possible, however, to note the number of unique hits to the website server where the electronic survey was hosted, and thereby determine an effective distribution rate. The server logs recorded 2,582 visits to the site, many of which may not have been unique. Hence, a conservative estimate of the effective response rate is 48% (1,235/2,582) of the invited participants. A wide variety of websites were studied, assuring full variance on the measures of constructs of interest. The reported websites varied across the five categories noted in Table 4.

[4] The Pew Foundation (www.pewinternet.org) conducts some of the largest studies about the general population's use of the Internet. Their study cited here surveyed 3,553 adults, and thus serves as a useful demographic comparison. A $\chi^2$ test for differences in the demographic variable distributions between our study and the Lenhart et al. (2003) study was not significant ($p > 0.75$).

**Table 4 Retail Categories Reported by Respondents**

| Category | Number of respondents reporting* | Percentage of total (%) |
|---|---|---|
| Books | 295 | 27 |
| Clothing | 163 | 15 |
| Electronics | 110 | 10 |
| Music/video/DVD/games | 170 | 16 |
| Other (specified separately) | 343 | 32 |
| Total | 1,081 | 100 |

*Represents the number of respondents who identified a website within a given category. For example, 163 people reported on a site that sold, or primarily sold, clothing.

## Results

**Common Method Bias.** To address the potential concern of common method bias from the use of a field survey technique, we conducted an exploratory factor analysis and applied the Harman (1967) one-factor extraction test. The exploratory factor analysis of the 73 variables revealed 17 factors with eigenvalues greater than 1.00. No single factor explained a majority of the variance, thus supporting that common method bias was not a threat.

**Model Testing.** The properties of the theoretical model were assessed following a two-step measurement and structural approach (Gefen et al. 2000). We assessed the measurement properties using covariance-based structural equation modeling (SEM), and the structural properties using partial least squares (PLS) SEM.[5]

**Measurement Model Assessment.** To first test the discriminant and convergent validity of the constructs, we used LISREL to analyze a model in which all 22 constructs were allowed to freely correlate with one another. The five service quality dimensions exhibited a lack of discriminant validity, as indicated

[5] The $73 \times 73$ matrix is available at http://isr.sauder.ubc.ca/ISR2005-129-correlations.xls. For ease in interpretation, a correlation matrix is provided in lieu of a covariance matrix.

**Table 5 Service Quality Second-Order Construct Loadings**

| First-order factor | Loading on service quality as a second-order factor |
|---|---|
| Assurance | 0.95 |
| Empathy | 0.95 |
| Reliability | 0.95 |
| Responsiveness | 0.93 |
| Tangibles | 0.79 |

by high cross-loadings of items to other SERVQUAL constructs. These results are not surprising given the results of our qualitative card-sorting exercise, as well as the factor instability of SERVQUAL reported in previous studies (Dabholkar et al. 1996, Gefen 2002, VanDyke et al. 1997). To further explore this lack of discriminant validity, we analyzed service quality as a second-order construct (Chin 1998, Edwards 2001). A second-order model is appropriate if (a) there are more than four first-order constructs and (b) those factors each have a standardized loading on the second-order construct greater than 0.70 (Chin 1998). Our second-order superordinate service quality construct met these criteria (Table 5).

We reanalyzed the measurement model based on the second-order service quality construct, the 14 SSF dimensions, usefulness, satisfaction, and continued website usage. The vast majority of indicator items loaded highly on their intended constructs (>0.70, Hair et al. 1998). The exceptions included one service quality item (*empathy*) and one item from each of the following SSF dimensions: *pay*, *test and accept*, *resell/return*, and *train*. Given that this was a small fraction of the total of 73 items in the model and that all constructs would retain at least two items, we decided to drop these five items from further analysis.[6] Appendix A shows the item loadings on their intended constructs. With the combined dimensions and revised set of items noted above, we analyzed a final measurement model and found it exhibited statistics largely in line with recommended tolerance levels (Table 6). The $\chi^2$ test was significant as a result of the power provided by the large sample size. The GFI was slightly below the suggested threshold of 0.90, but acceptable given the large number of constructs in the model (Boudreau et al. 2001).

[6] The removal of the RESELL3 item resulted in a construct more appropriately referred to as simply *return*.

**Table 6 Measurement Model Fit Statistics**

| Fit statistic | Statistic | Desired levels |
|---|---|---|
| $\chi^2$ | 6,809.69 | Smaller |
| Degrees of freedom | 2,031 | |
| Goodness-of-fit index | 0.84 | >0.90 |
| Adjusted goodness-of-fit index | 0.81 | >0.80 |
| Standardized root mean residual | 0.05 | ≤0.05 |
| Root mean square error of appreciation | 0.049 | <0.080 |
| Normed fit index | 0.90 | >0.90 |
| Comparative fit index | 0.93 | >0.90 |

The internal consistency of all constructs were well in excess of the recommended thresholds for Cronbach's alpha (>0.70, Hair et al. 1998), composite reliability (≥0.70), and average variance extracted (AVE) (>0.50, Fornell and Larcker 1981), thus supporting convergent validity (Table 7). We evaluated discriminant validity by comparing the square root of AVE with the correlations between constructs (Appendix B). The square root of AVE for a construct should be greater than the correlations with any other construct, to support that the variance shared between a construct and its measures exceeds the variance shared by that construct with other constructs (Fornell and Larcker 1981). Of the 153 bivariate correlations, 150 met this test.

To further assure discriminant validity and the psychometric properties of these scales, we conducted two additional tests. First, we performed the $\chi^2$ difference test as suggested by Venkatraman (1989). We tested those pairs of constructs that had an absolute difference of 0.10 or less between the bivariate correlation and either of the two associated AVE statistics. All $\chi^2$ tests supported that the interconstruct correlations were significantly different ($p < 0.001$) from both the common 1.00 standard as well as a more stringent constrained correlation of 0.90.[7] We performed a second test of discriminant validity by calculating an item loading and cross-loading matrix with PLS-Graph version 3.00 (Chin 2001, Gefen and Straub 2005). The 68 items from the refined measurement model were correlated with all 22 constructs for a total of 1,496 bivariate comparisons. All items loaded on their intended constructs above a 0.50 level and those loadings were higher than any cross-loadings

[7] See Table 1 available at http://isre.pubs.informs.org.

**Table 7 Construct Internal Consistency**

| Construct | No. of items | AVE | Fornell | Alpha |
|---|---|---|---|---|
| Account | 3 | 0.58 | 0.80 | 0.80 |
| Evaluate | 3 | 0.65 | 0.85 | 0.82 |
| Maintenance | 3 | 0.78 | 0.91 | 0.90 |
| Monitor | 3 | 0.70 | 0.87 | 0.91 |
| Obtain | 4 | 0.82 | 0.95 | 0.95 |
| Order | 3 | 0.71 | 0.91 | 0.90 |
| Pay | 2 | 0.76 | 0.86 | 0.81 |
| Replace | 3 | 0.73 | 0.89 | 0.88 |
| Return | 2 | 0.78 | 0.88 | 0.88 |
| Sourcing | 3 | 0.78 | 0.91 | 0.91 |
| Specify and establish requirements | 6 | 0.68 | 0.93 | 0.92 |
| Test and accept | 2 | 0.61 | 0.76 | 0.75 |
| Train | 2 | 0.80 | 0.89 | 0.88 |
| Upgrade | 3 | 0.78 | 0.92 | 0.91 |
| Service quality | 16 | 0.61 | 0.96 | 0.95 |
| Satisfaction | 4 | 0.79 | 0.94 | 0.94 |
| Usefulness | 3 | 0.75 | 0.90 | 0.91 |
| Continued website usage | 3 | 0.75 | 0.90 | 0.90 |

*Notes.* The recommended levels for the above statistics are as follows:
Average variance extracted (AVE) $> 0.50$.
Composite reliability (Fornell) $> 0.70$.
Cronbach's alpha $> 0.70$.

on any other construct, thus further supporting discriminant as well as convergent validity (Gefen and Straub 2005).[8]

**Structural Model Assessment.** We tested a structural model based on our theoretical model (Figure 1). We chose to model SSF as a second-order *aggregate* construct consisting of a weighted sum of the individual 14 dimensions of SSF. Aggregate constructs are similar to formative constructs, inasmuch as the causal indicators *cause* variance in their associated higher order constructs that are not otherwise separately measured (Chin and Gopal 1995, Diamantopoulos and Winklhofer 2001, Edwards 2001, Jarvis et al. 2003, Petter et al. 2007). We modeled SSF as an aggregate construct as a result of the direction of causality between dimensions and the overall construct of SSF. IT can be used to provide many different types of supporting services and companies may choose any combination of these applications, e.g., allowing online payment but not order tracking. Thus the occurrence and extent of any particular SSF dimension may or may not correlate with another as is typical with superordinate constructs.

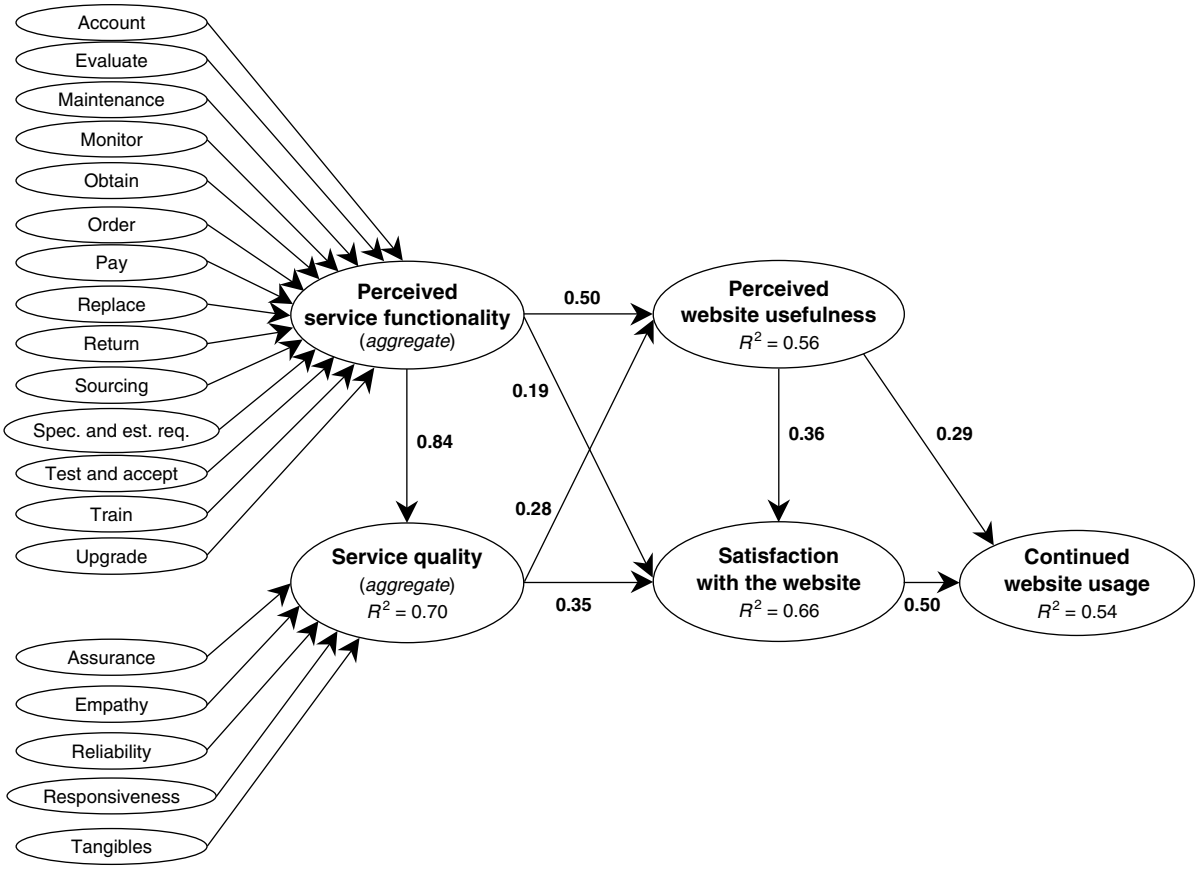
[8] The matrix of loadings and cross-loadings is provided at http://isre.pubs.informs.org.

As revealed during the measurement model analysis, service quality is more appropriately modeled as a second-order construct as well. However, rather than model service quality as a superordinate construct, we chose instead to model it also as an aggregate construct consistent with theory rather than empirics (Jarvis et al. 2003, Petter et al. 2007). We theorize that individual perceptions of the five service quality attributes should drive a collective service quality assessment rather than the reverse. We modified the measures of service quality based on potential conceptual issues with both the specificity of the items as well as that some measures, as originally designed, potentially tap either satisfaction or dimensions of functionality. For example, a SERVQUAL *reliability* item (RELIAB4) measures "on-time delivery" and an *empathy* item (EMPTH3) measures "satisfaction" with "payment." To guard against threats to construct validity, our results are based on a model with these potentially problematic measures removed.[9] As a result of our modeling choices, we analyzed the structural model using PLS-Graph. The SSF and service quality second-order constructs were modeled in PLS using repeated indicators (Chin and Gopal 1995).

Before proceeding with the structural analysis, we analyzed the indicators of SSF and service quality for possible multicollinearity. Multicollinearity is concern for formative/aggregate constructs given that multiple indicators are jointly predicting a latent construct in analogous fashion to variables in a multiple regression (Diamantopoulos and Winklhofer 2001, Petter et al. 2007), which can lead to instability of indicator coefficients. None of the bivariate correlations between the 14 SSF dimensions were above 0.90, a potential indication of collinearity (Tabachnick and Fidell 2001). The maximum variance inflation factor of either the 14 SSF dimensions or the 5 service quality dimensions was 4.20, and so below the suggested tolerance range of 5.00 to 10.00 (Hair et al. 1998, Mathieson et al. 2001).

[9] These items were ASSUR2, ASSUR3, RELIAB3, RELIAB4, EMPATH3, RESP2, and RESP3. However, post hoc structural testing with these items included produced only a 0.02 change in path coefficient magnitudes.

**Figure 3 Structural Model Results**




*Notes.* All path coefficients displayed above are significant at $p < 0.01$. Weight for the dimensions of *service functionality* and *service quality* are provided in a separate table.

The results of the structural model analysis, including standardized path coefficients and their statistical significance,[10] are listed in Figure 3 and Table 8. All hypotheses were supported. *SSF* had a positive and significant effect on *service quality* ($\beta = 0.84, p < 0.01$) and predicted 70% of the variance in *service quality*.[11] *SSF* had positive and significant effects on *perceived usefulness* ($\beta = 0.50, p < 0.01$) and *satisfaction* ($\beta = 0.19, p < 0.01$). *Service quality* also had a positive and significant effect on *perceived usefulness* ($\beta = 0.28, p < 0.01$) and *satisfaction* ($\beta = 0.35$, $p < 0.01$). *SSF* and *service quality* jointly explained 56% of the variance of *perceived usefulness*. *perceived usefulness* had a positive and significant effect on *satisfaction* ($\beta = 0.36, p < 0.01$). *SSF*, *service quality*, and *perceived usefulness* jointly explained 66% of the variance in *satisfaction*. The effects of *perceived usefulness* and *satisfaction* on *continued website usage* were both significant ($\beta = 0.29, \beta = 0.50, p < 0.01$), explaining 54% of the variance of usage.

[10] We computed standard errors using a bootstrap procedure with 200 resamples.

[11] The 0.84 path coefficient between SSF and service quality may raise a concern about the discriminant validity between these two constructs. From a *quantitative* analysis, we previously reported three tests supporting adequate discriminant validity: comparisons of AVE with construct bivariate correlations; $\chi^2$ tests, and the PLS cross-loading tests. In addition, the SSF/service quality card sort exercise previously described provides a *qualitative* assessment of discriminant validity. In toto, these tests support that the 0.84 path coefficient is the result of a strong relationship between SSF and service quality, rather than a lack of distinction between these constructs.

The results of the structural model include the contributions made by the individual first-order dimensions of SSF and service quality on their respective second-order aggregate constructs. It is important to note that the paths from the dimensions to the aggregate second-order construct are *weights*, not reflective *loadings*, and thus interpreted in a different manner. All five first-order service quality constructs had strong and significant weights on the aggregate service quality construct, ranging from 0.12 to 0.33. Seven of the 14 SSF dimensions were supported as significant contributors to the aggregate SSF construct: *account*, *evaluate*, *monitor*, *obtain*, *order*, *specify and establish requirements*, and *test and accept* ($p < 0.05$). The *pay* and *sourcing* dimensions were marginally significant ($p < 0.10$). The remaining five dimensions were not significant: *maintenance*, *replace*, *return*, *train*, and *upgrade*.

**Additional Analyses.** To augment the findings from the theoretical model, we performed several additional analyses that supported three findings.[12] First, we found that SSF helps to explain *significant additional variance beyond service quality* in predicting usefulness and to a smaller degree in predicting satisfaction. Second, our results were robust when the second-order SSF and service quality constructs were modeled as either aggregate or as superordinate. Third, the strength and relative contribution of each functionality dimension remained invariant across the product categories in our sample (DVD's, books, etc.).

## Discussion of Results

**Theoretical Implications.** Given the dual role of B2C e-business as both a vendor and as an IS, our theory combined dominant paradigms in both services marketing and IS; namely, service quality and technology acceptance. We found that SSF is an important contributor to an online customer's perceptions of usefulness, the customer's satisfaction with the website, and ultimately their continued usage of that site. Furthermore, SSF explains *additional variance* in usefulness and satisfaction, beyond the predictions made by service quality alone. This is a substantial hurdle to overcome, given service quality's extensive and robust predictive power supported by more than two decades of research. We also found that SSF is an important contributor to service quality itself.

[12] See the "Additional Analyses" summary at http://isre.pubs.informs.org.

**Table 8 Path Coefficients Between First- and Second-Order Service Factors**

| Service quality first-order factors | Weight to second-order construct | SSF first-order factors | Weight to second-order construct |
|---|---|---|---|
| Assurance | **0.12**$^{**}$ | Account | **0.07**$^{*}$ |
| Empathy | **0.19**$^{***}$ | Evaluate | **0.12**$^{**}$ |
| Reliability | **0.33**$^{***}$ | Maintenance | *0.03* |
| Responsiveness | **0.22**$^{***}$ | Monitor | **0.07**$^{**}$ |
| Tangibles | **0.31**$^{***}$ | Obtain | **0.30**$^{***}$ |
| | | Order | **0.48**$^{***}$ |
| | | Pay | **0.05**$^{*}$ |
| | | Replace | *0.03* |
| | | Return | *0.02* |
| | | Sourcing | **0.04**$^{*}$ |
| | | Specify and establish requirements | **0.26**$^{***}$ |
| | | Test and accept | **0.08**$^{*}$ |
| | | Train | *0.02* |
| | | Upgrade | *0.01* |

*Notes.* Italics indicate nonsignificance. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

The results of the 14 individual dimension path weights to the second-order SSF aggregate construct provide some interesting findings (Table 8). These weights are analogous to a multiple regression analysis, and thus indicative of each dimension's *relative importance* to B2C success. The SSF dimensions that are relatively more important are those that support ordering, obtaining a product or service, and assisting with specifying the product or otherwise establishing a customer's requirements. The *evaluate* dimension, which involves providing customers with tools to communicate with the company, was also relatively important. The remaining dimension weights, such as *maintenance*, lacked statistical significance. This may be a result of the types of products evaluated (e.g., books, songs, or clothes do not usually require training, repair, or upgrades). However, these less significant dimensions may be more important in very specific contexts, such as higher priced products, more risky transactions, or initial website usage rather than continued usage. Alternatively, B2C firms may currently be offering limited functionality and do not see, at this time, the same competitive opportunities for further functionality capability (Piccoli et al. 2004).

An important caveat to interpreting these results is that while the dimension path weights are indica-

tive of their *relative* importance to B2C success, these results are not necessarily indicative of *absolute* importance. Significant, positive bivariate correlations between the statistically insignificant dimensions with satisfaction, usefulness, and usage provide support that these dimensions do also contribute to these dependent variables. What the structural results support is that certain key service functions, such as ordering, are *more* important for customers than other functions. That many of the functionality dimensions are insignificant in the structural analysis may well be an artifact of the aggregate nature of the construct and the "competition" among 14 variables to explain a single dependent variable.[13]

Our study contributes to the literature by supporting prior research in continued technology usage. The specific results of our submodel are very similar to Bhattacherjee's (2001b) work and offer some replication of these findings. As in his study, our results found that satisfaction was the stronger predictor of continued usage intentions, as compared to usefulness. As contexts for technology usage shift from job-oriented environments to personal activities, such as B2C, there is a real need to include affective considerations in addition to usefulness beliefs, even if those affective considerations are *not* supported in job-oriented contexts (Venkatesh et al. 2003).

Finally, although both service quality and technology acceptance have each been widely studied, there is little, if any, research that we are aware of that has attempted to integrate these two theories. In studies where service quality and technology acceptance are investigated, the concepts are either viewed as independent factors (Devaraj et al. 2002) or as simply a change in taxonomy (Zeithaml et al. 2002). Indeed, it is important to consider *the system's characteristics* as a source of service quality (DeLone and McLean 2003, Wixom and Todd 2005), and as an important antecedent to its use. In other words, a customer can judge the quality of the service she receives whether that service is provided by Sears.com or by a Sears sales representative in a physical store. This paper served not only to validate the important concept of SSF and theorize its effects relative to service quality, but also served to integrate these two dominant theories.

**Managerial Implications.** Companies increasingly deal with their customers through the "window" of a B2C website, and sometimes exclusively through this window (Benbasat and DeSanctis 2001). SSF provides a means of supplying the missing "human touch" by leveraging IT to provide multiple supporting services, in some cases, services that could not realistically be delivered in an offline setting.

SSF helps practitioners address *what* services, tools, and functions are important to their customers, in addition to the *how* of gaining such benefits, which has been the focus of other models such as SERVQUAL or TAM. The basic prescription for companies is to consider all the ways IT can be leveraged to provide services to support a core product or service.

SSF can be prescriptive of the design and operation of a company's IT assets. SSF directly targets the leverage points of IT design and development, thereby overcoming a potential shortcoming of broad and abstract perceptual models (Benbasat and Zmud 2003, Wixon 2005). Beliefs-based adoption theories typically model beliefs at a global high level of abstraction. The prevailing beliefs salient to adoption research, such as usefulness, have high theoretical utility but they are inherently less relevant to the design of the IT artifact, the means by which IT can be used to increase these salient beliefs. Potentially more useful from a design perspective are beliefs about specific design attributes. Our modeling of SSF provides both a design as well as theoretically relevant construct and provides, in our view, one of the first attempts in IS research to address *what makes an IT useful.*

**Limitations and Additional Research.** Because some of the SSF dimensions were not significant may cause concern as to the validity of the dimensions. Toward this concern, there are several arguments to consider. First, although formative aggregate constructs are highly advantageous for modeling phenomena of interest, there are unique challenges

[13] An aggregate construct cannot have more than 100% of its variance explained by its indicators. For example, the maximum possible *average* standardized variable weight for a two variable aggregate construct is 0.71. Given the 14 variables in our case, the maximum possible average variable weight is 0.27. This is in the unlikely case of complete orthogonality. As a result, typical variable weights are expected to be substantially lower (Cenfetelli and Bassellier 2008).

as compared to reflective superordinate constructs (Diamantopoulos and Winklhofer 2001). Specifically, *content validity* is essential for aggregate constructs as failing to include a particular measure of a construct can drastically change its nature. On the other hand, there is no such bias when these types of constructs include *insignificant* measures, nor is it necessary to re-estimate a model with those insignificant measures removed (Mathieson et al. 2001). As a result, it is better to err on the inclusion of dimensions that may be less relevant, particularly with a new construct such as SSF.

A second argument for retaining all dimensions is that the results presented in this paper are intended to pertain to a general B2C context. As noted earlier, different contexts (products, risks, etc.) may alter the results, and thus the prescriptions for what dimensions SSF will be most important. Our findings are applicable to a broad range of consumer product categories, but with the caveat that certain very specific products may shift the results. For example, an automotive website may not benefit from offering an ordering function, because most purchases take place offline at a physical dealership. Instead, such a site might benefit most from maintenance functions (e.g., www.mygmlink.com) that were demonstrated to be less important in the general context of our study.

A third reason to maintain full dimensionality is that SSF can be generalized beyond B2C to other contexts, such as business-to-business relationships. Again, these contextual aspects may change the relative weight of the individual SSF dimensions without altering the conclusion that SSF is an important antecedent to customer benefits.

As noted earlier, we substituted attitude for satisfaction in our theoretical model. We caution researchers not to generalize this treatment for all contexts. There are important distinctions between satisfaction and attitude, the two are not equivalent, and each has its own set of antecedents and consequences. Our context of multiple encounters with a B2C website allowed such isomorphism. However, differing contexts, such as initial usage, may not allow satisfaction to be substituted for attitude, and instead require theorizing and measurement of both constructs separately.

Future research would benefit from taking a task-technology fit (TTF) (Goodhue and Thompson 1995) approach to the effects of SSF. As this study showed, there are a variety of specific functions that can be delivered through technology. The role and importance of those functions may be contingent on the tasks facing the customer. This may be particularly true in continued usage situations where users have become dependent on a given website (Goodhue and Thompson 1995) but are still vulnerable to "poaching" by competitors. A TTF perspective also provides for the interesting possibility that websites may provide too many service functions for a given task, thus leading to confused and overwhelmed customers (Cenfetelli 2004a, b; Zeithaml et al. 2002). Studies incorporating a TTF perspective could investigate specific shopping contexts and gather data on which service functions are most important in that particular context.

## Conclusion

This paper made several contributions. First, it introduced and described the novel concept of SSF as it applies within B2C, and we developed and validated a measure for this multidimensional construct. A second contribution was to develop a theory for how SSF influences customer perceptions, and whether SSF is predictive of continuing usage of B2C website. A related and third contribution entailed positioning SSF (*what* services are offered) with service quality (*how* those services are offered). The results of this study demonstrate that SSF is an important predictor of customer perceptions and behavior, augmenting predictions based solely on service quality. A fourth contribution was a theory to explain perceptions and behavior in the vendor/systems in the B2C environment. To meet this goal, we posited an integration of dominant predictive theories found in services marketing and technology acceptance research. As a result, we found that taking *both* a functional *and* service quality perspective can provide a more comprehensive view of IT-mediated customer service, by identifying what services should be offered using IT, as well as determining how best to offer them.

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## Appendix A. Instrument and Measurement Properties

| Item | | Mean (std. dev.) | Loading |
|---|---|---|---|
| | SSF—(7-point Likert agreement scale preceded by the statement "The tools provided by the site . . . ") | | |
| Account | | | |
| ACCOUNT1 | . . . allow me to track where and how much money is being spent | 4.46 (2.23) | 0.75 |
| ACCOUNT2 | . . . allow me to get reports on my financial transactions with the company | 4.10 (2.22) | 0.81 |
| ACCOUNT3 | . . . allow me to get a detailed history of the goods I ordered from this website | 5.16 (1.96) | 0.72 |
| Evaluate | | | |
| EVALUAT1 | . . . allow me to provide feedback to the company | 5.89 (1.45) | 0.88 |
| EVALUAT2 | . . . allow me to communicate with the company | 5.92 (1.37) | 0.84 |
| EVALUAT3 | . . . allow me to provide my evaluation of the product to the company | 5.34 (1.87) | 0.70 |
| Maintain | | | |
| MAINT1 | . . . provide information that helps me keep the product in good working order | 3.62 (2.01) | 0.77 |
| MAINT2 | . . . help me repair a product | 2.89 (1.82) | 0.92 |
| MAINT3 | . . . help me do maintenance on the product | 2.82 (1.79) | 0.95 |
| Monitor | | | |
| MONIT1 | . . . help me control the use of my product | 3.81 (1.94) | 0.91 |
| MONIT2 | . . . help me monitor how I am using the product | 3.39 (1.89) | 0.88 |
| MONIT3 | . . . help me as a customer track ongoing usage | 3.85 (2.09) | 0.70 |
| Obtain | | | |
| OBTAIN1 | . . . ensure I get the product | 6.10 (1.26) | 0.91 |
| OBTAIN2 | . . . allow me to obtain the product | 6.27 (1.07) | 0.87 |
| OBTAIN3 | . . . ensure satisfactory delivery | 6.11 (1.27) | 0.93 |
| OBTAIN4 | . . . ensure simple delivery | 6.15 (1.21) | 0.91 |
| Order | | | |
| ORDER1 | . . . facilitates the ordering process | 6.11 (1.14) | 0.81 |
| ORDER2 | . . . allow me to effectively conduct a buying transaction online | 6.27 (1.07) | 0.91 |
| ORDER3 | . . . has all of the functions needed to order a product | 6.22 (1.09) | 0.88 |
| Pay | | | |
| PAY1 | . . . provide the necessary functions to make a payment | 6.38 (1.01) | 0.87 |
| PAY2 | . . . provide multiple options of how to pay | 5.96 (1.39) | 0.87 |
| *PAY3** | *. . . allow me to make a payment* | *6.06* (*1.47*) | *0.48* |
| Replace | | | |
| REPLAC1 | . . . help me replace a product | 4.30 (2.05) | 0.90 |
| REPLAC2 | . . . help me replace my product if I need another product | 4.39 (2.03) | 0.92 |
| REPLAC3 | . . . allow me to find where to get a replacement product if mine is not working | 3.96 (2.09) | 0.74 |
| Resell/Return | | | |
| RESELL1 | . . . allow me to return or get rid of a product by using the tools online | 4.92 (1.93) | 0.87 |
| RESELL2 | . . . include features that aid in my return (or disposal) of a purchased product | 4.90 (1.87) | 0.90 |
| *RESELL3** | *. . . allow me to find buyers to sell a product second hand* | *3.51* (*2.45*) | *0.18* |
| Source | | | |
| SOURC1 | . . . help me find an online merchant for the product | 4.60 (2.06) | 0.90 |
| SOURC2 | . . . make it easy for me to find an online store to obtain the product | 4.75 (2.03) | 0.90 |
| SOURC3 | . . . allow me to find out who sells the product. | 4.74 (2.04) | 0.84 |
| Specify and establish requirements | | | |
| SPECER1 | . . . help me to establish my product requirements | 5.66 (1.29) | 0.83 |
| SPECER2 | . . . help me in determining my product needs | 5.46 (1.41) | 0.90 |
| SPECER3 | . . . help me better figure out my product requirements | 5.41 (1.41) | 0.92 |
| SPECER4 | . . . help me determine the attributes of the product I intend to buy | 5.78 (1.24) | 0.77 |
| SPECER5 | . . . aid me in identifying which product attributes best fit my needs | 5.46 (1.42) | 0.84 |
| SPECER6 | . . . let me specify the product features that I want | 5.32 (1.61) | 0.70 |

## Appendix A. (cont'd.)

| Item | | Mean (std. dev.) | Loading |
|---|---|---|---|
| Test and accept | | | |
| TEST1 | ...allow me to verify the acceptability of a product before I use it | 5.11 (1.66) | 0.73 |
| *TEST2** | *...where appropriate, allow me to test or try the product online* | *3.35* (*2.00*) | *0.50* |
| TEST3 | ...provide me with enough information to determine the quality of the product before buying | 5.42 (1.44) | 0.82 |
| Train | | | |
| *TRAIN1** | *...help me learn about the product* | *5.65* (*1.38*) | *0.56* |
| TRAIN2 | ...show me how to use the product | 3.96 (1.94) | 0.87 |
| TRAIN3 | ...help me use a product to its fullest extent | 4.21 (1.93) | 0.92 |
| multicolumn4lUpgrade | | | |
| UPGRAD1 | ...allow me to upgrade a product | 3.32 (1.97) | 0.88 |
| UPGRAD2 | ...let me upgrade the product and know if my requirements change | 3.10 (1.91) | 0.95 |
| UPGRAD3 | ...inform me when improvements to the product are available | 3.23 (2.00) | 0.82 |
| Service quality—(7-point Likert agreement scale) Source: Devaraj et al. (2002), Gefen (2002), Parasuraman et al. (1988) | | | |
| Assurance | | | |
| ASSUR1 | I felt confident about the online purchase decision | 6.40 (0.97) | 0.84 |
| *ASSUR2*** | *I feel safe in my transactions with the online store* | *6.42* (*0.93*) | *0.75* |
| *ASSUR3*** | *The online store had answers to all my questions about the product* | *5.43* (*1.56*) | *0.70* |
| Empathy | | | |
| *EMPATH1** | *The online store remembers/recognizes me as a repeat customer* (*after the first time*) | *5.95* (*1.53*) | *0.64* |
| EMPATH2 | I think that the site can address the special needs of each customer | 5.43 (1.53) | 0.72 |
| *EMPATH3*** | *I was satisfied with the payment options* (*e.g., different credit cards*) *at the store I shopped* | *6.39* (*1.06*) | *0.74* |
| Reliability | | | |
| RELIAB1 | I believe that the online shopping website was reliable | 6.42 (0.95) | 0.87 |
| RELIAB2 | I believe that what I asked for was what I got from the website | 6.42 (1.06) | 0.83 |
| *RELIAB3*** | *I think that the online store I purchased from performs the service right* | *6.29* (*1.10*) | *0.92* |
| *RELIAB4*** | *I trust the online store to deliver the product on time* | *6.26* (*1.18*) | *0.82* |
| Responsiveness | | | |
| RESP1 | I believe the online store was responsive to my needs | 6.15 (1.21) | 0.91 |
| *RESP2*** | *If something were to go wrong, I think the website would give me prompt service* | *5.83* (*1.43*) | *0.85* |
| *RESP3*** | *Customer service at the online store will address any concerns that I have* | *5.73* (*1.48*) | *0.82* |
| Tangibles | | | |
| TANG1 | The company has an up-to-date website | 6.31 (1.04) | 0.81 |
| TANG2 | The website is visually appealing | 6.12 (1.12) | 0.91 |
| TANG3 | The site is neat in appearance | 6.18 (1.08) | 0.91 |
| TANG4 | The appearance of the site is in keeping with the services it provides | 6.24 (1.04) | 0.91 |
| Dependent variables | | | |
| Satisfaction—Source: Bhattacherjee (2001b) | | | |
| "Overall, how do you feel about the website that you identified?" (7-point semantic differential scale with the following anchors) | | | |
| SATIS1 | Dissatisfied/Satisfied | 6.12 (1.09) | 0.87 |
| SATIS2 | Terrible/Delighted | 5.74 (1.10) | 0.87 |
| SATIS3 | Frustrated/Contented | 5.83 (1.31) | 0.90 |
| SATIS4 | Displeased/Pleased | 5.99 (1.17) | 0.91 |
| Continued Website Usage Intention—(7-point Likert agreement scale) Source: Bhattacherjee (2001b), Gefen et al. (2003) | | | |
| CUI1 | I would consider using the site for future purchases | 6.58 (0.98) | 0.94 |
| CUI2 | I have no desire to buy from the website [R] | 6.70 (0.88) | 0.79 |
| CUI3 | How likely is it that you will visit the website again in the future? | 6.65 (0.88) | 0.87 |
| Perceived Usefulness—(7-point Likert scale) Source: Davis (1989), Devaraj et al. (2002), Gefen et al. (2003), Venkatesh et al. (2003) | | | |
| USE1 | Using the site enabled me to shop more quickly | 6.04 (1.20) | 0.82 |
| USE2 | In my opinion, using the site increased my shopping effectiveness | 5.94 (1.27) | 0.86 |
| USE3 | Overall, the site was useful for shopping | 6.26 (1.05) | 0.92 |

*Item dropped from final analysis.

**Item dropped because of potential to tap either *satisfaction* or a dimension of *service functionality*.

[R]—Reverse coded item. Statistics are based on the transpose of the original scale.

## Appendix B. Correlations of Latent Variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Account | **0.76** | | | | | | | | | | | | | | | | | |
| 2 Evaluate | 0.51 | **0.81** | | | | | | | | | | | | | | | | |
| 3 Maintenance | 0.36 | 0.28 | **0.88** | | | | | | | | | | | | | | | |
| 4 Monitor | 0.36 | 0.34 | 0.80 | **0.84** | | | | | | | | | | | | | | |
| 5 Obtain | 0.31 | 0.49 | 0.23 | 0.27 | **0.91** | | | | | | | | | | | | | |
| 6 Order | 0.34 | 0.50 | 0.15 | 0.18 | 0.75 | **0.84** | | | | | | | | | | | | |
| 7 Pay | 0.31 | 0.36 | 0.13 | 0.12 | 0.64 | 0.83 | **0.87** | | | | | | | | | | | |
| 8 Replace | 0.29 | 0.39 | 0.70 | 0.54 | 0.38 | 0.29 | 0.24 | **0.85** | | | | | | | | | | |
| 9 Resell | 0.41 | 0.64 | 0.41 | 0.42 | 0.50 | 0.43 | 0.34 | 0.49 | **0.88** | | | | | | | | | |
| 10 Sourcing | 0.34 | 0.38 | 0.39 | 0.40 | 0.30 | 0.36 | 0.30 | 0.37 | 0.25 | **0.88** | | | | | | | | |
| 11 Specify and establish requirements | 0.30 | 0.44 | 0.36 | 0.42 | 0.56 | 0.60 | 0.47 | 0.35 | 0.43 | 0.46 | **0.82** | | | | | | | |
| 12 Test and accept | 0.38 | 0.56 | 0.48 | 0.53 | 0.58 | 0.56 | 0.44 | 0.55 | 0.61 | 0.46 | 0.68 | **0.78** | | | | | | |
| 13 Train | 0.33 | 0.39 | 0.74 | 0.85 | 0.32 | 0.26 | 0.18 | 0.54 | 0.45 | 0.38 | 0.45 | 0.62 | **0.89** | | | | | |
| 14 Upgrade | 0.38 | 0.31 | 0.82 | 0.75 | 0.24 | 0.13 | 0.11 | 0.71 | 0.38 | 0.37 | 0.34 | 0.44 | 0.64 | **0.88** | | | | |
| 15 Service quality | 0.38 | 0.63 | 0.24 | 0.28 | 0.82 | 0.79 | 0.66 | 0.38 | 0.55 | 0.33 | 0.59 | 0.66 | 0.34 | 0.23 | **0.78** | | | |
| 16 Satisfaction | 0.34 | 0.52 | 0.23 | 0.27 | 0.67 | 0.71 | 0.55 | 0.29 | 0.42 | 0.34 | 0.58 | 0.60 | 0.33 | 0.20 | 0.77 | **0.89** | | |
| 17 Usefulness | 0.34 | 0.50 | 0.21 | 0.22 | 0.66 | 0.74 | 0.60 | 0.31 | 0.38 | 0.37 | 0.64 | 0.58 | 0.29 | 0.21 | 0.74 | 0.79 | **0.87** | |
| 18 Continued website usage | 0.29 | 0.46 | 0.17 | 0.18 | 0.63 | 0.64 | 0.50 | 0.26 | 0.34 | 0.26 | 0.43 | 0.47 | 0.21 | 0.15 | 0.76 | 0.77 | 0.74 | **0.87** |

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