

# Choosing Among Alternative Service Delivery Modes: An Investigation of Customer Trial of Self-Service Technologies

Electronic commerce is an increasingly popular business model with a wide range of tools available to firms. An application that is becoming more common is the use of self-service technologies (SSTs), such as telephone banking, automated hotel checkout, and online investment trading, whereby customers produce services for themselves without assistance from firm employees. Widespread introduction of SSTs is apparent across industries, yet relatively little is known about why customers decide to try SSTs and why some SSTs are more widely accepted than others. In this research, the authors explore key factors that influence the initial SST trial decision, specifically focusing on actual behavior in situations in which the consumer has a choice among delivery modes. The authors show that the consumer readiness variables of role clarity, motivation, and ability are key mediators between established adoption constructs (innovation characteristics and individual differences) and the likelihood of trial.

It is widely recognized that the use of information technology has transformed business processes over the past ten years. With the explosion of the Internet and other tools, many firms are incorporating technology into their marketing and operations. The impact has been especially profound in the services arena, which has traditionally relied on close, personal contact between customers and employees. Technology is dramatically changing how services are conceived, developed, and delivered. Indeed, not only has technology infiltrated back-office processes, but it has also been established prominently within the firm–customer interface through self-service technologies (SSTs), such as automated teller machines, pay-at-the-pump, automated hotel checkout, telephone banking, and Internet transactions (Meuter et al. 2000).

The lure of incorporating technology into the service interaction can be tremendous. For example, IBM shifted 99 million service telephone calls to an online service provision, which resulted in cost savings of \$2 billion (Burrrows 2001). Although the potential financial benefits of successful technology incorporation are enticing, the savings cannot be realized unless customers embrace and use the

new technologies. For example, McKinsey & Company reports that one firm projected a \$40 million savings from moving its billing and service calls to the Web. However, it suffered a \$16 million loss, partially as a result of lower customer use than was projected. Thus, despite the proliferation of SSTs, firms are increasingly aware that there are barriers to customer adoption and substantial implementation obstacles to be overcome.

The most prominent obstacle is getting customers to try new SSTs for the first time, which often involves a significant behavior change in which patterns that are ingrained must be altered. Not only must customers change their behaviors, but in a self-service situation, they must also become coproducers of the service, with responsibility for delivery of the service and for their own satisfaction (Bendapudi and Leone 2003; Meuter and Bitner 1997). Across industries, firms are trying to develop stronger partnerships with their customers and to help them be better coproducers (Vargo and Lusch 2004).

This article explores the underlying factors that influence customer trial of new SST options and, by extension, trial of innovations that require significant behavior change or coproduction activity. We begin by examining the literature on innovation adoption for clues to the causes of customer adoption behavior. The traditional view of innovation adoption focuses on demographic characteristics and characteristics of the innovation itself as the primary predictors of adoption (Rogers 1995). A review of the research on consumer use of SSTs reveals a primary focus on individual differences (e.g., Parasuraman and Colby 2001) and on attitude models to predict intended behaviors (e.g., Curran, Meuter, and Surprenant 2003; Dabholkar and Bagozzi 2002).

We build on this literature by exploring a set of variables labeled “consumer readiness,” which are positioned as

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Matthew L. Meuter is Professor of Marketing, Department of Finance and Marketing, California State University, Chico (e-mail: mmeuter@csuchico.edu). Mary Jo Bitner is PETsMART Chair in Services Leadership and Professor of Marketing (e-mail: maryjo.bitner@asu.edu), Amy L. Ostrom is Associate Professor of Marketing (e-mail: amy.ostrom@asu.edu), and Stephen W. Brown is Edward M. Carson Chair of Services Marketing and Professor of Marketing (e-mail: stephen.brown@asu.edu), Department of Marketing, Arizona State University. The authors thank the Center for Services Leadership at Arizona State University for its support in securing a research partner for the study. The authors extend their gratitude to the sponsoring firm for its involvement in the project and to the three anonymous *JM* reviewers for their insights throughout the review process.

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mediators between established adoption variables and trial. Consumer readiness encompasses role clarity, motivation (intrinsic and extrinsic), and ability. We expect that exploring consumer readiness and its underlying constructs will broaden our understanding of the antecedents of SST trial and provide greater depth of knowledge with respect to why consumers try innovative services. Another contribution of this study is to provide marketing managers with a concise and actionable set of factors for directly influencing SST trial behavior. The consumer readiness constructs can be actively managed before an SST is introduced as well as after it is fully operational. This is important because the innovation characteristics and demographic factors that have been previously shown to influence trial either are not readily manipulated (e.g., age, sex) or are easily managed only before the SST is introduced (e.g., complexity, trialability).

Next, we develop a conceptual model and hypotheses to predict SST trial behavior. Then, we test our hypotheses across two different technologies with actual trial behavior as the dependent variable. We include both users and nonusers of the services in the study. The underlying theory as well as the practical lessons learned can be extended to other coproduction situations in which consumer readiness for a significant behavior change may be equally important.

## Conceptual Foundations

### *Adoption of Innovations*

Diffusion and adoption research has a rich history and has been studied in a wide range of fields (for a comprehensive review, see Rogers 1995). Within the adoption literature, several constructs have received widespread attention. Perceptions of innovation characteristics (Eastlick 1996; Labay and Kinnear 1981; Rogers 1995; Venkatraman 1991) and individual differences (Dickerson and Gentry 1983; Eastlick 1996; Greco and Fields 1991) have been shown to predict adoption behaviors, such as trial or commitment.

Although there is support in the literature for such factors influencing adoption behavior, the results have often been inconclusive or contradictory. For example, a study found significant relationships between adoption and the perceived relative advantage, complexity, and compatibility of the innovation (Labay and Kinnear 1981), whereas another study found only relative advantage to be significantly linked to adoption behavior (Venkatraman 1991). However, the contradictory findings within studies are even more troubling. In one study, a significant link was found between adoption behavior and relative advantage in two different contexts; however, the relationship was positive in one context and negative in the other (Venkatraman 1991). A meta-analysis exploring the directionality of links between adoption behavior and perceptions of innovation characteristics (with no regard to the magnitude or statistical significance of the findings) found that only three of ten characteristics consistently related to adoption in the same direction (Tornatzky and Klein 1982, p. 41): "If it could be demonstrated that a finite number of perceived characteristics seem to be consistently related to innovation adoption across settings and technologies this would serve to focus

both policy and research." We begin to address this concern with our mediating variables.

In addition, individual differences, such as demographics, have generated largely inconsistent findings. For example, although adopters are usually predicted to be younger (Eastlick 1996; Venkatraman 1991), a comprehensive review of the relationship between age and innovation adoption concludes that only half of the 228 studies reviewed showed a significant relationship between age and adoption behavior (Rogers 1995). It is also problematic that of the studies with significant links between age and adoption behavior, some conclude that adopters are younger, and others conclude that adopters are older (Rogers 1995).

It is important to understand why certain innovation characteristics or individual differences vary in direction and significance across different contexts. A way to clarify the inconsistencies is through the use of mediating variables that are included specifically to explain relationships between variables. To date, the question of why individual differences or innovation characteristics influence adoption behavior has been left largely unexplored. The model we develop herein includes key mediators and is designed to explore why the relationships exist.

### *Services and Technology*

In response to the increasing role of technology in services, researchers have begun to explore customer perceptions and usage of service delivery technologies. For example, a critical incident study describes the key factors that lead to (dis)satisfaction related to customer use of SSTs (Meuter et al. 2000). In addition, Parasuraman (2000, p. 308) proposes a "technology readiness" construct, which refers to the "propensity to embrace and use new technologies for accomplishing goals in home life and at work." Technology readiness is a generalized individual difference concept that balances contributors (optimism and innovativeness) and inhibitors (discomfort and insecurity). Similarly, some researchers have explored the capacity and willingness of customers as predictors of adoption (Walker et al. 2002), and others have investigated customers' attitudes toward the technology as a means to predict behavioral intentions (Curran, Meuter, and Surprenant 2003; Dabholkar and Bagozzi 2002; Plouffe, Vandenbosch, and Hulland 2001). The technology acceptance model posits that ease of use and the perceived usefulness of a new technology influence customers' attitude toward using the technology, which in turn directly influences intentions to use the technology (Adams, Nelson, and Todd 1992; Davis 1989). Furthermore, Taylor and Todd (1995) compare the effectiveness of the technology acceptance model and the theory of planned behavior, both of which focus on behavioral intentions of the user. Dabholkar (1994) explores competing models to understand the attitudinal forces that influence the choice between interpersonal and technology-based service experiences.

Going beyond the emphasis on attitudes and behavioral intentions in the services technology literature, our study is designed to extend the literature by focusing on actual trial behavior. We designed this study to introduce new factors for the prediction of trial of technology and to embed the

new factors within well-established innovation and adoption models.

### Consumer Coproduction

Customer use of a new SST implies coproduction of the service, which frequently requires customers to engage in new behaviors. For example, in the grocery industry, customers are increasingly given the option of scanning their own grocery items and paying for and bagging their food without assistance from a sales clerk. This option has revolutionized the typical interface between the customer and the service provider as well as the behaviors required of customers in the grocery industry. Lovelock and Young (1979) were among the first to discuss customer coproduction and to indicate that customers are important contributors to a firm's productivity (e.g., by using automated teller machines or by pumping their own gas). Other researchers describe a shift in which both practitioners and academics recognize that a "separation of production and consumption is not a normative goal, and toward a recognition of the advantages, if not the necessity, of viewing the consumer as a coproducer" (Vargo and Lusch 2004, p. 11). Defining the nature of the customer's role requires conducting a "job analysis" of the customer's responsibilities as is traditionally done for a firm's employees (Schneider and Bowen 1995). Therefore, we propose that successful SST coproduction relies on customers knowing what is expected of them (role clarity), being motivated to engage in desired behaviors (motivation), and having the necessary knowledge and skills (ability) to fulfill their responsibilities (Del-

lande, Gilly, and Graham 2004; Schneider and Bowen 1995).

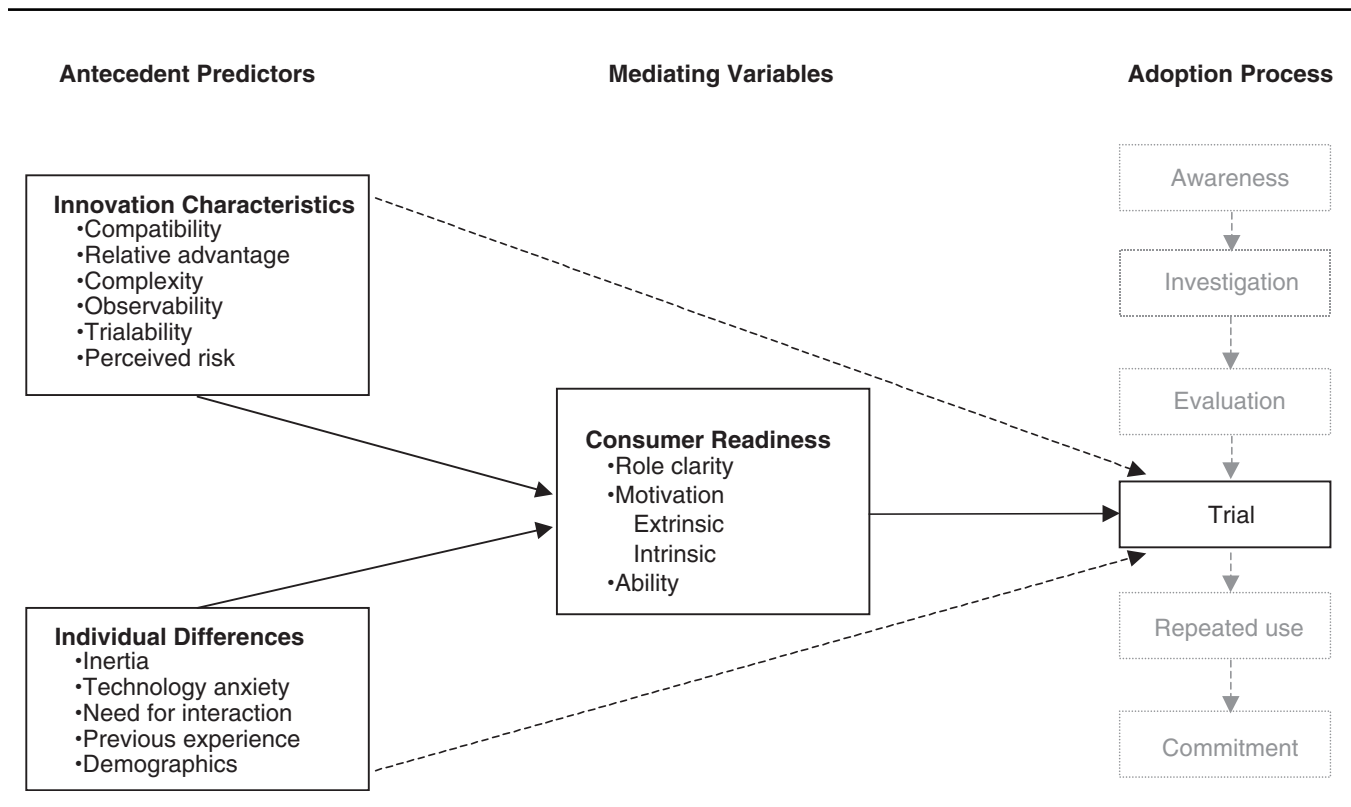
However, a paucity of empirical research exists on customer coproduction (for a recent exception, see Dellande, Gilly, and Graham 2004). A review of the customer-coproduction literature from 1979 to 2000 finds that of the 23 studies, only 3 are empirical (Bendapudi and Leone 2003). Furthermore, no research has examined SST coproduction. Our study is designed to build on and extend the three streams of research that we previously reviewed.

### Conceptual Model and Hypotheses

A wide range of SST options is available, yet most consumers use only a few of them (Barczak, Ellen, and Pilling 1997, p. 131). This study investigates the critical factors that influence trial of SSTs in situations in which consumers have a choice among service delivery alternatives. We developed the conceptual model (see Figure 1) using both qualitative depth interviews of consumers and insights from related research streams. We used the qualitative interviews (n = 22) to focus on variables that are relevant and important to consumers and to ensure that key variables were not overlooked.

On the far right-hand side of the conceptual model, we show a traditional six-step adoption process that begins with awareness and leads to commitment to illustrate how our research relates to the process of innovation adoption and commitment (Rogers 1995). However, we focus our empirical research specifically on actual trial behavior as

**FIGURE 1**  
**Key Predictors of Consumer Trial of Self-Service Technologies**



the focal dependent variable. The focus on trial is motivated by companies' experiences, indicating that a key barrier in consumer adoption of new technologies is getting customers to actually try the SST for the first time. Consider the airline self-check-in SST as an illustration. Such SSTs provide significant time savings for customers, yet many travelers who are unsure of the system or its potential benefits often do not use them. Similar outcomes have been observed across industries.

In the model, we divide predictors of trial into mediating variables (consumer readiness) and antecedent predictors (innovation characteristics and individual differences). A contribution of the model is the establishment of the set of consumer readiness variables as mediators between the antecedent variables and trial. To conclude mediation, several sets of relationships must be present (Baron and Kenny 1986). First, there must be a direct effect of the consumer readiness variables on trial. Second, there must be a direct effect of the antecedent predictors on consumer readiness. Third, there must be a direct effect of the antecedent predictors on trial that is lessened by inclusion of the consumer readiness variables. We discuss the literature and theory that supports each of the requisite sets in the following section.

### ***Consumer Readiness Variables as Predictors of Trial***

Consumer readiness is a condition or state in which a consumer is prepared and likely to use an innovation for the first time. We conceptualize consumer readiness as role clarity, motivation, and ability. Role clarity reflects the consumer's knowledge and understanding of what to do, motivation refers to a desire to receive the rewards associated with using the SST, and ability relates to possessing the required skills and confidence to complete the task. We adapted the constructs from a framework to improve employees' performance from the human resource and industrial psychology literature streams (Bowen 1986; Schneider and Bowen 1995; Vroom 1964).

*Role clarity.* Because services are traditionally provided by an employee, using an SST requires a set of new coproduction behaviors for the consumer. A study found that 89% of firms reported problems of either staff or customer confusion (reduced role clarity) in relation to new services or products (Easingwood 1986). Participation can be constrained by insufficient clarity in terms of a consumer's understanding of his or her role in the service process (Larsson and Bowen 1989). Potential users of an SST who do not understand what to do are unlikely to try the SST. Thus, we expect to find a significant, direct relationship between role clarity and trial.

*Motivation.* Because consumers may have a choice between interpersonal and SST delivery options, they must be sufficiently motivated to produce a service independently. Motivation as a key predictor of usage of technology-based products and services is theoretically well supported in the literature (Barczak, Ellen, and Pilling 1997). The willingness to perform has been shown to be dependent on motivational levels for both employees and

customers in the production of services (Larsson and Bowen 1989; Vroom 1964).

We expect both intrinsic and extrinsic rewards to be important in influencing the likelihood of SST trial. Some consumers may prefer an active role in the production of a service because they find participation to be intrinsically attractive (Bateson 1985; Dabholkar 1996; Schneider and Bowen 1995). Feelings of accomplishment, prestige, personal growth, or mere pleasure from engaging in the activity are intrinsic motivational factors that are related to the use of SSTs (Becker 1970; Rogers 1995). Consumers are also motivated by their own self-interests, emphasizing the role of extrinsic motivation (Schneider and Bowen 1995). Users have been found to be motivated by a price discount, time savings, or other extrinsic advantages (Dabholkar 1996). Without motivation to perform, it is unlikely that a customer will use an SST. Thus, we expect that both intrinsic and extrinsic motivation have a significant, direct effect on trial.

*Ability.* Ability relates to having the necessary skills and confidence required to perform a task (Ellen, Bearden, and Sharma 1991; Jayanti and Burns 1998; Jones 1986). Ability refers to what a person "can do" rather than what he or she "wants to do" or "knows how to do." Self-efficacy research has shown that competent behavior in a situation requires both specific skills and beliefs of self-efficacy. Low self-efficacy is more likely with complex tasks, but even relatively simple tasks have been shown to create feelings of inability (Ellen, Bearden, and Sharma 1991). It has also been proposed that perceived confidence in the ability to engage in a task influences behavior within computer-mediated environments (Hoffman and Novak 1996). In general, self-efficacy has been shown to be a strong predictor of behavior (Maddux, Norton, and Stoltenbert 1986). When people believe that they are incapable of performing a task, they will not engage in the behavior, even if they acknowledge that it is a better alternative (Seltzer 1983). Thus, we anticipate that there is a significant, positive relationship between ability and trial.

### ***Antecedent Variables as Predictors of Consumer Readiness***

Another important set of relationships illustrated in the conceptual model is the influence of the antecedent predictors on consumer readiness. We explore two sets of antecedent variables: innovation characteristics and individual differences. To conclude that consumer readiness mediates their effect on trial, there must be a direct relationship between the antecedent predictors and the consumer readiness variables.

*Innovation characteristics.* The innovation characteristics that we explore are compatibility, relative advantage, complexity, observability, trialability, and perceived risk. They are commonly tested in the adoption literature (Rogers 1995) and thus have well-developed measures from which to draw (Moore and Benbasat 1991). Theoretical and empirical justification for the direct influence of each of the antecedent variables on consumer readiness appears in Table 1. Overall, we expect that relative advantage, observ-

**TABLE 1**  
**Previous Research Results Supporting the Effects of Antecedent Predictors on Consumer Readiness and Trial**

Antecedent Predictors	Dependent Variable: Consumer Readiness Variables		Dependent Variable: Trial	
	Justification	Supporting Literature	Justification	Supporting Literature
Compatibility	Compatibility will increase motivation because the SST will be consistent with values and lifestyle. This may also influence the willingness to learn about the SST, thus increasing role clarity.	Eastlick (1996), Gatignon and Robertson (1991)	Increased compatibility with personal values and lifestyle increases the odds of a customer trying the SST.	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Relative advantage	Relative advantage will encourage customers to learn about the SST, positively influencing both role clarity and ability. The advantages also provide a motivational force by providing incentives or perceived rewards.	Eastlick (1996), Gatignon and Robertson (1991)	Because the SST is perceived as better than an alternative, it is more likely to be tried.	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Complexity	A complicated, confusing SST will hinder role clarity and ability because it will be more difficult to operate and understand and may also make the benefits (motivation) less apparent to the user.	Eastlick (1996), Gatignon and Robertson (1991)	If an SST is perceived as more complicated or confusing, a customer will be less likely to try the SST.	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Observability	Observability helps clarify the role of the consumer, increase feelings of confidence, and show positive outputs to increase motivation.	Eastlick (1996), Gatignon and Robertson (1991)	The ability to observe and communicate with others about the SST increases the chances that it will be tried.	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Trialability	Trialability enables users to observe how the SST works, allowing them to recognize the benefits, understand their role, and have confidence in their abilities.	Eastlick (1996), Gatignon and Robertson (1991)	The ability to test the SST increases chances that it will be tried.	Eastlick (1996), Gatignon and Robertson (1991), Labay and Kinnear (1981), Moore and Benbasat (1991), Rogers (1995)
Perceived risk	As perceived risk increases, the likelihood of rewards decreases, reducing motivation to use an SST and hindering feelings of ability and desire to learn about the SST.	Ellen, Bearden, and Sharma (1991)	As perceived risk increases, the likelihood of trial decreases.	Aaker (1991), Gwinner, Gremler, and Bitner (1998), Ostlund (1974), Venkatraman (1991)
Inertia	Inertia may limit efforts to learn about SSTs (role clarity and ability). Using a new SST also requires an investment in time and energy, thus reducing motivation.	Gremler (1995), Olshavsky and Spreng (1996)	Inertia inhibits changes in behavior and thus results in hesitancy to try new service delivery options.	Aaker (1991), Gremler (1995), Heskett, Sasser, and Hart (1990)
Technology anxiety	Technology anxiety may lead to confusion regarding the task to be performed (role clarity), decreased motivation levels, and a reduced perception of ability.	Meuter and Bitner (1997), Parasuraman (2000), Raub (1981), Ray and Minch (1990)	High levels of technology anxiety may lead to the avoidance of technological tools, in this case SSTs.	Igbaria and Parasuraman (1989), Meuter and Bitner (1997), Parasuraman (2000), Parasuraman and Colby (2001), Raub (1981), Ray and Minch (1990)

**TABLE 1**  
Continued

Antecedent Predictors	Dependent Variable: Consumer Readiness Variables		Dependent Variable: Trial	
	Justification	Supporting Literature	Justification	Supporting Literature
Need for interaction	A high need for personal interaction may lead to decreased interest in learning how SSTs work (role clarity and ability) and reduced motivation to try it.	Dabholkar (1996), Langeard et al. (1981)	A high level of need for personal interaction decreases the desire to try an SST.	Bateson (1985), Dabholkar (2000), Langeard et al. (1981), Meuter et al. (2000)
Previous experience	The previous use of related technology will increase perceptions of self-confidence and ability and may also allow for the recognition of rewards (motivation) and guide behavior (role clarity).	Bowen (1986), Gardner, Dukes, and Discenza (1993), Mahajan, Muller, and Bass (1990), Mohr and Bitner (1991)	Heavy users of related technologies are more likely to try SSTs.	Danko and MacLachlan (1983), Dickerson and Gentry (1983), Eastlick (1996), Gatignon and Robertson (1991), Rogers (1995)
Demographics (age, sex, education, and income)	Higher education may lead to confidence (ability) and the perception of the SST as more understandable (role clarity) and rewarding (motivation). Higher income may increase the chances of access to the required tools (ability) and the motivation (time savings, or other) to use SSTs. Age and sex may also have similar effects.	Breakwell et al. (1986), Gist (1987), Igbaria and Parasuraman (1989)	People who adopt new technologies tend to be younger, male, and more educated and have a greater income than those who do not adopt it.	Danko and MacLachlan (1983), Darian (1987), Dickerson and Gentry (1983), Gatignon and Robertson (1991), Greco and Fields (1991), Labay and Kinneer (1981), Rogers (1995), Sim and Koi (2002), Venkatraman (1991), Zeithaml and Gilly (1987)

ability, trialability, and compatibility have a positive effect on the consumer readiness variables. We expect that complexity and perceived risk have a negative effect on consumer readiness variables.

*Individual differences.* The individual differences that we include are inertia, technology anxiety, need for interaction, previous experience with related SSTs, and demographic characteristics. We include demographic characteristics and previous experience because of their pervasive nature in previous adoption studies (Rogers 1995). We include need for interaction, inertia, and technology anxiety because of their presence in recent services technology research (Dabholkar 1996, 2000; Parasuraman 2000) and their relevance to the technology-based service delivery context. Theoretical and empirical justification relating each of the individual differences to the consumer readiness variables appears in Table 1. Overall, we expect a positive relationship between previous experience and the consumer readiness variables. However, we expect that need for interaction, inertia, and technology anxiety have negative effects on consumer readiness. We consider demographic variables such as age, income, education level, and sex. We expect that higher-income, highly educated consumers have greater consumer readiness. The effects of age and sex are less clear, though there is a belief that younger people and males are more likely to have higher levels of role clarity, motiva-

tion, and ability with respect to technology innovations than are older people and females.

#### ***Antecedent Variables as Predictors of Trial***

Without a direct effect of an antecedent predictor on trial, mediation by the consumer readiness variables is not possible. Justification for the direct influence of each of the antecedent variables on trial appears in Table 1. Because the variables have been tested in prior studies (albeit with mixed results), we do not discuss the relationships at length here. We expect that relative advantage, observability, trialability, and compatibility are positively related to trial, whereas complexity and perceived risk have a negative effect on trial. Consistent with previous research, we expect that inertia, technology anxiety, and need for interaction have a negative effect on trial, whereas previous experience with related technologies has a positive effect on trial. We also expect that consumers who are more educated, have a higher income, are younger, and are male are more likely to try the SST.

#### ***Overall Mediation Hypotheses***

As we conceptualize in Figure 1 and have developed in the previous discussion of important relationships, the model indicates that consumer readiness variables mediate the relationships among the innovation characteristics, individ-

ual differences, and the likelihood of trial. That is, we believe that the consumer readiness variables provide a concise set of variables that can explain why the direct effects of the antecedent predictors occur and why we may observe inconsistent directionality and magnitude of effects for the antecedent predictor variables. On the basis of the conceptualization of the model, the literature we reviewed, and the previous discussion, we propose the following mediating hypothesis:

H<sub>1</sub>: Role clarity, extrinsic motivation, intrinsic motivation, and ability mediate the relationship (a) between the individual difference variables and the likelihood of trial and (b) between the innovation characteristic variables and the likelihood of trial.

### ***Explanatory Power of Consumer Readiness Versus Antecedent Predictors***

In addition to the mediating effects of the consumer readiness variables, it is important to explore the relative strength of the various sets of predictors of trial. Although we propose the consumer readiness variables as mediators, it is also important to know whether the variables are more effective than traditional antecedents in the direct prediction of trial. We expect that the small set of consumer readiness variables may be more stable across contexts, because previous research shows that these factors consistently drive human behavior (Bowen 1986; Schneider and Bowen 1995; Vroom 1964). A key value of the constructs is to provide managers with a consistent and concise set of actionable variables that influence trial. It is our belief that, overall, the consumer readiness variables are more robust predictors. Thus, we provide the following hypothesis:

H<sub>2</sub>: The consumer readiness variables are better predictors of trial than are the innovation characteristic or individual difference variables.

## **Methodology, Procedure, and Analysis**

To test the conceptual model empirically, we conducted two studies, each of which focused on a new SST. The replication across two SSTs provides a strong test of the model and hypotheses.

### ***Context***

We selected a context with three traits. First, it was important to allow consumers to have a choice between the SST and non-technology-based delivery options. Second, it was necessary to identify a group of consumers that had used the SST and a group that had never tried it. Third, it was important for the SST to be a newly implemented delivery option to maintain recency in the consumer decision of whether to try the SST. A national company that satisfies the three criteria was selected as a partner. The context is consumers' prescription refill ordering through a mail-order pharmacy. Customers typically order a three-month supply of their prescription medication (insurance industry restrictions allow orders only every 90 days). All respondents are customers who have ordered a prescription refill through

the mail-order pharmacy and who were confronted with the choice of using an SST or other ordering options.

Most customers use the mail-order pharmacy to order prescription refills for illnesses that require continual medication (e.g., diabetes). Therefore, customers are regularly (every 90 days) faced with the decision of ordering through the SST or not. Prescription refill requests can be filled through non-SST alternatives (speaking with a live customer service representative or mailing a refill request) or one of the SST alternatives (an interactive voice response [IVR] telephone system or an Internet-based system). Study 1 explores the IVR telephone system, which is fully automated so that the customer does not talk to a company representative. Study 2 explores the Internet-based SST, which is also fully automated through the company's Web site and has no live support from employees. There is no financial cost difference for customers between the ordering options, and they can select either option. Company representatives estimated that at the times of data collection, a majority of the firm's customers had not yet tried the SST. At the time of the IVR study, the Internet ordering option was not yet available.

### ***Survey Development***

We developed a self-administered cross-sectional survey to explore the variables in the conceptual model. We used a multistep process to develop the survey instrument. We used existing scales for all measures except previous experience and perceived risk. The survey was reviewed by 14 employees of the sponsoring firm, and after necessary changes were made, we pretested the survey instrument with a convenience sample of 21 participants to assess its clarity. The instrument was then administered to a small group of mail-order pharmacy customers for further insight. During this process, wording was adapted as needed, and ambiguous questions were clarified or deleted. Final items included in the survey and their sources appear in the Appendix.

### ***Measure Purification***

We assessed all multiple-item measures on seven-point Likert scales with the endpoints "strongly disagree" and "strongly agree." Trial, the key dependent variable, was assessed with a single-item question that indicated whether the customer had used the SST before. To verify the validity of the measures, we created a measurement model and tested it with the CALIS procedure in SAS using data from Study 1. We tested all four consumer readiness variables, six innovation characteristic variables, and four individual difference variables. As a result of this process, we dropped one item from the original measure for ability, observability, trialability, perceived risk, and need for interaction. The measurement model fit was acceptable: chi-square = 2286, degrees of freedom = 690 (chi-square/degrees of freedom = 3.3); comparative fit index = .9452; nonnormed fit index = .9349; and root mean square error of approximation = .0555 (Hair et al. 1998).

We also conducted tests to assess the reliability and validity of the factors and their indicators. The alpha values for the latent constructs were sufficiently high (see the

Appendix), and most of the variance extracted values are greater than .70 (Hair et al. 1998). We established convergent validity by examining the t-tests for factor loadings, and all are significant ( $p < .0001$ ). We established discriminant validity using the confidence interval test and the variance extracted test (Hatcher 1994). In addition, a correlation matrix with means, standard deviations, reliabilities, and correlations among variables appears in Table 2. On the basis of the overall pattern of positive results, we are confident in the revised measurement model and the measures. To maintain consistency in Study 2, we used purified measures from Study 1.<sup>1</sup>

### **Analysis Approach**

To assess the hypotheses empirically, we analyzed a series of multiple regression and logistic regression models. We did not use simultaneous path analysis, because the key dependent variable, trial, is a discrete variable with no continuous latent variable underlying the construct. Path analysis assumes multivariate normality in the dependent variable, which is not the case here. In addition, the large number of constructs that we explore exceeds the recommended ratio of number of indicators to sample size for path analysis (Hair et al. 1998; Hatcher 1994). Therefore, a series of regressions and logistic regression models provide a more effective analysis approach to test the hypotheses.

To test for mediation, we used a four-step process (Baron and Kenny 1986). The first step is to ensure that the selected mediator has a significant influence on trial. The second step is to assess the impact of the antecedent predictors on trial. The third step is to regress the antecedent predictors on the selected mediator variable. The fourth step is to assess the influence of the selected mediator with the antecedent predictors on trial. In the fourth step, the influence of the antecedent predictors (established in Step 2) must be lessened when they are modeled with the selected mediator variable (in Step 4). We used logistic regression for Steps 1, 2, and 4 in which trial is the dependent variable, and we used multiple regression for Step 3.

Complete mediation is rarely observed with behavioral data; therefore, partial mediation is a more realistic expectation. Complete mediation occurs when the inclusion of the selected mediator variable (in Step 4) eliminates any significant influence of the antecedent predictor on trial. Partial mediation occurs when the inclusion of a mediator variable (in Step 4) reduces the significance of the influence of the antecedent predictors from Step 2 (Baron and Kenny 1986). To determine a reduction of the influence of the antecedent predictors between Steps 2 and 4, we examined changes in the beta coefficients and  $p$ -values. An implication of this data analysis approach is that comparisons across the steps in the process require the testing of individual mediators (Baron and Kenny 1986; Ocker and Morand 2002). Thus, we conducted this four-step process eight separate times to test for all possible mediating effects in Study 1. We tested each of the consumer readiness variables individually as a mediator between the individual differences variables and

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<sup>1</sup>Full details on the measurement model are available in a technical appendix, which can be acquired from the lead author.

trial, followed by an assessment of each readiness variable as a mediator between the innovation characteristics and trial.

## **Study 1 Results**

### **Sample**

Study 1 explores customer trial of the IVR telephone-based SST. At the time of data collection, the Internet-based SST was not available, and the IVR system had been in place for less than one year. More than 60,000 customers who had recently placed orders using the IVR system were identified, and 800 were randomly selected for the study. At the same time, more than 60,000 customers who had recently placed orders but did not use the IVR system were identified, and 1200 were randomly selected for the study.<sup>2</sup> A total of 2000 surveys were mailed, and 406 users and 499 nonusers returned the survey. Of these, 77 surveys were unusable, resulting in a total of 828 usable responses, for an overall response rate of 41% (828/2000). More women (57%) responded to the survey than men (43%), and ages ranged from 21 to 94 years, with an average age of 56 years. Approximately 75% of the respondents were between 40 and 69 years of age. The most common educational category was "some college education" (28%); however, a significant percentage (20%) had graduate degrees. Income was distributed normally, except for a large group (25%) that had an income of more than \$90,000 per year.

### **Tests of Model and Hypotheses**

The first step in the test for mediation determines whether the proposed mediator (role clarity, motivation, or ability) has a significant, direct effect on trial. We tested each of the mediating variables individually using logistic regression, and all had a significant, positive influence on trial. All were significant ( $p < .0001$ ), with strong classification-accuracy statistics. The classification accuracy for the role clarity mediator is 86%, indicating that 86% of the sample was correctly classified into the trial (or no-trial) group on the basis of the role clarity score. Classification-accuracy measures for extrinsic and intrinsic motivation and ability were 73%, 67%, and 78%, respectively.

We also analyzed results using an independent-samples t-test to determine whether the means for each of the consumer readiness variables are significantly different between the trial and no-trial groups. The mean scores for role clarity were 6.4 and 3.6 for triers and nontriers, respectively ( $t$ -value = 25.8,  $p < .0001$ ). Mean scores for ability were 6.7 and 4.8 for triers and nontriers, respectively ( $t$ -

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<sup>2</sup>We selected more IVR nonusers to compensate for the possibility that some participants who identified with the nonuser group had actually used the IVR SST between the time they identified as a nonuser and the completion of the survey. We did this in an attempt to generate roughly equal sample sizes for the SST user and nonuser groups.



**TABLE 2**  
Means, Standard Deviations, Reliabilities, and Correlations Among Variables

Variable	Mean	Standard Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Role clarity	5.22	1.99	.96													
2. Ability	5.99	1.56	.69**	.94												
3. Intrinsic motivation	1.81	1.61	.28**	.30**	N/A											
4. Extrinsic motivation	2.72	1.22	.41**	.53**	.63**	N/A										
5. Inertia	4.18	1.90	-.05	-.07	-.09*	-.03	.90									
6. Technology anxiety	2.32	1.55	-.29**	-.33**	-.10**	-.29**	.18**	.93								
7. Need for interaction	3.90	1.99	-.26**	-.28**	-.15**	-.40**	.09**	.33**	.88							
8. Previous experience	5.18	1.53	.32**	.35**	.09*	.29**	-.13**	-.54**	-.31**	.72						
9. Relative advantage	4.99	1.83	.47**	.44**	.53**	.74**	-.00	-.30**	-.43**	.29**	.95					
10. Compatibility	5.25	1.92	.50**	.54**	.50**	.74**	-.09**	-.36**	-.43**	.34**	.81**	.95				
11. Complexity	2.48	1.47	-.51**	-.53**	-.42**	-.62**	.08*	.40**	.45**	-.36**	-.70**	-.70**	.83			
12. Observability	5.64	1.72	.43**	.49**	.36**	.55**	-.13**	-.37**	-.32**	.37**	.58**	.68**	-.53**	.92		
13. Trialability	5.27	1.74	.43**	.49**	.43**	.54**	-.15**	-.28**	-.30	.27**	.54**	.65**	-.48**	.55**	.81	
14. Perceived risk	2.59	1.50	-.49**	-.43**	-.33**	-.52**	.12**	.44**	.46**	-.30**	-.60**	-.59**	.64**	-.44**	-.43**	.85

\* $p < .05$ .

\*\* $p < .01$ .

Notes: The figures are based on data from Study 1. Sample sizes for the table range from 791 to 827 because of missing data. We report means and standard deviations on the basis of a seven-point scale (except for intrinsic and extrinsic motivation, which we recalibrated [dividing by 100] to be in alignment with the other measures; intrinsic motivation uses a 0–5 scale, and extrinsic motivation uses a 0–4 scale). Correlation alphas are reported along the diagonal. The expectancy theory conceptualization of motivation results in a single motivation score, thus we do not calculate an alpha. N/A = not applicable.

value = 15.5,  $p < .0001$ ). The trial group mean score for extrinsic motivation was 3.2, and the nontrial group mean score was 1.9 ( $t$ -value = 16.1,  $p < .0001$ ).<sup>3</sup> Mean scores for intrinsic motivation were 2.3 and 1.1 for triers and non-triers, respectively ( $t$ -value = 11.1,  $p < .0001$ ). The values show that participants in the trial group had significantly higher levels of role clarity, motivation (both intrinsic and extrinsic), and ability. The high  $p$ -values, strong classification-accuracy scores, and significant  $t$ -tests satisfy the first step in the test for mediation.

To assess the mediating power of the consumer readiness variables, we completed the remaining three steps in the test for mediation. Because of space limitations, it is impractical to discuss in detail the results from all eight multistep tests for mediation in Study 1.<sup>4</sup> Table 3 provides a summary of the findings for the eight tests for mediation in Study 1, showing the key comparisons between Step 2 and Step 4. For example, in the first test (role clarity as a mediator between the individual difference variables and trial), technology anxiety, need for interaction, and previous experience all had a significant, direct effect on trial in Step 2. However, in Step 4 (when the individual difference variables were modeled with role clarity), the effect became nonsignificant, indicating that role clarity completely mediates the main effects of technology anxiety, need for interaction, and previous experience on trial. In addition, the influence of inertia and age on trial went from highly significant (both at  $p < .0001$ ) to a much less powerful influence ( $p = .04$  for inertia, and  $p = .003$  for age). The results indicate that role clarity partially mediates the relationship between inertia and age with trial.

The test for mediation for each antecedent predictor could fail in Steps 2, 3, or 4. Antecedent predictors that failed to have a significant influence in either Step 2 or Step 3 were discontinued from the mediation analysis (shown as a dash in the Step 4 column of Table 3). Failures in Step 2 indicate that the antecedent predictor did not have a direct effect on trial and thus could not be mediated by the consumer readiness variables. The failures to mediate are not due to limitations of the consumer readiness variables but rather to the weaknesses of the antecedent predictors. Sex and education were two individual difference variables that failed in Step 2.

The failures to mediate that are due to limitations in the consumer readiness variables are failures to mediate in either Step 3 or Step 4. Failures in Step 3 indicate that the antecedent predictor did not have a direct effect on the con-

sumer readiness variable, and thus the consumer readiness variable cannot be a mediator. Failures in Step 4 indicate that when the antecedent predictor is modeled with the mediator, the influence of the antecedent predictor is not lessened. This indicates that the consumer readiness variable is not a mediator for that particular variable.

Overall, the pattern of results supports the conclusion that the consumer readiness variables mediate the effects of individual differences on trial. Of the eight individual difference antecedent predictors, only two were not mediated by the consumer readiness variables, and the failures were due to the inability of sex and education to show a direct link to trial. Of the six remaining variables, all were mediated by at least one of the consumer readiness variables. Need for interaction was mediated by all four readiness variables, whereas technology anxiety and age were mediated by three of the four readiness variables. In summary, all individual difference antecedent predictors that effect trial were mediated by the set of consumer readiness variables. The results provide support for  $H_{1a}$ .

With the innovation characteristics, a similar pattern emerges. Two of the antecedent predictors (complexity and observability) did not have a direct effect on trial and thus could not be mediated. Of the remaining four variables, three are mediated by at least two of the readiness variables. Relative advantage was not mediated by any of the consumer readiness variables. Compatibility was mediated by three of the four readiness variables, and perceived risk and trialability were mediated by two of the readiness variables. Therefore, the only innovation characteristic not mediated by the readiness variables was relative advantage. The overall pattern of results also provides support for  $H_{1b}$ .

It is also insightful to explore the relative mediating power of the consumer readiness variables. In Study 1, it appears that role clarity and ability were the strongest mediators, both mediating five of the six individual difference antecedent predictors that were eligible for mediation. Extrinsic and intrinsic motivation are important mediators, though they mediated only three and two (respectively) of the six individual difference antecedent predictors that were eligible for mediation. The same pattern held when we evaluated the relative mediating power of the consumer readiness variables on the innovation characteristic antecedent predictors. Role clarity and ability mediated three of the four eligible antecedent predictors, and extrinsic and intrinsic motivation mediated one and none of the antecedent predictors, respectively.

## Study 2 Results

Replicating Study 1 with a different SST helps determine the strength of the results and provides a further test of the model. In the replication study, the SST of interest was an Internet ordering system for prescription refills that was offered by the same company. The company implemented the Internet ordering system several months after the completion of Study 1, and the system had been in place less than six months at the time of data collection. We collected data from current mail-order pharmacy customers who had the option of using the Internet SST or placing an order

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<sup>3</sup>Whereas all Likert scale measures used a 1–7 scale, extrinsic motivation uses a 0–4 scale, and intrinsic motivation uses a 0–5 scale. The expectancy theory's conceptualization of motivation uses a multiplicative function to generate a motivation score, which was significantly out of alignment with other measures and was recalibrated (by dividing the motivation scores by 100). This has no impact on the data analysis other than bringing the motivation measures into alignment with the other scales.

<sup>4</sup>Full details are provided in a technical appendix, which is available from the lead author.

**TABLE 3**  
**Study 1 (IVR) Results of Tests for Mediation**

Description of Test	Significance of Mediator: Step 1	Change in Effects of Antecedent Predictors Between Steps 2 and 4			Conclusion
		Predictor	Step 2	Step 4	
Role clarity as a mediator of the relationship between individual difference variables and trial	Role clarity: 1.3 (.0001)	Inertia	-.19 (.0001)	-.12 (.04)	<b>Partial mediation</b> <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> <b>Partial mediation</b> No mediation, failed in Step 3 No direct effect on trial No direct effect on trial
		Technology anxiety	-.13 (.01)	n.s.	
		Need for interaction	-.18 (.0001)	n.s.	
		Previous experience	.15 (.002)	n.s.	
		Age	-.19 (.0001)	-.03 (.003)	
		Income	.12 (.02)	—	
		Sex	n.s.	—	
		Education	n.s.	—	
Extrinsic motivation as a mediator of the relationship between individual difference variables and trial	Extrinsic motivation: 1.0 (.0001)	Inertia	-.19 (.0001)	—	No mediation, failed in Step 3 <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> No mediation, failed in Step 4 <b>Completely mediates main effects</b> No mediation, failed in Step 3 No direct effect on trial No direct effect on trial
		Technology anxiety	-.13 (.01)	n.s.	
		Need for interaction	-.18 (.0001)	n.s.	
		Previous experience	.15 (.002)	.19 (.001)	
		Age	-.19 (.0001)	n.s.	
		Income	.12 (.02)	—	
		Sex	n.s.	—	
		Education	n.s.	—	
Intrinsic motivation as a mediator of the relationship between individual difference variables and trial	Intrinsic motivation: .53 (.0001)	Inertia	-.19 (.0001)	-.18 (.0002)	<b>Partial mediation</b> No mediation, failed in Step 3 <b>Partial mediation</b> No mediation, failed in Step 4 No mediation, failed in Step 3 No mediation, failed in Step 4 No direct effect on trial No direct effect on trial
		Technology anxiety	-.13 (.01)	—	
		Need for interaction	-.18 (.0001)	-.14 (.002)	
		Previous experience	.15 (.002)	.21 (.001)	
		Age	-.19 (.0001)	—	
		Income	.12 (.02)	.13 (.0004)	
		Sex	n.s.	—	
		Education	n.s.	—	
Ability as a mediator of the relationship between individual difference variables and trial	Ability: 1.3 (.0001)	Inertia	-.19 (.0001)	—	No mediation, failed in Step 3 <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> <b>Partial mediation</b> <b>Completely mediates main effects</b> No direct effect on trial No direct effect on trial
		Technology anxiety	-.13 (.01)	n.s.	
		Need for interaction	-.18 (.0001)	n.s.	
		Previous experience	.15 (.002)	n.s.	
		Age	-.19 (.0001)	-.02 (.004)	
		Income	.12 (.02)	n.s.	
		Sex	n.s.	—	
		Education	n.s.	—	

**TABLE 3**  
Continued

Description of Test	Significance of Mediator: Step 1	Change in Effects of Antecedent Predictors Between Steps 2 and 4			Conclusion
		Predictor	Step 2	Step 4	
Role clarity as a mediator of the relationship between innovation characteristic variables and trial	Role clarity: 1.3 (.0001)	Perceived risk	-.28 (.0001)	n.s.	<b>Completely mediates main effects</b> No mediation, failed in Step 3 No direct effect on trial
		Relative advantage	.32 (.0002)	—	
		Complexity	n.s.	—	
		Compatibility	.34 (.0002)	.31 (.002)	<b>Partial mediation</b>
		Trialability	.17 (.01)	n.s.	<b>Completely mediates main effects</b> No direct effect on trial
		Observability	n.s.	—	
Extrinsic motivation as a mediator of the relationship between innovation characteristic variables and trial	Extrinsic motivation: 1.0 (.0001)	Perceived risk	-.28 (.0001)	—	No mediation, failed in Step 3
		Relative advantage	.32 (.0002)	.36 (.0001)	No mediation, failed in Step 4
		Complexity	n.s.	—	No direct effect on trial
		Compatibility	.34 (.0002)	.32 (.0003)	<b>Partial mediation</b>
		Trialability	.17 (.01)	.18 (.01)	No mediation, failed in Step 4
		Observability	n.s.	—	No direct effect on trial
Intrinsic motivation as a mediator of the relationship between innovation characteristic variables and trial	Intrinsic motivation: .53 (.0001)	Perceived risk	-.28 (.0001)	—	No mediation, failed in Step 3
		Relative advantage	.32 (.0002)	.41 (.0001)	No mediation, failed in Step 4
		Complexity	n.s.	—	No direct effect on trial
		Compatibility	.34 (.0002)	.37 (.0001)	No mediation, failed in Step 4
		Trialability	.17 (.01)	.20 (.003)	No mediation, failed in Step 4
		Observability	n.s.	—	No direct effect on trial
Ability as a mediator of the relationship between innovation characteristic variables and trial	Ability: 1.3 (.0001)	Perceived risk	-.28 (.0001)	-.22 (.01)	<b>Partial mediation</b>
		Relative advantage	.32 (.0002)	.33 (.0003)	No mediation, failed in Step 4
		Complexity	n.s.	—	No direct effect on trial
		Compatibility	.34 (.0002)	.22 (.01)	<b>Partial mediation</b>
		Trialability	.17 (.01)	n.s.	<b>Completely mediates main effects</b> No direct effect on trial
		Observability	n.s.	—	

Notes: The numbers shown are maximum likelihood parameter estimates, and *p*-values (based on Wald chi-square significance test) are shown in parentheses. All nonsignificant (n.s.) relationships indicate a *p*-value greater than .05. Text shown in bold indicates a relationship in which the mediator either completely or partially mediates the relationship between the antecedent variable and trial.

through other means (i.e., mail, IVR SST, or a customer service representative on the telephone).

### Sample

For Study 2, we used the same sampling procedure as that in Study 1. Of the 2000 surveys mailed, 401 usable surveys were returned from SST users, and 333 usable surveys were returned from SST nonusers. The overall response rate in the Study 2 was 37% (734/2000), and sample demographics closely matched those in Study 1.

### Tests of Model and Hypotheses

The first step in the test for mediation shows that role clarity, motivation (both extrinsic and intrinsic), and ability all have significant, direct effects on trial. All were tested individually with logistic regression and were highly significant ( $p < .0001$ ), with strong classification-accuracy scores. Classification-accuracy scores were 92% for role clarity, 78% for extrinsic motivation, 72% for intrinsic motivation, and 83% for ability.

We also analyzed results using an independent-samples *t*-test to determine whether the means for each of the consumer readiness variables are significantly different between the trial and no-trial groups, as they were in Study 1. Mean scores for role clarity are 6.4 and 2.9 for triers and nontriers, respectively ( $t$ -value = 33.6,  $p < .0001$ ). Mean scores for ability are 6.6 and 4.1 for triers and nontriers, respectively ( $t$ -value = 19.8,  $p < .0001$ ). The trial group mean score for extrinsic motivation is 3.3, and the nontrial group mean score is 1.7 ( $t$ -value = 19.4,  $p < .0001$ ). Mean scores for intrinsic motivation are 2.5 and 1.2 for triers and nontriers, respectively ( $t$ -value = 11.4,  $p < .0001$ ). The high *p*-values, strong classification-accuracy scores, and significant *t*-tests verify the link between the consumer readiness variables and trial that we established in Study 1.

To confirm the mediating power of the consumer readiness variables that we established in Study 1, we completed the remaining three steps in the test for mediation. Table 4 provides a summary of the findings for the eight tests for mediation in Study 2, showing the key comparison between Steps 2 and 4. The individual difference variables of technology anxiety and education did not have a direct effect on trial. The variables could not be mediated because of their failure in Step 2. As with Study 1, there were a handful of mediation failures in Steps 3 and 4.

As in Study 1, the positive pattern of results supports the mediating role of the consumer readiness variables. Of the eight individual difference antecedent predictors, only two (technology anxiety and education) were not mediated by at least one consumer readiness variable, and the failures were due to the inability of the antecedent predictor to significantly influence trial. Of the six remaining variables that were eligible for mediation, all were mediated by at least one of the readiness variables. Need for interaction, previous experience, age, and income were mediated by all four readiness variables, and sex was mediated by three of the four. Therefore, as in Study 1, all individual difference variables that had a direct effect on trial were mediated by the set of consumer readiness variables. The results provide support for  $H_{1a}$ .

We found similar results in the replication of the mediation of the innovation characteristics. Trialability and observability did not have a direct effect on trial and thus could not be mediated. Of the remaining four variables, all were mediated by at least one of the readiness variables. Therefore, all innovation characteristic variables that had a direct effect on trial were mediated by the set of consumer readiness variables. However, as in Study 1, intrinsic motivation failed to mediate any of the innovation characteristic variables. The overall pattern of results provides support for  $H_{1b}$ .

It is also insightful to explore the relative mediating power of the consumer readiness variables. In Study 2, role clarity was again the strongest mediator, mediating all six of the eligible individual difference variables. The other three readiness variables were also strong mediators; intrinsic motivation and ability mediated five of the six individual difference variables, and extrinsic motivation mediated four. With respect to innovation characteristics, role clarity again mediated the most antecedent predictors, mediating three of the remaining four innovation characteristic antecedent predictors. Extrinsic motivation mediated two, and ability mediated one innovation characteristic.

## Relative Importance of Consumer Readiness

With the consumer readiness variables established as mediators across two studies, it is valuable to explore the overall effectiveness and relative strength of the consumer readiness variables as a group. Although we conducted the test for mediation one consumer readiness mediator at a time (because of methodological considerations), the group of predictors can be regressed on trial when they are separated from the test for mediation. Across both studies, the consumer readiness variables, when taken as a group, generated high-classification-accuracy statistics. The classification scores were 86% and 93% for IVR and Internet studies, respectively (see Table 5). The high scores indicate that 86% (93%) of the respondents in the IVR (Internet) study were correctly classified into the trial or no-trial groups on the basis of their consumer readiness variable scores. The regression results also help determine the relative strength of the consumer readiness variables. In both studies, the other consumer readiness variables in the model overwhelmed the impact of ability (see Table 5). Intrinsic motivation was only marginally significant ( $p = .09$ ) in the IVR study, and it was nonsignificant in the Internet-based study. Thus, role clarity and extrinsic motivation were the two strongest consumer readiness predictors.

In addition to exploring the relative strength of the consumer readiness variables, it is illuminating to compare the three sets of predictors that we have explored: consumer readiness, innovation characteristics, and individual differences. As Table 5 shows, the consumer readiness set of predictors generated a higher classification-accuracy score than did either of the other sets of variables across both studies. Based on the classification-accuracy scores, the consumer readiness variables are the best set of predictors, followed by the innovation characteristics, and finally the individual

**TABLE 4**  
**Study 2 (Internet) Results of Tests for Mediation**

Description of Test	Significance of Mediator: Step 1	Change in Effects of Antecedent Predictors Between Steps 2 and 4			Conclusion
		Predictor	Step 2	Step 4	
Role clarity as a mediator of the relationship between individual difference variables and trial	Role clarity: 1.4 (.0001)	Inertia	-.20 (.0002)	-.21 (.01)	<b>Partial mediation</b> No direct effect on trial <b>Partial mediation</b> <b>Partial mediation</b> <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> No direct effect on trial
		Technology anxiety	n.s.	—	
		Need for interaction	-.28 (.0001)	-.24 (.01)	
		Previous experience	.61 (.0001)	.23 (.02)	
		Age	-.03 (.0002)	n.s.	
		Income	.12 (.0003)	n.s.	
		Sex	-.47 (.007)	n.s.	
		Education	n.s.	—	
Extrinsic motivation as a mediator of the relationship between individual difference variables and trial	Extrinsic motivation: 1.3 (.0001)	Inertia	-.20 (.0002)	—	No mediation, failed in Step 3 No direct effect on trial <b>Completely mediates main effects</b> <b>Partial mediation</b> <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> No mediation, failed in Step 3 No direct effect on trial
		Technology anxiety	n.s.	—	
		Need for interaction	-.28 (.0001)	n.s.	
		Previous experience	.61 (.0001)	.46 (.0001)	
		Age	-.03 (.0002)	n.s.	
		Income	.12 (.0003)	n.s.	
		Sex	-.47 (.007)	—	
		Education	n.s.	—	
Intrinsic motivation as a mediator of the relationship between individual difference variables and trial	Intrinsic motivation: .58 (.0001)	Inertia	-.20 (.0002)	—	No mediation, failed in Step 3 No direct effect on trial <b>Partial mediation</b> <b>Partial mediation</b> <b>Completely mediates main effects</b> <b>Partial mediation</b> <b>Completely mediates main effects</b> No direct effect on trial
		Technology anxiety	n.s.	—	
		Need for interaction	-.28 (.0001)	-.23 (.0001)	
		Previous experience	.61 (.0001)	.53 (.0001)	
		Age	-.03 (.0002)	n.s.	
		Income	.12 (.0003)	.10 (.02)	
		Sex	-.47 (.007)	n.s.	
		Education	n.s.	—	
Ability as a mediator of the relationship between individual difference variables and trial	Ability: 1.2 (.0001)	Inertia	-.20 (.0002)	—	No mediation, failed in Step 3 No direct effect on trial <b>Partial mediation</b> <b>Partial mediation</b> <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> <b>Completely mediates main effects</b> No direct effect on trial
		Technology anxiety	n.s.	—	
		Need for interaction	-.28 (.0001)	-.16 (.01)	
		Previous experience	.61 (.0001)	.33 (.0001)	
		Age	-.03 (.0002)	n.s.	
		Income	.12 (.0003)	n.s.	
		Sex	-.47 (.007)	n.s.	
		Education	n.s.	—	

**TABLE 4**  
Continued

Description of Test	Significance of Mediator: Step 1	Change in Effects of Antecedent Predictors Between Steps 2 and 4			Conclusion
		Predictor	Step 2	Step 4	
Role clarity as a mediator of the relationship between innovation characteristic variables and trial	Role clarity: 1.4 (.0001)	Perceived risk	-.34 (.0004)	-.23 (.04)	<b>Partial mediation</b> No mediation, failed in Step 4 <b>Completely mediates main effects</b> <b>Partial mediation</b> No direct effect on trial No direct effect on trial
		Relative advantage	.42 (.0002)	.49 (.001)	
		Complexity	-.46 (.0001)	n.s.	
		Compatibility	.43 (.0001)	.27 (.07)	
		Trialability	n.s.	—	
		Observability	n.s.	—	
Extrinsic motivation as a mediator of the relationship between innovation characteristic variables and trial	Extrinsic motivation: 1.3 (.0001)	Perceived risk	-.34 (.0004)	—	No mediation, failed in Step 3 <b>Partial mediation</b> No mediation, failed in Step 4 <b>Partial mediation</b> No direct effect on trial No direct effect on trial
		Relative advantage	.42 (.0002)	.38 (.001)	
		Complexity	-.46 (.0001)	-.56 (.0001)	
		Compatibility	.43 (.0001)	.39 (.001)	
		Trialability	n.s.	—	
		Observability	n.s.	—	
Intrinsic motivation as a mediator of the relationship between innovation characteristic variables and trial	Intrinsic motivation: .58 (.0001)	Perceived risk	-.34 (.0004)	—	No mediation, failed in Step 3 No mediation, failed in Step 4 No mediation, failed in Step 3 No mediation, failed in Step 3 No direct effect on trial No direct effect on trial
		Relative advantage	.42 (.0002)	1.1 (.0001)	
		Complexity	-.46 (.0001)	—	
		Compatibility	.43 (.0001)	—	
		Trialability	n.s.	—	
		Observability	n.s.	—	
Ability as a mediator of the relationship between innovation characteristic variables and trial	Ability: 1.2 (.0001)	Perceived risk	-.34 (.0004)	—	No mediation, failed in Step 3 No mediation, failed in Step 3 <b>Partial mediation</b> No mediation, failed in Step 4 No direct effect on trial No direct effect on trial
		Relative advantage	.42 (.0002)	—	
		Complexity	-.46 (.0001)	-.41 (.001)	
		Compatibility	.43 (.0001)	.63 (.0001)	
		Trialability	n.s.	—	
		Observability	n.s.	—	

Notes: The numbers shown are maximum likelihood parameter estimates, and  $p$ -values (based on Wald chi-square significance test) are shown in parentheses. All nonsignificant (n.s.) relationships indicate a  $p$ -value greater than .05. Text shown in bold indicates a relationship in which the mediator either completely or partially mediates the relationship between the antecedent variable and trial.

**TABLE 5**  
**Alternative Models for Predicting Trial**

Predictors of Trial	Study 1: IVR			Study 2: Internet		
	Consumer Readiness Model	Innovation Characteristics Model	Individual Differences Model	Consumer Readiness Model	Innovation Characteristics Model	Individual Differences Model
Role clarity	.23 (.0001)	—	—	1.2244 (.0001)	—	—
Ability	n.s.	—	—	n.s.	—	—
Extrinsic motivation	.11 (.0001)	—	—	.2289 (.0025)	—	—
Intrinsic motivation	.0262 (.0945)	—	—	n.s.	—	—
Perceived risk	—	-.28 (.0001)	—	—	-.34 (.0003)	—
Relative advantage	—	.32 (.0002)	—	—	.42 (.0002)	—
Complexity	—	n.s.	—	—	-.46 (.0001)	—
Compatibility	—	.34 (.0002)	—	—	.43 (.0001)	—
Trialability	—	.17 (.01)	—	—	n.s.	—
Observability	—	n.s.	—	—	n.s.	—
Inertia	—	—	-.19 (.0001)	—	—	-.20 (.0002)
Technology anxiety	—	—	-.13 (.01)	—	—	n.s.
Need for interaction	—	—	-.18 (.0001)	—	—	-.28 (.0001)
Previous experience	—	—	.15 (.002)	—	—	.61 (.0001)
Age	—	—	-.19 (.0001)	—	—	-.03 (.0002)
Income	—	—	.12 (.02)	—	—	.12 (.0002)
Sex	—	—	n.s.	—	—	-.47 (.007)
Education	—	—	n.s.	—	—	n.s.
Classification accuracy	86%	79%	65%	93%	86%	74%

Notes: n.s. = not significant.

difference variables. The consistency of results across the two studies further strengthens the findings. Overall, this comparison of predictor models provides support for H<sub>2</sub>.

## Discussion

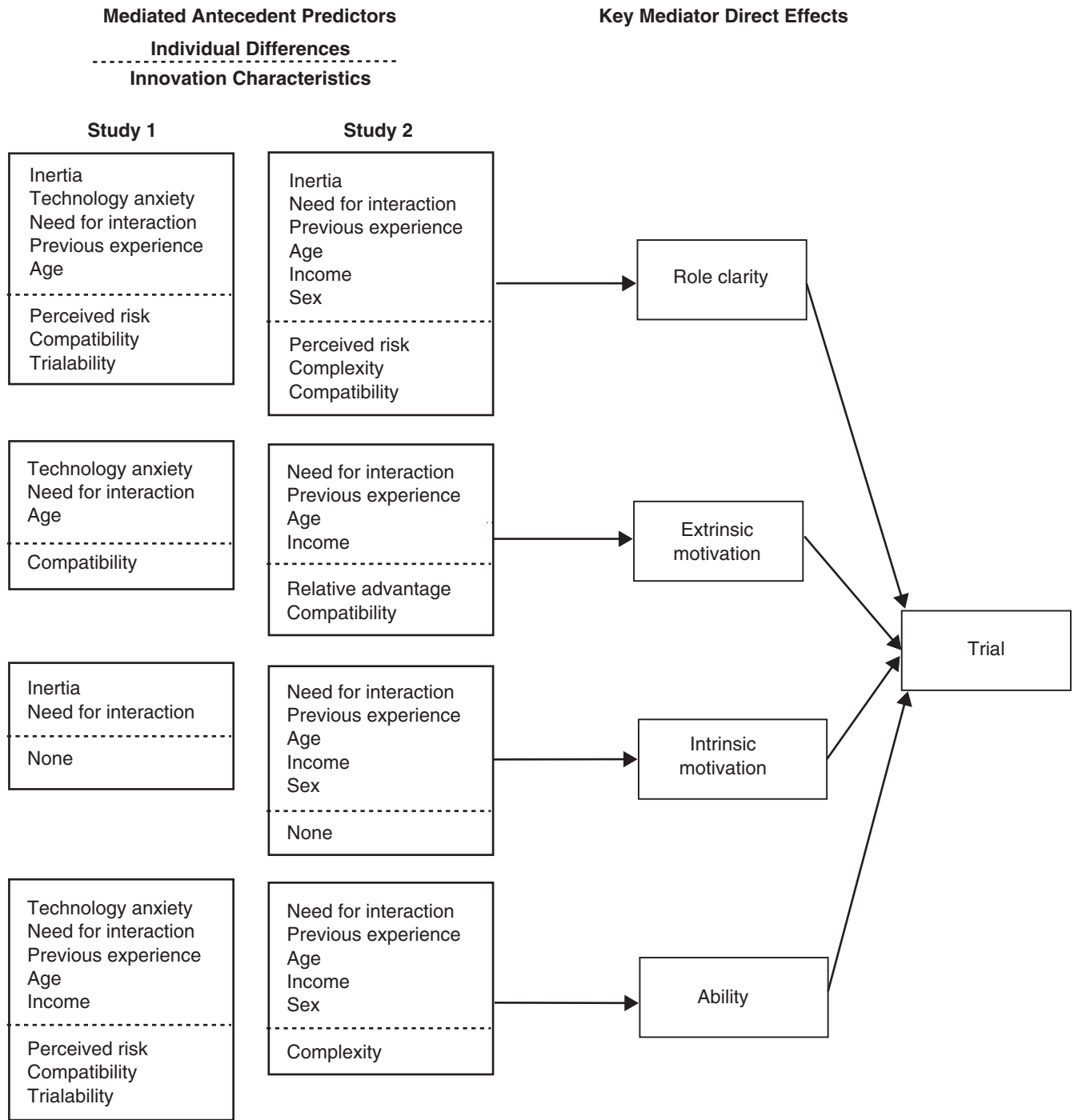
### Summary of Results

The findings from both studies support the proposed model. The direct effects of the consumer readiness variables on trial were significant across both studies. Most important, the mediating effects (H<sub>1</sub>) of the consumer readiness variables were replicated across two studies that focused on different SSTs. In Study 1, of the ten antecedent predictors

that had a direct effect on trial, only one (relative advantage) was not mediated by any of the consumer readiness variables. In Study 2, all ten antecedent predictors that had a direct effect on trial were mediated by at least one of the consumer readiness variables. Figure 2 summarizes the mediating effects found in Studies 1 and 2. The findings support the central role of the consumer readiness variables as key mediators to better understand when and why consumer trial occurs. Examining the strength of consumer readiness variables as predictors of trial in comparison with that of the antecedent predictors provides further reinforcement for the importance of the consumer readiness variables. In Studies 1 and 2, the consumer readiness variables were stronger predictors of trial than were either the set of



**FIGURE 2**  
**Significant Mediated Effects**



innovation characteristics or individual differences, thus providing support for H<sub>2</sub>.

Although all consumer readiness variables are important, the mediation results (H<sub>1</sub>) and the predictive comparisons (H<sub>2</sub>) suggest that role clarity and extrinsic motivation are the dominant consumer readiness variables in the pre-

diction of trial for this context. Indeed, although ability mediated several antecedent predictors in each study, its direct influence on trial was overwhelmed by the stronger effects of role clarity and extrinsic motivation when all the factors were modeled together to predict trial. Similarly, intrinsic motivation was only marginally significant in the

prediction of trial when all consumer readiness variables were tested.

### **Research Contributions**

The model and results contribute significantly to our theoretical understanding of the factors that influence consumer trial. The traditional adoption model variables and attitudes explored in previous research are not disputed. However, the added explanatory power of the consumer readiness variables and their role as mediators are significant. In practice, consumers may evaluate a new product or service positively, yet they may choose not to try it. Our results suggest that lack of “consumer readiness” can explain much of this failure to try. That is, even customers who have a positive evaluation of an innovative service may choose not to use it if they do not understand their role (role clarity), if they perceive no clear benefit to using it (motivation), or if they believe that they are not able to use it (ability).

Our findings suggest that the consumer readiness variables are not only additional predictors but also key factors with strong mediating properties. The mediating role of the consumer readiness variables also provides a partial answer to the “why” question with respect to several innovation characteristics and individual difference variables that have been tested in previous research. For example, extensive literature concludes that as experience with related technologies increases, the chance of adopting a new technology also increases. The consumer readiness mediators help explain why this relationship exists. In Study 2, it is not merely that increased experience with Internet-based tools leads to a greater likelihood of trial but also that increased experience leads to higher levels of role clarity, motivation (both extrinsic and intrinsic), and ability relative to the Internet ordering system, which increases the likelihood of trial.

Even more important are situations in which data might be misinterpreted without including the mediating variables. For example, in Study 1, complexity did not have a direct effect on trial. If the mediators are not included, the natural conclusion is that complexity does not influence trial behavior. However, we found that complexity has a significant, negative influence on role clarity ( $-.23, p < .0001$ ), extrinsic motivation ( $-.10, p < .004$ ), and ability ( $-.28, p < .0001$ ), which in turn decreases the likelihood of trial. Although this is not technically a mediated relationship, complexity is nonetheless an important factor to consider because of its influence on the consumer readiness variables. We found a similar result with observability in Study 1 and with trialability, observability, and technology anxiety in Study 2.

Another contribution of this study is that it establishes a more concise set of constructs as better predictors of trial. The key consumer readiness variables show more consistency in their influence on trial across two different technologies as well as higher classification-accuracy scores than do traditional innovation characteristics and individual difference variables. Our model and results suggest that the relevant variables for increasing trial are those that increase consumer readiness.

### **Managerial Implications**

For many firms, often the challenge is not managing the technology but rather getting consumers to try the technology. The findings should be useful to firms that are considering SST implementation as well as those that are struggling with the management of existing SSTs. This is especially relevant given a study that Forrester Research conducted, which shows that 41% of the firms surveyed observe no return on their self-service investments (Zurek et al. 2001). By establishing the consumer readiness variables as key mediators, we provide an actionable set of factors to help firms understand and influence SST trial behavior, a key driver of SST success. Managers can use tactical strategies to influence role clarity, motivation, and ability either before or after an SST has been introduced.

Management can take several steps to influence the actionable consumer readiness variables directly (Bitner, Ostrom, and Meuter 2002). For example, education and training, in the form of detailed, customer-friendly instructions or aids, are important in influencing role clarity. Contextually relevant education aids, such as wallet cards, magnets, and mouse pads with instructions (for SSTs used from home) or posters showing the steps to use the SST (for SSTs in remote locations), could be used to build role clarity and perceptions of ability. In addition, considerable “hand holding” should be readily available in accessing and using the SST. For example, if the SST is available on the Internet, management could consider a robust “first-time user” area and provide detailed instructions and frequently asked questions, a toll-free telephone number, and online help such as live text chat.

Motivation is another actionable consumer readiness variable that drives SST trial. To encourage trial, firms must clearly communicate valued customer benefits of an SST. For example, some consumers find appeal in SSTs that save them time or money, whereas others are attracted to the extended availability or easier access. To provide added motivation for potential first-time users, firms should give consumers the opportunity to try the SST with no obligations. When technologically feasible, offering the opportunity to interact with and learn from other consumers may also be appealing to consumers and increase their motivation to try.

This research also contributes to the understanding of variables that underlie effective customer coproduction. To be truly customer centric, firms need to strengthen the effectiveness of their customers as coproducers and cocreators of value (Vargo and Lusch 2004). Applying employee-management practices to customers can lead to effective coproduction by increasing role clarity, motivation, and ability of customers. The coproduction framework provides a lens through which firms can develop, adjust, and evaluate their operational procedures, technology friendliness, human resource practices, and performance criteria (Betten-court et al. 2002). Effective coproduction can increase the likelihood of product or service success and customer satisfaction and can present a competitive opportunity for firms.

## Limitations and Future Research Directions

As with any research, there are limitations associated with the studies. First, we use cross-sectional data rather than a longitudinal study. Time and cost constraints limited the feasibility of such an approach. Second, there is limited generalizability to other contexts, because we conducted this research within one organizational context. Additional studies in more diverse industries with other consumer groups should be conducted to provide additional support and increase the generalizability of the findings.

Beyond addressing the limitations, this research suggests opportunities for further research. A central question that remains unanswered is, What are the key drivers of role clarity, the most influential mediator in the set of consumer readiness variables? The antecedent predictors—need for interaction, previous experience, perceived risk, and complexity—appear to be the most consistent predictors of role clarity, so further research can explore the antecedents in more detail. In addition, prior research investigating the role clarity of employees in a work setting suggests that the nature of socialization activities (i.e., their content, context, and social aspects) and the feedback provided can affect role clarity perceptions (Anakwe and Greenhaus 1999; Betencourt and Brown 2003). In the context of health care compliance, it was shown that provider characteristics influence role clarity (Dellande, Gilly, and Graham 2004). Thus, further research could investigate provider character-

istics, the socialization of consumers, and the role of feedback for various customer groups and SSTs.

The conceptual model provides a framework for additional research. Although trial was the central dependent variable in this study, any of the other steps in the adoption process could be explored in detail. For example, the critical factors that influence commitment to SSTs or those that influence the investigation or evaluation steps that precede trial could be developed and tested. Along these lines, research could assess the differential influence of the consumer readiness variables across the stages in the adoption process.

Further research could also explore how SST usage influences consumer loyalty and, ultimately, revenue and profitability. Despite the increase in SSTs that firms are offering, scholars are just beginning to learn about how the absence of human interaction affects the bond between consumers and firms (Selnes and Hansen 2001). It is important to understand the long-term implications of shifting customers away from interpersonal interactions, which are traditionally viewed as important elements for establishing trust and loyalty in service contexts. Finally, additional research could extend the study of coproduction beyond SSTs to other contexts. This rich area of inquiry would benefit from studies in multiple contexts to determine what relevant antecedents increase consumer readiness and the differential influence of role clarity, motivation, and ability on trial in other high-customer-participation settings.

## APPENDIX Measures, Sources, Items, and Alpha Coefficients

	Coefficient Alpha	
	Study 1	Study 2
<b>Consumer Readiness</b>		
<i>Role Clarity:</i> (five items adapted from Rizzo, House, and Lirtzman [1970])	.96	.94
•I feel certain about how to effectively use the SST. <sup>a</sup>		
•I am NOT sure how to use the SST properly.		
•I know what is expected of me if I use the SST.		
•The steps in the process of using the SST are clear to me.		
•I believe there are only vague directions regarding how to use the SST.		
<i>Ability:</i> (six items adapted from Jones [1986] and Oliver and Bearden [1985])	.94	.96
•I am fully capable of using the SST.		
•I am confident in my ability to use the SST.		
•Using the SST is well within the scope of my abilities.		
•I do NOT feel I am qualified for the task of ordering a prescription refill with the SST.		
•My past experiences increase my confidence that I will be able to successfully use the SST.		
•In total, using the SST sometimes involves things that are more difficult than I am capable. <sup>b</sup>		
<i>Extrinsic Motivation:</i> (three expectancy items adapted from Tyagi [1985]; four instrumentality and four valence items created for the context)	N/A <sup>c</sup>	N/A
Expectancy		
•If I put forth the effort, I could successfully order a refill prescription with the SST.		
•If I tried to use the SST, my prescription would be ordered successfully.		
•Making the effort to use the SST would result in the refill being ordered successfully.		

**APPENDIX  
Continued**

	<b>Coefficient Alpha</b>	
	<b>Study 1</b>	<b>Study 2</b>
Instrumentality		
•Using the SST would provide me with added convenience.		
•Using the SST would allow me to order a refill more quickly.		
•Using the SST would allow me to order a refill whenever I want.		
•Using the SST would provide me more control over the refill ordering process.		
Valence		
•When I order a prescription refill, convenience is desirable.		
•When I order a prescription refill, being able to order a refill quickly is desirable.		
•When I order a prescription refill, being able to order a refill whenever I want is desirable.		
•When I order a prescription refill, having control over the refill ordering process is desirable.		
<i>Intrinsic Motivation:</i> (three expectancy items adapted from Tyagi [1985]; five instrumentality and five valence items created for the context)	N/A	N/A
Expectancy		
•If I put forth the effort, I could successfully order a refill prescription with the SST.		
•If I tried to use the SST, my prescription would be ordered successfully.		
•Making the effort to use the SST would result in the refill being ordered successfully.		
Instrumentality		
•Using the SST would provide me with personal feelings of worthwhile accomplishment.		
•Using the SST would provide me with feelings of enjoyment from using the technology.		
•Using the SST would provide me with feelings of independence.		
•Using the SST would allow me to feel innovative in how I interact with a service provider.		
•Using the SST would allow me to have increased confidence in my skills.		
Valence		
•When I order a refill, a personal feeling of worthwhile accomplishment is desirable.		
•When I order a prescription refill, a personal feeling of enjoyment is desirable.		
•When I order a prescription refill, a feeling of independence is desirable.		
•When I order a refill, feeling innovative in how I interact with a service provider is desirable.		
•When I order a prescription refill, increased confidence in my skills is desirable.		
<b>Individual Differences</b>		
<i>Inertia:</i> (three items adapted from Gremler [1995])	.90	.91
•Changing refill ordering methods would be a bother.		
•For me, the cost in time, effort, and grief to switch prescription refill ordering methods is high.		
•It's just not worth the hassle for me to switch prescription refill ordering methods.		
<i>Technology Anxiety:</i> (four items adapted from Raub [1981])	.93	.93
•I feel apprehensive about using technology.		
•Technical terms sound like confusing jargon to me.		
•I have avoided technology because it is unfamiliar to me.		
•I hesitate to use most forms of technology for fear of making mistakes I cannot correct.		
<i>Need for Interaction:</i> (three items adapted from Dabholkar [1996])	.88	.87
•Personal contact with an employee makes ordering a prescription refill enjoyable for me.		
•Personal attention by a customer service employee is important to me.		
•It bothers me to use a machine when I could talk to a live person instead. <sup>b</sup>		
<i>Previous Experience:</i> (three items created for the context of interest)	.72	.81
•I commonly use lots of automated systems when dealing with other businesses.		
•I do not have much experience using the Internet.		
•I use a lot of technologically based products and services.		
<b>Innovation Characteristics</b>		
<i>Compatibility:</i> (three items adapted from Moore and Benbasat [1991])	.95	.97
•Using the SST is compatible with my lifestyle.		
•Using the SST is completely compatible with my needs.		
•The SST fits well with the way I like to get things done.		

**APPENDIX**  
**Continued**

	Coefficient Alpha	
	Study 1	Study 2
<i>Relative Advantage:</i> (three items adapted from Moore and Benbasat [1991])	.95	.95
•Using the SST improves the prescription refill process.		
•Overall, I believe using the SST is advantageous.		
•I believe the SST, in general, is the best way to order a prescription refill.		
<i>Complexity:</i> (three items adapted from Moore and Benbasat [1991])	.83	.88
•I believe that the SST is cumbersome to use.		
•It is difficult to use the SST.		
•I believe that the SST is easy to use.		
<i>Observability:</i> (three items adapted from Moore and Benbasat [1991])	.92	.94
•I would have no difficulty telling others about the results of using the SST.		
•I believe I could communicate to others the outcomes of using the SST.		
•The results of using the SST are apparent to me. <sup>b</sup>		
<i>Trialability:</i> (three items adapted from Moore and Benbasat [1991])	.81	.85
•I can use the SST on a trial basis to see what it can do.		
•It is easy to try out the SST without a big commitment.		
•I've had opportunities to try out the SST. <sup>b</sup>		
<i>Perceived Risk:</i> (five items created for the context of interest)	.85	.87
•I fear using the SST reduces the confidentiality of my medical history.		
•I am unsure if the SST performs satisfactorily.		
•Using the SST infringes on my medical privacy.		
•Overall, using the SST is risky.		
•I am sure the SST performs as well as the other prescription refill ordering methods. <sup>b</sup>		
<b>Trial</b>		
<i>Trial:</i> (single-item measure created for the context of interest)	N/A	N/A
•Have you successfully completed a prescription refill request using the SST?		

<sup>a</sup>On the survey, "automated telephone refill system" and "Internet refill ordering system" were used instead of "SST."

<sup>b</sup>We dropped this item from the analysis during the measure purification process.

<sup>c</sup>The expectancy theory conceptualization of motivation results in a single motivation score, thus we did not calculate an alpha score. N/A = not applicable.

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