

THE ROLE OF SERVICE AGENT, SERVICE QUALITY, AND USER SATISFACTION IN SELF-SERVICE TECHNOLOGY

Completed Research Paper

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Abstract

This paper seeks to answer two questions: (1) Do consumers perceive the four service quality dimensions (reliability, responsiveness, assurance, and empathy) differently when interacting with Self-Service Technologies (SSTs) and human agents? and (2) How do these four dimensions affect consumers' satisfaction when using SSTs versus using human agents? Based on an extensive literature review, we propose that consumers will perceive higher service quality from human agents compared to from SSTs. Additionally, we propose that higher service quality will have a positive impact on consumer satisfaction. We tested our propositions using experimental data collected from 181 subjects. The results indicated that consumers perceived higher levels of reliability, assurance, and empathy from human agents compared to SSTs, but did not perceive a significant difference in responsiveness. Furthermore, the service quality dimensions affected consumer satisfaction differently when receiving service from human agents versus SSTs. This study raises important implications for research and practice.

Keywords: Service agent, service quality, consumer satisfaction, self-service technology, experimental design, system design.

Introduction

In recent years, the manner in which consumers interact with organizations has changed dramatically (Dabholkar 1994; Bobbit and Dabholkar 2001). Consumers can now avail of services either by themselves, with professional assistance, or by using a hybrid format that combines self-service with professional assistance (Ding et al., 2007). With rapid developments in information technology (IT), public and private sector organizations have begun to implement self-service technologies (SSTs) that aid consumers in completing their service requests. Advantages cited for SSTs include increased speed of service delivery, reduced labor costs, increased productivity, increased competitiveness, and service differentiation (Beatson et al. 2007). For example, the Internal Revenue Service (IRS) provides e-filing of taxes for US taxpayers. E-filing is now used by almost two-thirds of the country's taxpayers, reducing tax processing costs for the government and speeding up tax refunds for consumers (Carter et al. 2011). SSTs are also used in health diagnoses as a means to reduce costs, improve quality, and reach rural communities. Patients can self-diagnose their ailments using smart phones and then localize a doctor by crowd-sourcing. Such health care SSTs can enable more transparency, efficiency, competition, focus, and overall better health care quality (Lanseng and Andreassen 2007). Banks such as Chase and Bank of America are speedily implementing virtual teller remote deposit services. Virtual tellers enable consumers to capture, validate, and transmit their deposits from their office or home. This eliminates the need to physically process a deposit at bank and hence reduces the total time required to clear consumer checks.

Besides the above, some common SSTs include onsite options such as ATM services in banks, check-in kiosks at airports, and self-scanning machines in grocery stores (Dabholkar and Bagozzi 2002). They also include offsite options such as automated consumer service help lines, online banking, and internet shopping (Dabholkar 1994; Dabholkar and Bagozzi 2002). However, the distinction between onsite and offsite options is increasingly becoming blurred (Dabholkar and Bagozzi 2002) with firms such as Best Buy beginning to offer internet-connected in-store kiosks whereby consumers can browse the catalog, identify a product's availability in the store, and also order the product online. This increased consumer-technology interaction in an organizational context gives rise to important research questions, some of which have been well documented in prior literature (Dabholkar 2000).

While prior studies have provided an important starting point to understand why organizations adopt SSTs and what outcomes result from SST usage (e.g. Carter et al. 2011; Venkatesh et al. 2012), the answers to several questions still remain unclear. For instance: Do SSTs lead to better service quality compared to service provided by human agents? How can organizations facilitate greater consumer usage of their existing SSTs? Are there any moderating effects of demographics variables such as age, gender, and level of education in relation to SST usage? By exploring these questions, we hope to provide some managerial and research insights leading to better design and implementation of SSTs in organizations. Specifically, the current study seeks to answer the following two research questions:

(1) Do consumers perceive a difference between SSTs and human agents in the dimensions of service quality and in which dimensions are these differences more pronounced? (2) How do the dimensions of service quality affect consumers' satisfaction when receiving service from SSTs versus human agents?

In order to answer these two questions, we conducted a scenario-based experiment to simulate an airline's interactive voice response telephone system. The airline industry has been one of the forerunners seeking to improve operational efficiency and reduce costs by implementing SSTs, including installing kiosks at airports and using automated consumer service lines (Curran et al. 2003). This paper is organized as follows: we first review the relevant literature on SSTs. Next, we present our research models for two studies along with hypotheses. Finally, we clarify the findings, discuss implications and limitations, and suggest further research directions.

Literature Review

Self-service technologies (SSTs) are defined as "technological interfaces that enable consumers to produce a service independent of direct service employee involvement (Shamdasani et al. 2008, p.117)). It is a relatively recent service delivery method compared to personal service (Beatson et al. 2007). Most research on SSTs focuses on either 1) reasons to adopt or reject SSTs (e.g. Bitner et al. 2002), 2) determinants of SST adoption (e.g. Lin and Chang 2011, Venkatesh et al. 2012), or 3) outcomes of SSTs

usage (e.g. Weijters et al. 2007). These studies are summarized below.

Why do Consumers Use or Reject SSTs?

The reasons consumers adopt SSTs depend upon the benefits they can receive from SSTs usage. Benefits of using SSTs include cost and time savings through increased speed of service (Bitner et al. 2002), , greater convenience through extended operation hours and accessible locations (Walker et al. 2002), and greater control over the service delivery process (Meuter et al. 2000). Other potential benefits include a higher level of personalization as SSTs can be tailored to the individual profile, spatial and time efficiency, reduced waiting time (Weijters et al. 2007), and flexibility (Bitner et al. 2002).

Bitner et al. (2002) collected written descriptions from 823 customers of their satisfying and dissatisfying SSTs experience. These experiences spanned 13 different industries ranging from pay-at-pump gas stations, ATMs, a variety of automated telephone services, to online shopping. They cited three reasons as to why consumers may prefer to use SSTs. First, SSTs can help consumers in difficult situations. For example, at a pay-at-pump gas service, a single mom with a sleeping baby can fill gas and make a payment at the pump while letting the baby sleep, thereby not having to leave the baby and pay inside the store. Second, SSTs are often better than interpersonal alternatives. Consumers will switch to an SST if it can save them time or money, or provide them easier access. For instance, the Stop-n-Shop Supermarket in Massachusetts uses a hand-held device called Scan-it in store for self-checkout. A consumer can use membership card to pick up a Scan-it at the store entry. Then use the device to check out all the items while shopping around the store. Stores have lanes dedicated only for Scan-it orders and Scan-it users also receive additional coupons. Third, SSTs can provide consumers with reasonably reliable services that are consistent and accurate.

Despite the benefits described above, there is evidence that consumers sometimes reject SSTs (Curran et al. 2003). First, consumers avoid using poorly designed SSTs. Consumers are usually frustrated with technologies that are hard to use or understand (Bitner et al. 2002). Therefore, they might return to a conventional service delivery option. Second, consumer might avoid using SSTs if SSTs can lead to potential loss of personal interaction between them and the service employee (Zeithamal and Gilly 1987). Finally, if consumers don't feel comfortable with the technology and worry about the lack of technical support from service employees, they will avoid using SSTs (Curran et al. 2003).

What are the Determinants of SSTs Adoption?

Following the procedure recommended by Webster and Watson (2002), we conducted an extensive literature review of the determinants of adoption of SSTs. According to the Innovation Diffusion Theory (Rogers 2010), adoption of a new technology is a process, including awareness, investigation, evaluation, trial, repeated use, and commitment. Hence, in this study, adoption of SSTs was defined as consumer intention or action to explore, investigate, evaluate, try, and continue use SSTs.

In general, the determinants of SST adoption derived from the prior literature can be summarized into three categories:

(1) Acceptance factors: factors in this category mainly come from Information Systems (IS) acceptance models, e.g. Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Unified Theory of Acceptance and Use of Technology (UTAUT). Factors in this category include perceived usefulness (e.g. Njuguna et al. 2012), perceived ease of use (e.g. Yang et al. 2012), subjective norm (e.g. Carter et al. 2011), perceived behavioral control (e.g. Chen et al. 2009), perceived self-efficacy (e.g. Njuguna et al. 2012), effort expectancy (e.g. Carter et al. 2011), usability (e.g. Venkatesh et al. 2012), attitude toward using SST (e.g. Lanseng and Andreassen 2007) , and attitude toward service-employee (e.g. Curran and Meuter 2005), among others.

(2) Personal factors: factors in this category are derived from social or relationship theories, such as trust (e.g. Dimitriadis and Kyrezis 2011), fairness perceptions (e.g. White et al. 2012), and desire for interaction (e.g. Oh et al. 2013).

(3) Environmental factors: factors in this category originate from institutional theory such as coercive, mimetic, and normative pressures (e.g. Yang et al. 2012).

Curran et al. (2003) developed and tested a model of bank consumers' intention to use SSTs based on their "specific" attitude towards three particular SSTs (i.e., Bank by Phone, Online Banking or ATM) and

their “global” attitude towards the firm and towards general SSTs. They found that global attitudes partially mediated the relationship between consumers’ specific attitudes and their intention to use the three SSTs. Meuter et al. (2005) noted that as experience with related technologies increases, the use of SSTs increases. They explained this relationship through the consumer readiness variable, stating that increased experience can lead to higher levels of motivation, role clarity and ability which increased the likelihood of consumer usage of SSTs. More recently, Reinders et al. (2008) looked at the impact on consumers when organizations eliminated professional service and forced consumers to use SSTs. They defined forced use of SST as a scenario where the consumers did not have a say in selecting their service delivery mode. Their findings suggested that forced use of SST negatively impacts attitude towards the SST, and towards the service provider. They concluded that consumers preferred to have some choice in selecting their service delivery mode.

Prior researchers have also looked at the impact of consumer traits on SSTs adoption. Self-efficacy, novelty seeking, self-consciousness were found to affect the consumer’s attitude and intention to use (Dabholkar and Bagozzi 2002). Situational factors such as ease of use, control, reliability, perceived usefulness and enjoyment have also been found to positively affect SST adoption (Dabholkar et al. 2003; Weijters et al. 2007).

For personal factors, Carter et al. (2011) conducted a survey with 304 US taxpayers to investigate the influence of six determinants on taxpayer’ intention to adopt IRS e-filing systems. They did not find significant impact of trust on the intention to adopt e-filing systems. However, all the other 5 factors effort expectancy, performance expectancy, social influence, self-efficacy, and perceived control were found to significantly affect adoption decision. Dimitriadis and Kyrezis (2011) examined the effect of trust on use intention of two technologies, internet and phone banking, with 762 bank consumers. They found that consumers who trusted the SSTs were more likely to transact online or via phone. Only one study in prior literature examined environmental factors. Yang et al. (2012) studied the links from coercive pressures, mimetic pressures, and normative pressures to intention to use SSTs. They found that all three factors positively affect intention to use SSTs. The determinants of SST adoption in prior literature are summarized in Table 1 below.

Table 1: Determinants of SST Adoption in Prior Literature

References	Influencing Factors	SST being adopted	Outcomes
Cater et al. (2011)	Effort Expectancy (+)* Performance Expectancy (+) Social Influence (+) Trust of Independent Intermediary (+) Web Self-Efficacy (+)	IRS e-filing	Intention to Use
Chan and Lu (2004)	Subjective Norm (+) Perceived Usefulness (+)	Internet banking	Intention to Adopt/Continue-use
Chen et al. (2009)	Satisfaction (+) Subjective Norm (+) perceived behavioral control (+) Optimism (+) Innovativeness (-)	E-reservation/ticketing, kiosks, ATM, internet or mobile banking for finance/investment.	Satisfaction, Continuance Intention
Curran and Meuter (2005)	Attitude(+)	Online banking, ATM, Bank by Phone	Intention to Use SST
Curran and Meuter (2007)	Attitude toward Staff(-) Enjoyment(+) Utility (+)	Online banking, ATM, Bank by phone	Intention to Change Behavior
Dimitriadis and Kyrezis (2011)	Trusting Intention (+) Level of Information (+)	Phone and online banking	Intention to Transact

Table 1: Determinants of SST Adoption in Prior Literature

References	Influencing Factors	SST being adopted	Outcomes
Lanseng and Andreassen (2007)	Attitude toward Using (+) Outcome Desirability (+)	Health care	Behavioral Intention
Lee and Allaway (2002)	Controllability (+)		Adoption Intention
Lin and Chang (2011)	Technology Readiness (+) Perceived Usefulness (+) Attitude toward using SST (+)	Kiosks, interactive phone response systems, internet, and mobile services	Behavioral Intentions
Lin and Hseih (2006)	Technology Readiness (+) SST Satisfaction (+) SST Service Quality (+)	Transportation services (e-reservation/ticketing, voice reservation system and kiosks), financial services (ATM, internet or mobile banking/finance/investment, interactive phone banking/finance/investment), and other services (e.g. government and cinema).	SST Behavioral Intentions
Meuter et al. (2005)	Role Clarity (+) Extrinsic Motivation(+) Intrinsic Motivation(+) Ability(+)	Voice-response telephone system or an internet-based system.	Trial of SSTs
Njuguna et al. (2012)	Perceived Ease of Use(+) Perceived Usefulness(+) perceived Self-Efficacy(+) Relative Advantage(+) Compatibility(+) Result Demonstrability(+)	Internet banking	Intention
Oh et al. (2013)	Perceived Usefulness(+) Desire for Interaction (-)	Hotel reservation	Intention to Use SSTs
Tong (2008)	Perceived Usefulness(+)	E-recruitment	Behavioral Intention to Use SSTs
Venkatesh et al. (2012)	Usability(+) Computer Resource Requirement (-) Technical Support Provision(+) Security Provision(+)	Online appointment booking service, and online tax filing service	Intention, Use, and Satisfaction
White et al. (2012)	Fairness Perception(+)	Not specified	Intention to Stay

Table 1: Determinants of SST Adoption in Prior Literature

References	Influencing Factors	SST being adopted	Outcomes
Yang et al. (2012)	Technology Readiness(+) Perceived Usefulness(+) Perceived Ease of Use(+) Perceived risk Coercive(+) Normative(+) Mimetic(+)	Not specified	Intention to Use SSTs

**a plus sign "+" indicates a positive relationship between an influencing factor and SST adoption. Likewise, a negative sign "-" represents a negative relationship.*

What are the Outcomes of SST Usage?

Service quality and satisfaction have been commonly used as outcome variables resulting from SST adoption (e.g. Lin and Hsieh 2006; Shamdasani et al. 2008). Service quality is an important indicator of IS success (Carr 2002, 2007; Grover et al. 1996; Landrum et al. 2008; Jiang et al. 2000; Kettinger and Lee 1999; 2005; Pitt et al. 1997; Yoon and Suh 2004; Wang and Tang 2003; Van Dyke et al. 1997). In general, service quality has been measured using five dimensions, which include responsiveness, assurance, reliability, empathy and tangibles (Bolton and Drew 1991; Ladhari 2008; Parasuraman et al. 1985; Parasuraman et al. 1994; Zeithaml et al. 1990; Jiang et al. 2000). Responsiveness refers to the willingness of a service provider to help consumers and provide prompt service; assurance refers to the knowledge and courtesy of a service provider and his ability to inspire trust and confidence; reliability refers to the ability of a service provider to perform the promised tasks dependably and accurately; empathy refers to a service provider who gives caring and individualized attention to consumers; and tangibles refers to the appearance of physical facilities, equipment, and personnel (Parasuraman et al. 1985; Jiang et al. 2000). IS literature has found that the "tangibles" dimension is not relevant to the perceived service quality of IS services (Cronin and Taylor 1992, 1994; Jiang et al. 2010).

Consumer satisfaction is seen as a primary objective for top management and has been linked to firm performance (Beatson et al. 2007). It is well accepted that front-line employees affect consumer satisfaction (Von Dolen et al. 2002). In the context of SSTs, prior literature also revealed that perceived service quality of SST impacted consumer satisfaction. For example, Lin and Hsieh (2006) found that consumer satisfaction was positively associated with service quality of SST and technology readiness of consumer. Consumer satisfaction in this study is conceptualized as overall satisfaction, and defined as an affective state to a service experience (Beatson et al. 2007).

Research Model

In this research, we conducted an experimental study to answer two research questions. The first set of hypotheses investigated the influence of the service agent on consumers' perceived service quality. Service quality was evaluated in terms of four dimensions: reliability, responsiveness, assurance, and empathy. The second set of hypotheses tested the relationships between the four dimensions of service quality and consumer information satisfaction for two groups of consumers: consumers who interacted with an SST, and consumers who interacted with a human agent.

Model 1: Personal Service vs. Self-Service Technology

Reliability has been found to represent overall electronic or technology-based service quality and refers to the correct functioning, in technical terms, of a self-service technology (Weijters et al. 2007). Reliability has been conceptualized as a performance metric in prior literature on consumers' evaluation of SSTs (Dabholkar and Bagozzi 2002). It refers to the consistency and accuracy of the technology based self-service. In addition, reliability has been found to be a strong predictor of consumer satisfaction (Wolfinbarger and Gilly 2003). Dabholkar and Bagozzi's (2002) results indicate that consumers do not view reliability as an important consideration when faced with a choice to use technology based self-service. However, Weijters et al. (2007) in their study of consumers' use of SSTs in a real retail setting found that reliability affected consumers' attitude towards technology based self-service. In addition, human agents were viewed to be more reliable than technology-based self-service because of their higher

level of interaction with consumers and abilities to provide more detailed information (Dabholkar and Bagozzi 2002). Hence, we hypothesize:

H1a: Consumers using human agent service (i.e., personal service) perceive a higher level of reliability than consumers using self-service technology.

Previous research has shown that the longer the delay in service provisioning, the lower the consumer's satisfaction with the service. Waiting time has been found to significantly impact consumers' perception of service quality (Maister 1985). Pruyn and Smidts (1998) conducted an experiment to study the impact of objective waiting time on service satisfaction, and concluded that waiting time is a critical reference point for service managers and its ability to provoke affective responses can have an impact on perceived service satisfaction. In another experiment, Tom and Scott (1995) found similar results regarding the effects of waiting time on satisfaction. Do such perceptions transfer to scenarios involving SSTs? Dabholkar and Bagozzi (2002) found in their study of user preference for self-service technologies that perceived waiting time significantly moderated the relationship between attitude toward using the technology and the intention to use it. The lesser the waiting time involved, the stronger was consumers' intention to use SSTs. In general, SSTs can respond to a consumer's request more quickly than human agents. Hence we expect that participants interacting with self-service technologies will perceive higher levels of responsiveness due to the shorter waiting time.

H1b: Consumers using human agent service (i.e., personal service) perceive a lower level of responsiveness than consumers using self-service technology.

Assurance was found to be the second most important dimension of service quality (Parasuraman et al. 1988). Assurance by definition invokes human interaction and it represents dimensions such as communication, credibility and competence (Parasuraman et al. 1988). A consumer's decision to use SSTs is often influenced by assurances that are derived from reputation and competence (Kovar et al. 2000). It has also been validated as a key measure of service quality of SSTs (Lin and Hsieh 2011). While SSTs can be technically accurate and provide proper service, it cannot however provide the same level of assurance to consumers that a human agent might provide. Therefore we hypothesize:

H1c: Consumers using human agent service (i.e., personal service) perceive a higher level of assurance than consumers using self-service technology.

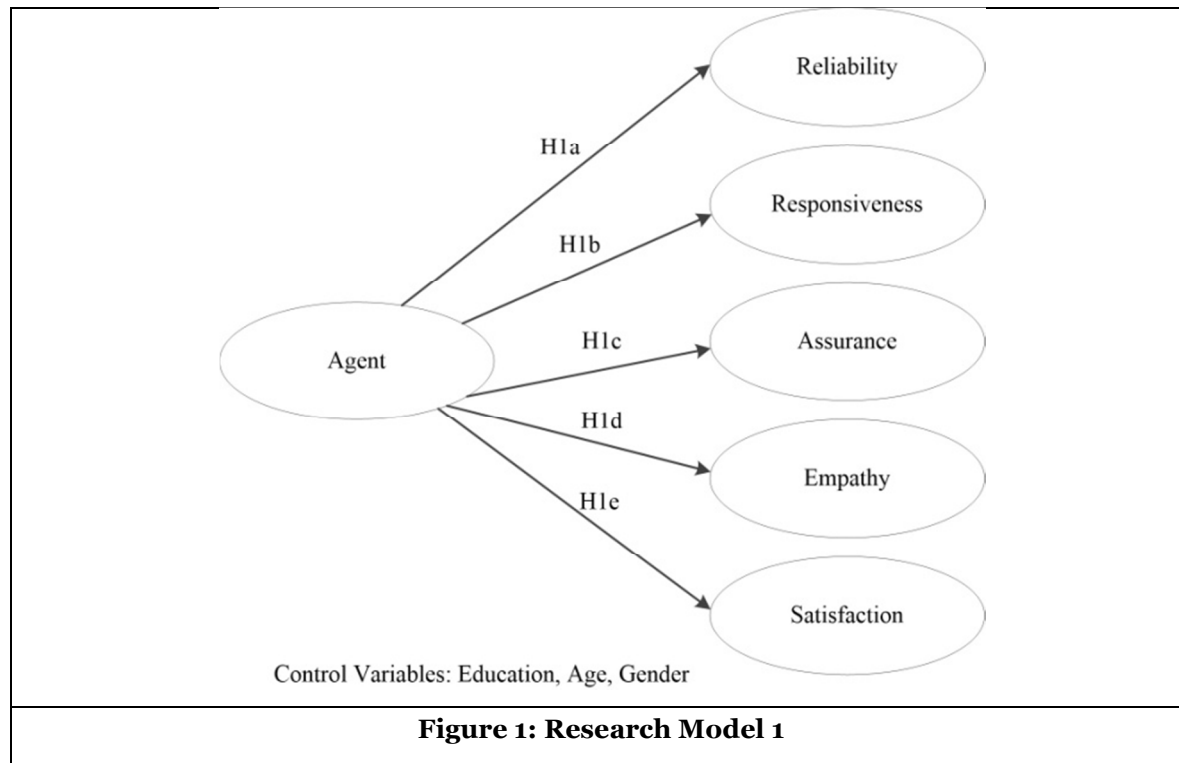
In the same light, empathy is defined as the "caring, individualized attention that the firm provides its consumers" (Parasuraman et al. 1988). Prior studies have found that people feel strongly that the use of machines in a service encounter dehumanizes the interaction (Breakwell et al. 1986; Zeithaml and Gilly 1987). While self-service technology can impersonate a human agent, it cannot provide the empathy that a human agent can provide. Hence we hypothesize:

H1d: Consumers using human agent service (i.e., personal service) perceive a higher level of empathy than consumers using self-service technology.

When both a human agent and a computer agent are available and can be reached without waiting, consumers are inclined towards interpersonal interaction. Especially, when dealing with complex issues, human agents are more capable of helping consumers solve problems. In turn, consumers tend to be more satisfied with personal service. Therefore, we hypothesize:

H1e: Consumers using human agent service (i.e., personal service) perceive a higher level of satisfaction than consumers using self-service technology.

In addition, this study incorporated age, gender, and education as control variables. Age has been found to have a negative impact on the preference to use SST (Simon and Usunier 2007). Young people are more likely to use SST as compared to older people (Morris and Venkatesh 2000). Prior research has also found that there are gender differences in SST usage (Venkatesh and Morris 2000). Males are more likely to use SSTs because of their efficiency and lower time burden whereas females avoid using SSTs due to their complication. Finally, Weijters et al. (2007) found that consumers with higher level of education are more likely to try new SSTs. The research model for these hypotheses is summarized in Figure 1.



Model 2: Perceived Service Quality and Consumer Satisfaction with SSTs

Many studies offer both theoretical justification and empirical evidence that supports the link between overall service quality and consumer satisfaction. Recent studies on SSTs and IS also reveal that higher perceived service quality leads to higher consumer satisfaction. For example, DeLone and McLean (1992; 2004) found that IS service quality influences user satisfaction. Taylor and Hunter (2002) and Taylor et al. (2002) also suggested that consumer perceived e-service quality increases consumer satisfaction. Similar results have been found in SST-related studies (e.g. Lin and Hsieh 2006; Shamdasani et al. 2008). For example, Lin and Hsieh (2006) examined the relationship between service quality and satisfaction in a wide range of SSTs and found that service quality has a significantly positive impact on consumer satisfaction. In addition, we are interested in examining whether the sub-dimensions of service quality affect the consumer satisfaction differently. Therefore, we decomposed service quality into four dimensions and hypothesized that all four dimensions positively influence consumers' satisfaction with SSTs.

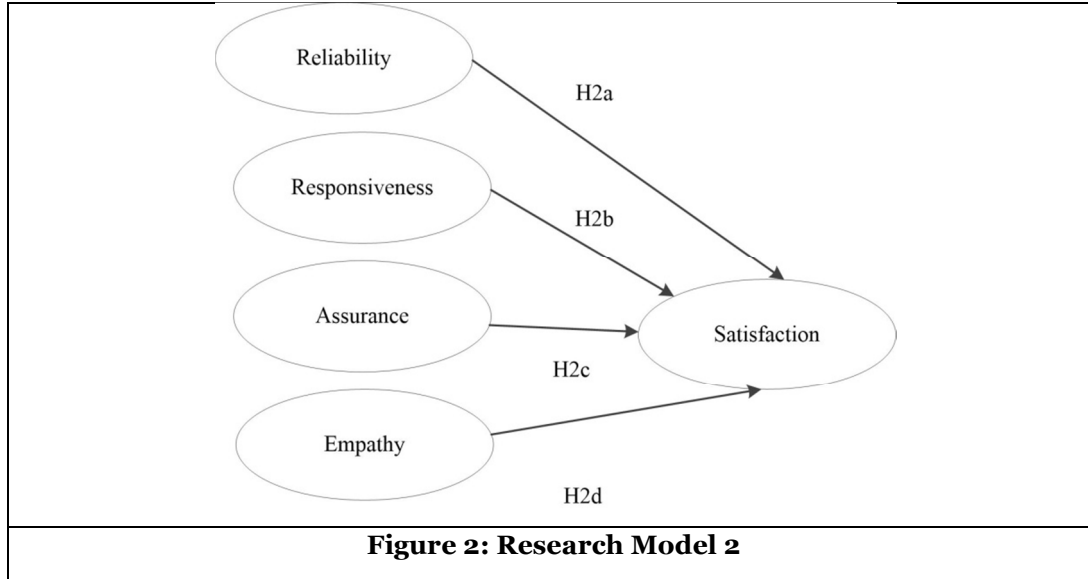
H2a: Perceived reliability is positively related to consumer satisfaction.

H2b: Perceived responsiveness is positively related to consumer satisfaction.

H2c: Perceived assurance is positively related to consumer satisfaction.

H2d: Perceived empathy is positively related to consumer satisfaction.

In the current study, we tested the above four hypotheses with two subsamples. The first subsample included consumers who interacted with a human agent. We refer to this subsample as Non-SST consumers. The second subsample included consumers who interacted with SSTs. We referred to these as SST consumers. The research model for the second set of hypotheses is shown in Figure 2.



Study Design and Methodology

We tested the research models with college students, who are generally more interested in self-service technologies compared to the general population. Due to greater homogeneity of student subjects, there is a greater control over extraneous variables (Peterson 2001). Furthermore, student subjects are reasonable representatives of SST users such as online shoppers, and consumers of airline SSTs. Finally, younger people are more receptive to SSTs (Morris and Venkatesh 2000).

Experimental Design

To test the hypotheses, a scenario-based experiment was designed (see Table 2). Prior self-service research has successfully used scenario-based questionnaire to study a variety of topics (Dabholkar and Bagozzi 2002). We used an airline consumer call to reschedule a flight as the context for the consumer service scenario. This context has been used before to study service satisfaction, which is consistent with our research design (Dubé and Maute 1998). An airline consumer service call is a suitable context because many people have prior experience with air travel. To make the scenario as realistic as possible, we called an airline's consumer service center to reschedule a flight. We transcribed the conversation to create the base scenario and manipulated the base scenario to create two versions applicable to the two treatments. This is a common method used in linguistic studies (Blum-Kulka 1982; Olshtain 1983; Olshtain and Cohen 1989; Blum et al. 1989; Beebe and Cummings 1996). The written approaches save time in data collection, avoid biases in human voices (gender, accent, tone), and provide reasonable measures of the same constructs collected from oral approaches (Cohen 1996).

Table 2: Service Agent

Staff: Sarah (Personal Service)	Automated Voice System (SST)
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The design yields 2 treatments:

Treatment 1: A consumer service scenario handled by a human agent: Sarah.

Treatment 2: A consumer service scenario handled by Airlines' automated voice system.

A survey was administered after participants read the scenario. The survey measured the main constructs of perceived service quality and satisfaction, as well as a number of demographic and control variables. The measures are explained below.

Measurement

Measure of Perceived Service Quality. This study uses the perceived service quality items of the SERVQUAL instrument from Jiang et al. (2000) because it has been tested in the context of IS and has been found to represent an accurate view of user perceptions. This version of SERVQUAL eliminates the “tangibles” dimension of service quality because Jiang et al. (2000) and other prior research has found that tangibles are not relevant to the perceived service quality of IS services (Cronin and Taylor 1992; 1994). Three possible reasons might lead to the lack of significance in the tangible dimension of IS services: (1) users are limited to the physical view of IS facilities; (2) users are limited to the visibility of a great deal of IS functions; and (3) users could also be limited to the appearance of IS personnel (Jiang et al. 2000). Therefore, we used 18 items to measure four dimensions of perceived service quality: responsiveness, assurance, reliability, and empathy. Perceived service quality was measured with a seven-point Likert scale.

Measure of Consumer Satisfaction. Consumer satisfaction was measured using four items adapted from Lin and Hsieh (2006) with a seven-point Likert scale.

Measure of Control Variables. Our experimental design controls for 3 variables: gender, age, and education. The control variables were measured with single items.

Manipulation Check

A post-experiment manipulation check was developed to measure the extent to which treatments were perceived by the participants. Manipulation checks are used to ensure high internal validity and subjects who fail manipulation checks are normally dropped from the study (Fromkin and Streufert 1976; Straub et al. 2004). The manipulation check consisted of 1 question to determine if participants could ascertain if the agent they interacted with was a human or self-service technology and 2 reading comprehension questions to test whether the participants had read and understood the scenarios. Participants were only included in the study if they passed the manipulation check questions (Perdue and Summers 1986).

Data Collection and Analyses

Data Collection

After pilot testing with five students and a university staff member, the paper-based scenarios, surveys, and manipulation checks were administered to undergraduate and graduate business students enrolled in classes at two large U.S. universities, one Midwestern and the other Southern. The experiment was conducted in similar conditions for all classes on both campuses in order to keep the experimental setting as controlled as possible. Subjects were randomly assigned to one of the two treatments shown in Table 2. The authors did not administer the experiment to their own students. Participation was voluntary and occurred after the formal class was dismissed. To motivate participation, a small extra credit was awarded to participants.

In total, we administered the experiment to 362 students. At the Midwestern university, we collected data from 204 students, and at the Southern university, from 158 students. Of the 362 participants, 77.0 % passed the manipulation check pertaining to their ability to identify the Agent (Human or SST). However only 181 answered both reading comprehension questions correctly. Thus only these 181 participants were included in the final sample. Their demographic characteristics are summarized in Table 3.

Table 3: Demographics and Prior Experience (n = 181)

	Value	Number	Percentage
Gender	Male:	110	60.8%
	Female:	71	39.2%
Nationality	American:	158	87.3%
	Other Countries:	23	12.7%
Education level	Undergraduate:	152	84%
	Graduate:	29	16%
Bought Air-ticket Before	Yes:	145	80.1%
	No:	36	19.9%
Called Airlines' Consumer Service Before to Reschedule a Flight	Yes:	44	24.3%
	No:	137	75.7%
Prior Experience with Automated Systems	Mean = 5.21 Standard Deviation = 1.29		
Age	Median = 23 years Average = 24.3 years Standard Deviation = 5.60 Range: 18 years to 60 years old		

Data Analysis

LISREL 8.53 and SPSS 20 was used to analyze our data. LISREL was used to test the measurement model and to assess convergent validity. SPSS was used for hypotheses testing as it provides easily understandable results for the hypotheses tests.

Measurement Model

Convergent validity was assessed using t-statistics (Anderson and Gerbing 1988; Sabherwal and Becerra-Fernandez 2003). Items with factor loadings less than 0.70 were dropped from the measurement model. Thus 3 items each were dropped from the reliability and empathy constructs, and 2 each from the responsiveness and assurance constructs. As shown in Table 4, the lowest t-statistic was 10.04 ($p < .001$) thus confirming convergent validity for the constructs. Furthermore all item loadings exceeded .70 (Jung et al. 2010).

Table 4: Measurement Model

Construct	Measurement	Factor Loading	Error	T-Value of factor loading
Reliability	RELI3	0.77	0.41	11.40
	RELI3: ABC Airlines' customer service unit is dependable.			
	RELI4	0.72	0.48	10.49
	RELI4: ABC Airlines' customer service unit provides service at the times it promises to do so.			
Responsiveness (RESP)	RESP2	0.82	0.32	12.60
	RESP2: ABC Airlines' customer service unit gives prompt service to customers.			
	RESP3	0.74	0.45	10.04
	RESP3: ABC Airlines' customer service unit is always willing to help customers.			
Assurance (ASSU)	ASSU1	0.81	0.34	12.63
	ASSU1: The behavior of ABC Airlines' customer service unit instills confidence in customers to use the service in the future.			
	ASSU2	0.82	0.32	12.90
	ASSU2: Customers will feel safe in their transaction with ABC Airlines'			

	customer service unit.			
Empathy (EMPA)	EMPA1	0.91	0.18	14.55
	EMPA1: ABC Airlines' customer service unit gives customers individual attention.			
	EMPA3	0.88	0.23	13.92
	EMPA3: ABC Airlines' customer service unit gives customers personal attention.			
Consumer Satisfaction (SAT)	SAT1	0.90	0.20	15.36
	SAT1: I was satisfied with the experience with ABC Airlines' customer service unit.			
	SAT2	0.89	0.20	15.26
	SAT2: I was satisfied with the support and services of ABC Airlines' customer service unit.			
	SAT3	0.84	0.30	13.74
	SAT3: I found the information provided was reliable, accurate and complete.			
	SAT4	0.94	0.11	16.84
Model Fit	SAT4: Overall, I was satisfied with ABC Airlines' customer service unit.			
	Chi-Square=125.71			
	Degree of freedom=55			
	Chi-Square/Degree of freedom=2.29			
	NFI=0.97 NNFI=0.98 CFI=0.98 RMSA=0.08			

*Measurement items were dropped from measurement model if factor loading < 0.70.

Table 5 demonstrates further support for the convergent validity of the constructs, with the average variance extracted (AVE) for each construct exceeding .50 (Au et al. 2008; Hatcher 1994). Table 5 also shows the inter-item (Cronbach's alpha) and the composite reliabilities of the constructs (Sabherwal and Becerra-Fernandez 2003), which all exceeded the recommended minimum value of 0.70 (Nunnally 1978; Gefen et al. 2000; Hair et al. 2006).

Table 5: AVE and Reliabilities

Construct	AVE	Composite Reliability	Alpha
Reliability	0.56	0.72	0.72
Responsiveness	0.61	0.76	0.75
Assurance	0.66	0.80	0.80
Empathy	0.80	0.89	0.85
Consumer Satisfaction	0.80	0.94	0.94

Discriminant validity was demonstrated using the Average Variance Extracted (AVE) test (Gefen and Straub 2005). As seen in Table 6, the square root of the AVE of each construct was greater than its correlation with any other construct. To further test discriminant validity, chi-square difference tests were performed, all of which were significant at $p < .001$.

Table 6: AVE Test for Discriminant Validity

Construct	Square Root of AVE	Correlations				
		RELI	RESP	ASSU	EMPA	SAT
Reliability (RELI)	0.75	-				
Responsiveness (RESP)	0.78	0.74*	-			
Assurance (ASSU)	0.82	0.72*	0.64*	-		
Empathy (EMPA)	0.90	0.68*	0.66*	0.76*	-	
Satisfaction (SAT)	0.89	0.73*	0.69*	0.67*	0.78*	-

*correlation is significant at $p\text{-value} < 0.05$.

Common method variance refers to "variance that is attributable to the measurement method rather than to the constructs the measures represent" (Podsakoff et al. 2003, p.879). It may occur when data are collected through only one method (Campbell and Fiske 1959) or through the same method but only at one point in time. Harman's single-factor test (Podsakoff et al. 2003) was used to test common method variance in this study. A model with a single factor linking to all 12 measurement items was tested. The model didn't show good model fit (Chi-square/degrees of freedom=5.40, RMSEA=0.16). Therefore common-method bias was not an issue in this study.

Hypothesis Tests

Model 1: Human (Personal) Service vs. Self-Service Technology

To examine the effect of agent on reliability, responsiveness, assurance and empathy, we conducted four univariate ANOVAs. The results indicated that consumers who interacted with the human agent perceived higher levels of reliability, assurance, and empathy than those who interacted with the self-service technology. However, consumers did not perceive significant difference in terms of responsiveness when interacting with human agent versus the self-service technology. Descriptive data and hypothesis testing results are shown in Tables 7 and 8.

Table 7: Descriptive Statistics of Constructs						
Construct	Between-Subject Factor	Mean	Standard Deviation	95% Confidence Interval		
Reliability	Human Agent	5.75	0.99	(5.48, 5.02)		
	Self-Service Technology	5.30	1.12	(5.10, 5.51)		
Responsiveness	Human Agent	5.97	1.00	(5.69, 6.25)		
	Self-Service Technology	5.46	1.23	(5.25, 5.67)		
Assurance	Human Agent	5.96	1.00	(5.65, 6.27)		
	Self-Service Technology	5.32	1.38	(5.08, 5.55)		
Empathy	Human Agent	5.96	1.11	(5.58, 6.12)		
	Self-Service Technology	4.25	1.75	(3.96, 4.53)		
Satisfaction	Human Agent	6.32	0.72	(6.05, 6.58)		
	Self-Service Technology	5.76	1.24	(5.56, 5.96)		
Table 8: Summary of Hypothesis Tests 1a to 1e						
Hypothesis	Sum of Squares	Error	F	P-Value	Partial Eta Square	Conclusion
H1a	8.25	222.16	6.61	0.01	0.036	Supported
H1b	4.28	217.71	3.52	0.062	0.019	Not Supported
H1c	17.27	281.38	10.93	0.000	0.058	Supported
H1d	121.69	424.66	51.00	0.000	0.223	Supported
H1e	12.99	209.74	11.09	0.001	0.058	Supported

Clearly, consumers perceived higher levels in the three dimensions of service quality when interacting with the human agent versus the SST, although responsiveness was not significantly higher. In addition, consumers were more satisfied in their interaction with the human agent rather than the SST, even though in the scenarios both the human agent and the SST solved the consumer's problem. These findings are consistent with what have found in prior literature pertaining to consumer's preference for more personal interaction (e.g. Shostack 1977; Beatson et al. 2007).

Among the control variables, gender did not have an effect on the service quality dimensions or satisfaction, whereas age and education had effects on some service dimensions. Age had impacts on responsiveness and reliability. Older people perceived higher value of responsiveness and reliability of human agent than younger people. The respondent's level of education had impact on empathy, with graduates perceiving higher levels of empathy in the human agent than undergraduates.

Model 2: Perceived Service Quality and Satisfaction with SST

As seen in testing the first set of hypotheses, consumers in the human agent (i.e., non-SST) group perceived higher levels of reliability, assurance, empathy, and satisfaction than consumers in the SST group. Even though consumers prefer service from human agents, organizations are still implementing SSTs in order to reduce costs, to inspire service innovations, to enhance service delivery options, and to expand market reach (Bitner et al. 2010). Therefore, in the second set of hypotheses we investigated the relationships between the service quality sub-dimensions and consumer satisfaction in order to shed more light on the topic. There were 61 subjects in the human agent (personal) service group, and 116 subjects in the SST group. The research model in Figure 2 was tested using step-wise linear regression. The results are summarized in Tables 9 and 10. For the non-SST group, the model explained 64.7% of the variance of consumer satisfaction. Perceived reliability, assurance, and empathy were strongly associated with consumer satisfaction while responsiveness was not.

Table 9: Regression Analysis for Human Agent Service

Relationships	Path Coefficient (standardized Beta)	t-value	Conclusion
H2a:Reliability-->Satisfaction	0.227	3.59	Supported
H2b: Responsiveness-->Satisfaction	0.035	0.269	Not Supported
H2c: Assurance-->Satisfaction	0.467	5.13	Supported
H2d:Empathy-->Satisfaction	0.308	3.59	Supported

For the SST group, the model explained 68.9% of the variance of consumer satisfaction. Perceived reliability, responsiveness, and assurance were strongly associated with consumer satisfaction while empathy was not.

Table 10: Regression Analysis for SSTs

Relationships	Path Coefficient (standardized Beta)	t-value	Conclusion
H2a:Reliability-->Satisfaction	0.245	2.644	Supported
H2b: Responsiveness-->Satisfaction	0.221	2.805	Supported
H2c: Assurance-->Satisfaction	0.458	5.69	Supported
H2d:Empathy-->Satisfaction	0.071	1.03	Not Support

Discussion

This paper tested two research models to answer these two questions respectively: 1) do consumers perceive service quality differently with SSTs and with human agents? 2) how do the sub-dimensions of service quality affect customers' satisfaction in the case of SST usage as well as human agent usage? A majority of the hypotheses in Model 1 were supported except the H1b, confirming that consumers tend to perceive higher levels of reliability, assurance, empathy, and satisfaction when interacting with a human agent rather than with a SST. Further, the results in Model 2 suggest that a consumer's satisfaction is related to service reliability, assurance, and empathy when interacting with a human agent. In order to achieve a high level of reliability, human agents should be able to provide the service they promise to do at a certain time and be dependable. To achieve a high level of assurance, human agents should be knowledgeable and be able to answer consumers' questions, as well as keep the transactions safe and protected. For the high value of empathy, service employees should be patient and listen to consumers' opinions, as well as pay attention to their individual interests. Firms can focus on these aspects to improve consumer satisfaction.

In contrast, when interacting with a SST, a consumer's satisfaction is more related to service reliability,

responsiveness, and assurance. It seems like that consumers might not care about empathy of SSTs perhaps because they do not expect technology to be empathetic. Instead, they might prefer SSTs to give more prompt services and help them solve the problem in a short period of time. Firms may consider installing more SSTs in order to reduce the service waiting time. As indicated by our results, consumers also seem to seek reliability and assurance in SSTs. Regarding reliability, consumers might want SSTs that work faultlessly, and do not break down frequently. Therefore, organizations could ensure their SSTs work reliably by periodically updating their hardware and software, conducting extensive tests, and providing alternatives in case of failures. For assurance, consumers might want to ensure their transactions with SSTs are securely and correctly processed. Firms could send consumers confirmation emails including a transcript of the service interaction or let employees make follow up phone calls to ensure such consumers receive the assurance they seek.

Implications

A number of implications for firms implementing SSTs can be derived from our results. First, the degree of automation of service processes should be given increased attention by firms with existing SSTs or those considering implementing SSTs. As seen from the results of our Model 1, overall, consumers tend to perceive better service quality and satisfaction when interacting with a human agent over a SST. However, SSTs also have their advantages such as reducing operating costs and speeding up service delivery. Therefore, firms not only need to align their target market (e.g. who are the customers?) with their service concept (e.g. what is the service package offered?) (Ponsignon et al. 2011), but also need to balance the automation of service processes with the requisite level of human involvement, in order to design a better service delivery system. We recommend that firms consider the following questions when making their SST implementation decision: (1) Which service processes can be replaced by SSTs? and (2) How can human agent services be blended with SSTs?

Second, firms might consider segmenting customers based on their value to the organizations in order to provide better service quality and higher customer satisfaction to high valued customers through human agent services. For example, in the case of the Airline industry, customers who fly first class could have a dedicated hotline that connects them directly to human customer service agents. There are a few examples of this in practice like the customer service for the Discover IT credit card which promises around the clock human agent service (Discover 2013). It is interesting to note that amidst the increased proliferation of SSTs, businesses are now using human agent services as a competitive differentiator. Our results highlight this need and we encourage more businesses to adopt such a strategy.

Finally, firms should examine all SSTs service quality dimensions along with the context in order to improve consumer satisfaction. As indicated by our Model 2, consumers perceived the relationships between service quality dimensions and satisfaction differently for human agents and SSTs. For SSTs, consumers might care more about the reliability, responsiveness, and assurance of SSTs, but not empathy. Thus, in order to achieve higher level of consumer satisfaction with SSTs, firms should offer reliable services that respond clearly and promptly, while being easy to use and operate. Firms should also offer engaging functionalities and enhance the security of SSTs transactions while supplying clear guarantees (Lin and Hsieh 2006).

Additionally, our research also extends existing literature in a number of ways. Most importantly, our research provides an empirical evidence for the necessity to measure service outcomes of SSTs and human agents separately. We conducted an experiment to compare the perceived service quality of a human agent and of a SST. Our results indicated that consumers perceived the service quality offered by human agent and SST differently. They perceived that a human agent could provide more reliable, assured, and empathetic service than a SST, while a SST could respond to a service request as quickly as a human agent. Therefore, the current findings suggest that a specific SERVQUAL instrument to measure SSTs might be needed, which is consistent with the suggestions proposed by Lin and Hsieh (2005) and Lin and Hsieh (2006). In addition, service delivery systems increasingly involve both SSTs and human agents. For example, Amazon.com or Myhabit.com consumers can use the website to check their order history. However, if consumers need to contact customer service, they can enter their phone numbers on the website and be transferred to a human service agent. Consumers can also initialize live chat sessions with

human agents. Our findings suggest that firms implementing blended service delivery systems should measure both the service quality of human agents and of SSTs using separate instruments.

Finally, understanding consumers' requirements has been the cornerstone of IT systems analysis and design (Albert et al. 2004). Our research suggests that consumers perceive the relationships between service quality sub-dimensions and satisfaction differently for SSTs as compared to human agents. Therefore, designs of SSTs should emphasize their reliability, responsiveness and assurance in order to achieve system success.

Limitations & Future Research

Our study has several limitations that need to be acknowledged. Due to the nature of our research setting, we had to use a paper based experiment. While the scenario based experiment provides replication of hard to access research setting and manipulation of experimental factors, it does not provide the real setting from where participants' perceptions can be measured. Specifically, we feel undertaking a similar study in a real consumer service setting would be very useful. Having different service outcomes such as success, failure, and delays would help tease out interrelations between agent types, and service outcomes. Moreover, our results might be limited by the fact that we only used a female human agent in the simulated scenario. There might be differences in the perception of service quality when interacting with a male human agent.

Future research can focus on determining the right degree of automation of service processes. Should firms replace their consumer services 100% with SSTs? Or what is the right percentage? How can firms effectively blend human agent services with SSTs? Future research might identify decisions rules to automate service processes and test them with empirical cases. Furthermore, multiple technologies are being used to deliver services such as automated voice systems, email, and live chat. It would be interesting to investigate whether these technologies deliver the same quality of service and how well they compare to services provided by human agents.

Conclusion

The increased use of self-service technologies in consumer service interactions has given rise to several research questions. Our studies have been undertaken in an attempt to understand consumers' perceptions of agent types and their perceptions regarding service quality and satisfaction in service interactions. Our findings suggest that participants did perceive significant differences in perceived service quality between agent types in customer service interactions. We recommend that practitioners should not overlook the importance of employing human agents to handle customer service requests. We suggest that businesses prioritize high value customers by providing them excellent customer service, which as our study shows, is through human agents. The cost effectiveness of automated agents make a strong point for their continued use but we believe that practitioners should be aware of the perceived differences in the quality of service between human and automated agents at the very least. Our research provides strong evidence of this fact. Therefore, firms should consider carefully about the right degree of automation of service processes when implementing SSTs. Also, our research indicates that consumers perceive the relationships between service quality sub-dimensions and satisfaction differently for human agents and SSTs. Hence, service firms should evaluate all SST service quality dimensions in order to improve customer satisfaction and intention to continue use. There are several more pertinent research questions to be investigated in order to fully understand the impact of using automated agents in business settings. While we acknowledge its limitations, we also hope that our study would pave the way for further research in the increasingly pervasive area of self-service technologies.

References

- Albert, Terri C., Paulo B. Goes, and Alok Gupta 2004.. "GIST: a model for design and management of content and interactivity of customer-centric web sites." *MIS Quarterly* (28:2), pp. 161-182.
- Anderson, J., and Gerbing, D. 1988. "Structural Equation Modeling in Practice: A Review and Recommended Two-step Approach," *Psychological Bulletin* (103:3), pp. 411-423.
- Appan, R. and Browne, G. 2010. "Investigating Retrieval-Induced Forgetting During Information Requirements Determination," *Journal of the Association for Information Systems* (11:5), Article 2.
- Au, N., Ngai, E., and Cheng, T. 2008. "Extending the Understanding of End User Information Systems Satisfaction Formation: An Equitable Needs Fulfillment Model Approach," *MIS Quarterly*, Vol. 32, pp. 43-66.
- Balijepally, V., Mahapatra, R., Nerur, S., and Price, K. 2009. "Are Two Heads Better Than One for Software Development? The Productivity Paradox of Pair Programming," *MIS Quarterly* (33:1), pp. 91-118.
- Beatson, A., Lee, N., and Coote, L. V. 2007. " Self-Service Technology and the Service Encounter", *The Service Industries Journal* (27:1), pp. 75-89.
- Beebe, L. and Cummings, M. 1996. "Natural Speechact Data Versus Written Questionnaire Data: How Data Collection Method Affects Performance," in S.M. Gass and J. Neu (Eds.), *Speech acts Across Cultures*, Berlin, pp. 65-88.
- Blum-Kulka, S. 1982. "Learning how to say what you mean in a second language: A study of speech act performance in learners of Hebrew as a second language," *Applied Linguistics*, Vol. 3, pp. 29-59.
- Blum-Kulka, S., House, J., and Kasper, G. 1989. *Cross Cultural Pragmatics: Requests and Apologies*, Ablex, Norwood New Jersey.
- Bitner, M. J., Ostrom, A. L., and Meuter, M. L. 2002. "Implementing successful self-service technologies." *The Academy of Management Executive* (16:4), pp. 96-108.
- Bobbitt, L. M., and Dabholkar, P. A. 2001. "Integrating attitudinal theories to understand and predict use of technology-based self-service: The Internet as an illustration", *International Journal of Service Industry Management* (12:5), pp.423 - 450.
- Bolton, R. and Drew, J. 1991. "A Multistage Model of Customers' Assessments of Service Quality and Value," *The Journal of Consumer Research* (17:4) , pp. 375-384.
- Breakwell, G M., Chris, F. Terence, L., and Judith, S. 1986. "Attitudes to New Technology in Relation to Social Belief and Group Memberships: A Preliminary Investigation," *Current Psychological Research & Reviews*, 5, pp. 34-47.
- Carmon, Z., Wertenbroch, K., and Zeelenberg, M. (2003), "Option attachment: When deliberating makes choosing feel like losing," *Journal of Consumer Research* (30:1), pp. 15-29.
- Carr, C. 2002. "A Psychometric Evaluation of the Expectations, Perceptions, and Difference Scores Generated by the IS-Adapted SERVQUAL Instrument," *Decision Sciences* (33:2), pp. 281-296.
- Carr, C. 2007. "The FAIRSERV Model: Consumer Reactions to Services Based on a Multidimensional Evaluation of Service Fairness," *Decision Sciences* (38: 1), pp. 107-130.
- Carter L., Shaupp, L. C., Hobbs, J., and Campbell R. 2011. "The role of security and trust in the adoption of online tax filing", *Transforming Government: People, Process and Policy* (5:4), pp.303 - 318.
- Cohen, A. 1996. "Investigating the Production of Speech Acts," in *Speech Acts Across Culture: Challenges to Communication in a Second Language*, Susan Gass and Joyce Nue (eds), Mouton de Gruyter, Berlin and New York, pp. 21-43.
- Cronin, J., and Taylor, S. 1992. "Measuring Service Quality: A Reexamination and Extension", *Journal of*

Marketing (56:3), pp. 55-68.

Cronin, J., and Taylor, S. 1994. "SERVPERF versus SERVQUAL: Reconciling Performance-Based and Perceptions-Minus-Expectations Measurement of Service Quality," *Journal of Marketing* (58:1), pp. 125-131.

Curran, J. M., and Meuter, M. L. 2005. "Self-service technology adoption: comparing three technologies." *Journal of Services Marketing* (19:2), pp. 103-113.

Dabholkar, P. A. 1994. "Incorporating Choice into an Attitudinal Framework: Analyzing Models of Mental Comparison Processes", *Journal of Consumer Research* (21:1), pp. 100-118.

Dabholkar, P. A. 1996. "Consumer Evaluations of New Technology-Based Self Service Options: An Investigation of Alternative Models of Service Quality," *International Journal of Research in Marketing*, Vol. 13, pp 29-51.

Dabholkar, P. A. 2000. "Technology in Service Delivery: Implications for Self service and Service Support." *Handbook of Services Marketing and Management*, Swartz, TA and Iacobucci, D.(Eds), Sage, Thousand Oaks, CA, 103-110.

Dabholkar, P. A., and Bagozzi, R.P. 2002. "An Attitudinal Model of Technology-Based Self-Service: Moderating Effects of Consumer Traits and Situational Factors," *Journal of the Academy of Marketing Science* (30:3), pp 184-201.

Dabholkar, P. A., Bobbitt, L. M., and Lee, E. J. 2003. "Understanding consumer motivation and behavior related to self-scanning in retailing: implications for strategy and research on technology-based self-service." *International Journal of Service Industry Management* (14:1), pp. 59-95.

DeLone, W. H., and McLean, E. R. 1992. "Information systems success: the quest for the dependent variable." *Information systems research* (3:1), pp. 60-95.

Delone, W. H., and Mclean, E. R. 2004. "Measuring e-commerce success: applying the DeLone & McLean information systems success model." *International Journal of Electronic Commerce* (9:1), pp. 31-47.

Dimitriadis, S., and Kyrezi, N. 2011. "The effect of trust, channel technology, and transaction type on the adoption of self-service bank channels." *The Service Industries Journal* (31:8), pp. 1293-1310.

Ding, X., Verma, R., and Iqbal Z., 2007. "Self-service technology and online financial service choice", *International Journal of Service Industry Management* (18:3), pp.246 - 268.

Discover. (2013, August). *Discover Card*. Retrieved from <http://www.youtube.com/watch?v=RI6v9ayqWfc&list=SPFADD74FE72FoD31F>.

Dube, L., and Maute, M. 1998. "Defensive strategies for managing satisfaction and loyalty in the service industry," *Psychology and Marketing* (15: 8), pp. 775-791.

Fromkin, H., and Streufert, S., 1976. "Laboratory Experimentation," in *Handbook of Industrial and Organizational Psychology*, Dunnette M. (ed), Chicago IL: Rand McNally, pp. 415-466.

Gefen, D., Straub, D.W., and Boudreau, M.C. 2000. "Structural Equation Modeling and Regression: Guidelines for Research Practice", *Communications of the Association for Information Systems* (4:7), pp. 1-77.

Gefen, D., and Straub, D.W. 2005. "A Practical Guide To Factorial Validity Using PLS-Graph: Tutorial And Annotated Example," *Communications of the Association for Information Systems* (16:1), pp. 91-109.

Goswami, S., Chan, H., and Kim, H. 2008. "The Role of Visualization Tools in Spreadsheet Error Correction from a Cognitive Fit Perspective," *Journal of the Association for Information Systems*(9:6), Article 16.

Grover, V., Cheon, M., and Teng, J. 1996. "The Effect of Service Quality and Partnership on the Outsourcing of Information Systems Functions," *Journal of Management Information Systems* (12:4), pp. 89-116.

Hair, J., Black, B., Babin, B., Anderson, R., and Tatham, R. 2006. *Multivariate Data Analysis*, New Jersey:

Pearson Education.

Hess, T, Fuller, M., and Campbell, D. 2009. "Designing Interfaces with Social Presence: Using Vividness and Extraversion to Create Social Recommendation Agents," *Journal of the Association for Information Systems* (10:12), Article 1.

Jiang, J., Klein, G., and Crampton, S., 2000, "A Note on SERVQUAL Reliability and Validity in Information System Service Quality Measurement," *MIS Quarterly* (31:3) , pp. 725-744.

Kettinger, W., and Lee, C. 1999. "Replication of Measures in Information Systems Research: The Case of IS SERVQUAL," *Decision Sciences* (30:3), pp. 893-899.

Ladhari, R. 2008. "Alternative Measures of Service Quality: A Review," *Managing Service Quality* (18:1) , pp. 65-86.

Landrum, H., Prybutok, V., Kappelman, L., and Zhang, X. 2008. "SERVICES: A Parsimonious Instrument to Measure Service Quality and Information Systems Success," *QMJ* (15: 3), pp. 17-25.

Lanseng, E. J., and Andreassen, T. W., 2007. "Electronic healthcare: a study of people's readiness and attitude toward performing self-diagnosis", *International Journal of Service Industry Management* (18:4), pp.394 - 417.

Lin, J. S. C., and Chang, H. C. 2011. "The role of technology readiness in self-service technology acceptance." *Managing Service Quality* (21:4), pp.424-444.

Lin, J.C. and Hsieh, P.L. 2005. "Assessing self-service technology encounters: development and validation of SSTQUAL scale", *paper presented at Taiwan Institute of Marketing Science Annual Conference*, Taipei, Taiwan.

Lin, J. S. C., and Hsieh, P. L. 2006. "The role of technology readiness in customers' perception and adoption of self-service technologies." *International Journal of Service Industry Management* (17:5), pp. 497-517.

Lin, J. S. C., and Hsieh, P. L. 2011. "Assessing the self-service technology encounters: development and validation of SSTQUAL scale." *Journal of Retailing* (87:2), pp. 194-206.

Maister, D. 1985. "The one-firm firm." *Sloan Management Review* (27:1), pp. 3-13.

Meuter, M. L., Ostrom, A. L., Roundtree, R. I., and Bitner, M. J. 2000. "Self-service technologies: understanding customer satisfaction with technology-based service encounters." *the Journal of Marketing* (64:3), pp. 50-64.

Meuter, M. L., Bitner, M. J., Ostrom, A. L., and Brown, S. W. 2005. "Choosing among alternative service delivery modes: an investigation of customer trial of self-service technologies." *Journal of Marketing* (69:2), pp. 61-83.

Morris, M. G., and Venkatesh, V. 2000. "Age differences in technology adoption decisions: Implications for a changing work force." *Personnel psychology* (53:2), pp. 375-403.

Nunnally, J. 1978. *Psychometric Theory*, New York: McGraw-Hill.

Olshtain, E. 1983. "Sociocultural Competence and Language Transfer: The Case of an Apology," in *Language Transfer in Language Learning*, Susan Gass and Larry Selinker (eds), Newbury House, Rowley, Massachusetts, pp. 232-249.

Olshtain, E. and Cohen, A. 1989. "Speech Act Behavior across Languages," in *Transfer in Language Production*, Hans Dechert and Manfred Raupach (eds), Ablex, Norwood NJ, pp. 53-68.

Parasuraman, A., Zeithaml, V., and Berry, L. 1985. "A Conceptual Model of Service Quality and Its Implications for Future Research," *Journal of Marketing* (49:4) , pp. 41-50.

Parasuraman, A., Zeithaml, V. A., and Berry, L. L. 1988. "Servqual." *Journal of retailing* (64:1), pp.12-37.

Parasuraman, A., Zeithaml, V., and Berry, L. L. 1994. "Reassessment of Expectations as a Comparison Standard in Measuring Service Quality: Implications for Further Research," *Journal of Marketing* (58:1),

pp. 111-124.

Pitt, L., Watson, R., and Kavan, C. 1997. "Measuring Information Systems Service Quality: Concern for a Complete Canvas," *MIS Quarterly* (21:2), pp. 209-221.

Ponsignon, F., P. A. Smart, and R. S. Maull. 2011. "Service delivery system design: characteristics and contingencies." *International Journal of Operations & Production Management* (31:3), pp. 324-349.

Pruyn, A., and Smidts, A. 1998. "Effects of waiting on the satisfaction with the service: Beyond objective time measures." *International Journal of Research in Marketing* (15:4), pp. 321-334.

Reinders, M. J., Dabholkar, P. A., and Frambach, R. T. 2008. "Consequences of forcing consumers to use technology-based self-service." *Journal of Service Research* (11:2), pp. 107-123.

Rogers, Everett M. 2010, *Diffusion of innovations*. Simon and Schuster.

Roggeveen, A., Bharadwaj, N., and Hoyer, W. 2007. "How Call Center Location Impacts Expectations of Service from Reputable versus Lesser Known Firms," *Journal of Retailing* (83:4), pp. 403-410.

Sabherwal, R., and Becerra-Fernandez, I. 2003. "An Empirical Study of the Effect of Knowledge Management Processes at Individual, Group, and Organizational Levels," *Decision Sciences* (34:2), pp. 225-260.

Shamdasani, P., Mukherjee, A., and Malhotra, N. 2008. "Antecedents and consequences of service quality in consumer evaluation of self-service internet technologies." *The Service Industries Journal* (28:1), pp.117-138.

Shostack, G. L. 1977. "Breaking free from product marketing". *The Journal of Marketing*, pp. 73-80.

Simon, F., and Usunier, J. C. 2007. "Cognitive, demographic, and situational determinants of service customer preference for personnel-in-contact over self-service technology." *International Journal of Research in Marketing* (24:2), pp.163-173.

Straub, D. 1989. "Validating Instruments in MIS Research," *MIS Quarterly*, Vol. 13, pp. 147-169.

Straub, D., Boudreau, M., and Gefen, D. 2004. "Validation Guidelines for IS Positivist Research", *Communications of the Association for Information Systems* (13), pp. 380-427.

Sussman, S. and Sproull, L. 1999. "Straight Talk: Delivering Bad News through Electronic Communication," *Information Systems Research* (10:2), pp. 150-166.

Taylor, S. A., and Hunter, G. L. 2002. "The impact of loyalty with e-CRM software and e-services." *International Journal of Service Industry Management*, (13:5), pp.452-474.

Van Dolen, W., Lemmink, J., De Ruyter, K., and De Jong, A. 2002. "Customer-sales employee encounters: a dyadic perspective." *Journal of Retailing* (78:4), pp. 265-279.

Van Dyke, T., Kappelman, L., and Prybutok, V. 1997. "Measuring Information Systems Service Quality: Concerns on the Use of SERVQUAL Questionnaire," *MIS Quarterly* (21:2) , pp. 195-208.

Venkatesh, V., Chan, F. K., & Thong, J. Y. 2012. "Designing e-government services: Key service attributes and citizens' preference structures." *Journal of Operations Management* (30:1), pp. 116-133.

Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. 2003. "User acceptance of information technology: Toward a unified view." *MIS quarterly* (27:3), pp.425-478.

Walker, R. H., Craig-Lees, M., Hecker, R., and Francis, H. 2002. "Technology-enabled service delivery: an investigation of reasons affecting customer adoption and rejection." *International Journal of Service Industry Management* (13:1), pp. 91-106.

Wang, Y., and Tang, T. 2003. "Assessing Customer Perceptions of Website Service Quality in Digital Marketing Environments," *Journal of End-User Computing* (15:3), pp. 14-31.

Webster, Jane, and Richard T. Watson 2010. "Analyzing The Past to Prepare for The Future: Writing a Literature Review." *MIS quarterly* (26: 2), pp.xiii-xxiii.

- Weijters, B., Rangarajan, D., Falk, T., and Schillewaert, N. 2007. "Determinants and outcomes of customers' use of self-service technology in a retail setting." *Journal of Service Research* (10:1), pp. 3-21.
- Wolfinbarger, M., and Gilly, M. C. 2003. "eTailQ: dimensionalizing, measuring and predicting etail quality." *Journal of retailing* (79:3), pp. 183-198.
- Yang, Y. C., Liu, S. W., and Ding, M. C. 2012. "Determinants of self-service technology adoption." *African Journal of Business Management* (6:40), pp. 10514-10523.
- Yoon, S. and Suh, H. 2004, "Ensuring IT Consulting SERVQUAL and User Satisfaction: A Modified Measurement Tool," *Information Systems Frontiers* (6:4), pp. 341-351.
- Zeithaml, V. A., and Gilly, M. C. 1987. "Characteristics affecting the acceptance of retailing technologies: A comparison of elderly and nonelderly consumers." *Journal of Retailing* (63:1), pp. 49-68.
- Zeithaml, V., Parasuraman, and Berry 1990. *Delivering Quality Service; Balancing Customer Perceptions and Expectations*, Free Press.