

Service Personnel, Technology, and Their Interaction in Influencing Customer Satisfaction*

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ABSTRACT

Managing both the technologies and the personnel needed for providing high-quality, multichannel customer support creates a complex and persistent operational challenge. Adding to this difficulty, it is still unclear how service personnel and these new communication technologies interact to influence the customer's perceptions of the service being provided. Motivated by both practical importance and inconsistent findings in the academic literature, this exploratory research examines the interaction of media richness, represented by three different technology contexts (telephone, e-mail, and online chat), with six customer service representative (CSR) characteristics and their influences on customer satisfaction. Using a large-sample customer survey data set, the article develops a multigroup structural equation model to analyze these interactions. Results suggest that CSR characteristics influence customer service satisfaction similarly across all three technology-mediated contexts. Of the characteristics studied, service representatives contribute to customer satisfaction more when they exhibit the characteristics of thoroughness, knowledgeable, and preparedness, regardless of the richness of the medium used. Surprisingly, while three other CSR characteristics studied (courtesy, professionalism, and attentiveness) are traditionally believed to be important in face-to-face encounters, they had no significant impact on customer satisfaction in the technology-mediated contexts studied. Implications for both practitioners and researchers are drawn from the results and future research opportunities are discussed.

Subject Areas: Computer-Mediated Communication, Customer Service, Medium Richness, and Service Operations.

INTRODUCTION

Customer service operations are being subjected to rapid, technology-driven change. The ubiquity and sophistication of new information technologies, such as the Internet, have fundamentally changed, and continue to change, how

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organizations interact with their customers, yet it has become no less crucial to firm performance (El Sawy & Bowles, 1997; Parasuraman & Colby, 2001; Zeithaml, Parasuraman, & Malhotra, 2002; Burke, 2002; Piccoli, Brohman, Watson, & Parasuraman, 2004). While telephone and fax have become common in the customer service role, new communication media, like e-mail and instant messaging, are being deployed at a frenetic pace and are in great demand (Burke, 2002). As of 2005, it has been projected that 45% of all contact companies have with their customers occur over the telephone, 45% happen via online means (Web site, e-mail, etc.), just 5% occur face-to-face, and the remaining 5% via other means (Anton & Phelps, 2002). This movement away from face-to-face contact toward online and technology-mediated methods has implications both for selecting technologies and for managing personnel who provide customer service in these high-tech environments (Delene & Lyth, 1989; Parasuraman & Colby, 2001; Ray, Muhanna, & Barney, 2005).

With the introduction of new communication media and expanded customer touch-points, the characteristics of an effective customer service process/system are experiencing significant change (Boyer, Hallowell, & Roth, 2002; Hill et al., 2002). As this operational evolution progresses, the characteristics of the most effective service employees become less obvious, with so far little empirical investigation of the linkage between information technologies and customer service. As Ray et al. (2005) state, “. . . while a number of case studies do highlight the critical role of IT in customer service (Elam & Morrison, 1993; El Sawy & Bowles, 1997), empirical research examining the link between IT and customer service performance has been lacking” (p. 626).

While businesspeople have had centuries to learn how to interact with customers face-to-face and decades to discover the best way to provide customer service over the telephone, Internet-based media have been in use for only a short while. Despite evidence that different work environments may require different types of employees (Schneider, 2002), many managers with whom we have spoken assume that providing Internet-based customer service requires similar personnel attributes as in a telephone environment. There is, as of yet, no empirical research evidence to support such an assumption. In contrast, differences in features and channels (Griffith & Northcraft, 1994) among the various communication technologies, and findings from virtual team research (e.g., Martins, Gilson, & Maynard, 2004) and related areas suggest that different customer service representative (CSR) characteristics may be desirable depending upon the richness of the medium being used.

Per requests for further research on moderating effects in technology-mediated environments (e.g., Rice, 1992), this exploratory research examines the interaction of media richness, as represented by three different technology contexts (communication media), with six CSR characteristics and their influence on customer service satisfaction. Using a primary sample survey data set, this study addresses the following research question: should managers attempt to match CSRs, based on their customer-observable characteristics, to particular communication media depending on its richness? Or, conversely, is it appropriate to hire and assign CSRs based on a *unified* set of employee characteristics important across a variety of technology-mediated environments?

Insight into this issue is important because it enables better operational decision making on several fronts: staff allocation, staff training, and technology investment. First, if we learn that different CSR characteristics are important when using different communication media, each CSR, based on his or her unique attributes, can be better allocated to one (or more) of the media used to connect the firm with its customers. Second, employee training decisions can be improved by helping to focus first on those CSR attributes that have the most significant impact on customer satisfaction given the media over which customer service is to be rendered. This helps improve the efficiency of, and return on, the training investment. Finally, enterprise technology acquisition decisions could be better made with a more complete understanding of the characteristics, strengths, and limitations of the firms' employee base (Morris & Venkatesh, 2000; Morris, Venkatesh, & Ackerman, 2005). Acquiring a new technology to either capitalize on an established strength or help address a deficiency is dependent upon first having shared organizational knowledge about how those strengths and/or deficiencies relate to the proposed technology (Ray et al., 2005). But without more insight into the research question posed, each of these actions and organizational decisions is made without adequate information and understanding. And without that understanding, customer perceptions of service quality, and ultimately customer satisfaction and retention, are likely to suffer.

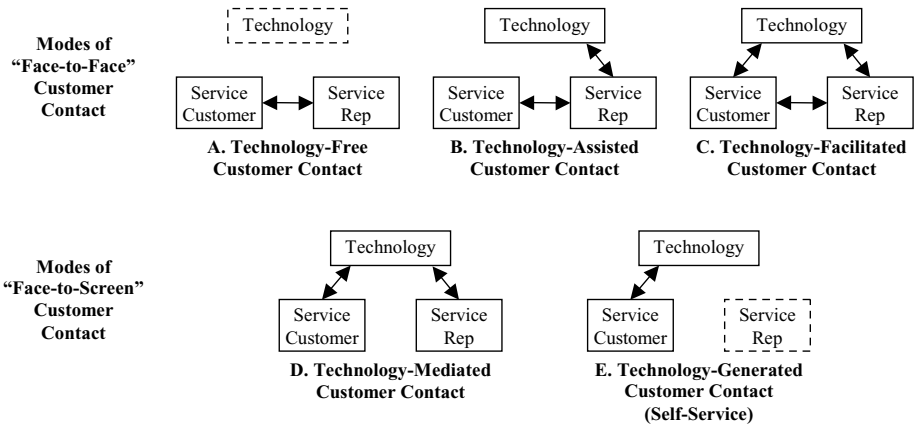
The organization of this article is as follows. The next section reviews related literature and develops hypotheses to be tested. The third section reviews the methodologies used to generate the data set and test the model. The fourth section presents the numerical results of those empirical tests, and discussion of those results follows thereafter. Finally, the last section draws conclusions from the findings, offers extensions for future research and discusses some limitations of this study.

THEORY DEVELOPMENT

Customer Contact and Technology Mediation

The importance of understanding how customer contact influences the management of service operations is clearly established (Chase, 1978, 1981; Chase & Tansik, 1983; Schneider, 2004). Customer contact, or the interaction between the company's employees (or systems) and its customers, often drives the design of new services (Bearden, Malhotra, & Uscátegui, 1998; Cook, Goh, & Chung, 1999), influences the potential efficiency of service operations (Chase, 1978, 1981; Chase, Northcraft, & Wolf, 1984; Walley & Amin, 1994), and is a primary determinant in perceptions of overall service quality (Soteriou & Chase, 1998; Parasuraman & Colby, 2000; Schneider, 2002; Pugh, Dietz, Wiley, & Brooks, 2002). Decoupling the high-contact (front-office) from the low-contact (back-office) areas of the service firm has been shown to be a viable operational strategy for a variety of industries, allowing the firm to better design its processes and more effectively deploy its resources (Metters & Vargas, 2000).

Historically, customer contact has been described in terms of the customer having a physical presence in the service system (Cook et al., 1999). Consistent

Figure 1: Modes of customer contact in relation to technology.

Source: Froehle and Roth (2004)

with this description, research on customer contact has typically focused on face-to-face environments (e.g., Kellogg & Chase, 1995; Soteriou & Chase, 1998). But, as organizational reliance on more sophisticated communications technologies grows, this early description of customer contact limited to *physical* presence needs to be updated to include *virtual* presence as well (Zeithaml et al., 2002; Froehle & Roth, 2004; Parasuraman, Zeithaml, & Malhotra, 2005).

Customer service can involve technology in a variety of ways, as illustrated in Figure 1 (Froehle & Roth, 2004). Technology-free customer contact (Figure 1A) represents a situation where information technology is not employed at all. With technology-assisted customer contact (Figure 1B), technology is used by the CSR but inaccessible to the service customer (such as a service counter employee referencing the customer’s account history). Technology-facilitated customer contact (Figure 1C) represents the case where technology is simultaneously used by both the customer and the service personnel to enhance the service experience. These three cases all illustrate “face-to-face” service encounters because the customer and CSR are physically colocated.

Situations where the customer and the CSR are *not* colocated are often referred to as “face-to-screen,” because the customer is generally using some sort of visual display (and/or audible interface) to interact with the service provider. Technology-mediated customer contact (Figure 1D) represents the situation where the CSR and the customer are interacting exclusively over some technology-based medium, such as the telephone or e-mail. This is similar to what others have referred to as “computer-mediated communication” (CMC) (e.g., Spears & Lea, 1992), but those definitions have not focused on customer service per se. In the final contact scenario (Figure 1E), a customer obtains fully automated self-service (i.e., no human CSR is involved). The research presented in this article focuses exclusively on the technology-mediated customer support context shown in Figure 1D.

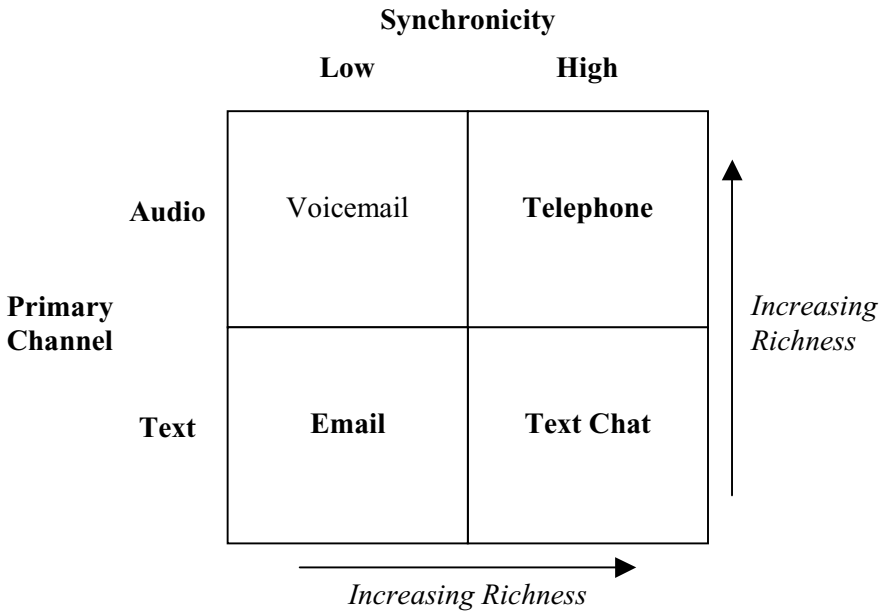
To date, a relatively limited amount of research has extended our knowledge on customer support contact in technology-mediated contexts involving more contemporary media, like e-mail and instant messaging (Parasuraman & Colby, 2001; Hill et al., 2002). The customer support research that exists typically consists of (i) contexts involving face-to-face environments or very traditional media, such as telephone, fax, or written correspondence; (ii) case studies (e.g., Zsidisin, Jun, & Adams, 2000), from which it can be hard to generalize; (iii) queuing analyses of call centers (e.g., Whitt, 1999; Garnett, Mandelbaum, & Reiman, 2002); or (iv) studies of customer interaction with automated systems (Figure 1E above), such as Web sites (e.g., Piccoli et al., 2004; Parasuraman et al., 2005). There has been considerable research in understanding how more contemporary media, such as e-mail and groupware, influence intra- and interorganizational communication (e.g., Poole, Holmes, & DeSanctis, 1991; Kettinger & Grover, 1997), and is discussed more below, but these environments differ from the technology-mediated one-on-one interaction that occurs between a CSR and an individual customer.

From an operations strategy perspective, Huete and Roth (1988) empirically tested a service strategy design matrix, thereby offering some conceptual structure to a range of technology-based customer engagement methods in the banking industry (e.g., fax, telephone, automated self-service, etc.). Boyer et al. (2002) conceptually extended the earlier Huete and Roth (1988) model to more directly consider newer Internet-based media. More tactically focused, van Dolen and de Ruyter (2002) examined the potential usefulness and effectiveness of multiuser instant messaging in a customer service role, but that study yielded indefinite results. So while the general topic of customer contact in a technology-mediated environment has attracted significant attention, there has been no research focused on the role CSR characteristics play in shaping customer satisfaction in that context. For guidance in theorizing about these relationships, we turn to additional literature.

Media Richness and Computer-Mediated Communication

Service organizations are relying on a wider variety of technology-based media for providing customer support (Burke, 2002; Ray et al., 2005). Beyond voice telephone calls, which are still the most frequent means of customer service communication, firms are also using e-mail and instant messaging (a.k.a. “chat”). E-mail, in its most basic and prevalent form, is defined here as the sending of text-based messages of virtually any length that can be read and responded to in an asynchronous (nonreal-time) manner. Instant messaging, or chat, is defined here as the sending and receiving of short, text-based messages where the sender and recipient communicate with usually no (or very minimal) delays (i.e., high synchronicity).

Communication media are often differentiated by their “richness” (Daft & Lengel, 1984, 1986; Daft, Lengel, & Trevino, 1987), or the medium’s ability to change understanding or convey meaning (a valuable quality for a medium over which customer service is to be provided). Significant empirical evidence supports this richness concept; the richness of a medium is influenced primarily by its ability to convey information via multiple cues/channels and the immediacy of obtaining

Figure 2: Customer service technologies and media richness potential.

feedback (Daft & Lengel, 1984, 1986; Dennis & Kinney, 1998; Kahai & Cooper, 2003).

Multiple cues involve such subtleties as verbal, paraverbal, and nonverbal communication. Lean media may increase the effort required to emulate these cues that are not as easily conveyed, potentially raising the “communication production costs” and prompting participants to alter the production of the message so as to reduce clarity (Dennis & Kinney, 1998). Additionally, the absence of cues not otherwise available in the medium (at any cost) can hamper the transmission of meaning, thereby making the message less clear. Some channels, such as video, provide more opportunities for these cues than other channels (e.g., plain text).

Feedback immediacy, or synchronicity, permits the rapid updating and/or clarification of the information being conveyed (Dennis & Kinney, 1998), including both concurrent feedback and sequential feedback (Kahai & Cooper, 2003). Opposite to this is the CMC concept of “asynchrony” (or “asynchronicity”), which can arise from delays due to message preparation, message delivery, and/or message response (Lea, 1991). Synchronicity can also help ensure continuity in the shared understanding of the concepts being discussed.

The three technology-based media studied here—chat, e-mail, and telephone—exist along a continuum of increasing media richness potential based on the medium’s synchronicity and primary communication channel (text or audio). Figure 2 shows a simplified representation of this framework.

Related to media richness is the concept of social presence (Short, Williams, & Christie, 1976; Schmidt, Montoya-Weiss, & Massey, 2001) in that richer media facilitate social perceptions. More specifically, multiple cues and immediate

feedback promote perceptions of being in a situation where others are present (Kahai & Cooper, 2003). Short et al. (1976) stated that “it is important to emphasize that we are defining Social Presence as a quality of the medium itself,” and that, “communications media vary in their degree of Social Presence, and that these variations are important in determining the way individuals interact” (p. 65). However, Culnan and Markus (1987) clarified this early definition by stating that “social presence is not an objective property of a medium, derived solely from technical constraints” (p. 427) and it depends on a combination of technical characteristics and subjective perceptions of the medium as well as the context of the task (Rice, 1984). So, according to social presence theory, the medium’s objective attributes, one of which is richness, explain some, but not all, of the medium’s ability to convey social/interpersonal interaction.

Exploration into media richness and social presence has found that the nature of the communication also matters. Two primary types of technology-mediated communication have been found. The first is task-oriented communication, sometimes referred to as “task execution” (Christie & de Alberdi, 1985), which is oriented toward achieving goals, solving problems, and making decisions (Kettinger & Grover, 1997). The second is relationship-building communication, which has been alternately called “person-oriented” (Christie & de Alberdi, 1985) and “relationship-oriented” (Dennis & Kinney, 1998). More socio-emotional in nature, relationship-building communication seeks to create bonds and establish familiarity between the participants. Empirically, one prior study found that tech-mediated communication fell into three categories, two of which involved “interpersonal” activities while one type was primarily task-based and focused on exchanging “factual information” (Short et al., 1976). This breakdown extends to a variety of media, including contemporary technologies like e-mail (Kettinger & Grover, 1997), and contexts, including intra- and interorganizational teams.

Some researchers have cited concerns over the theoretical underpinnings of, and empirical support for, Media Richness Theory and/or Social Presence Theory (Culnan & Markus, 1987; Lea & Spears, 1991; Spears & Lea, 1992). While few have questioned the fact that media can vary in richness, one concern has focused on the observation that relatively lean media can be used in seemingly richer ways (Carlson & Zmud, 1999), such as the use of emoticons (combinations of characters representing faces) in plain text e-mail or through shared understanding of its use. Research in virtual teams suggests that this is true, but requires extensive exposure to both the technology and the context (group, organization, etc.) in which the technology is being used. It is still unclear whether such adaptive behaviors can entirely mitigate the structural and technical boundaries of a given medium, which may limit its potential for supporting truly rich communication (Kahai & Cooper, 2003).

Others argue that while new media do remove some features present in traditional media (sometimes referred to as the “cues filtered out” literature), these media also add features, or present combinations of features, that have not previously existed, making them different than face-to-face and not necessarily less rich (Culnan & Markus, 1987). An example is e-mail, which, while essentially eliminating the aural and visual channels present in face-to-face media, adds back the opportunity to review messages multiple times and edit new communications prior

to sending—features not available in face-to-face discussions. This line of argument represents one of the key challenges facing technology-mediated communication researchers; comparing two different features or channels while holding all other things constant (to avoid confounds, according to Griffith & Northcraft, 1994) is nearly impossible to do outside of a laboratory environment. If one believes that actual working environments can yield useful insights, then recognizing the limitations of such studies is a significant first step toward incorporating them into a larger understanding of organizational work (Culnan & Markus, 1987). So, with these limitations in mind, we turn to the literature on virtual teams to further help the formation of an explanatory theory.

Virtual Teams

An evolution from face-to-face to virtual interaction similar to the one influencing customer contact research can be observed in the research on teamwork and collaboration (e.g., Colquitt, Hollenbeck, Ilgen, LePine, & Sheppard, 2002; Martins et al., 2004). If we imagine that a CSR and a customer compose a two-person virtual team, opportunities arise for employing some of the findings from the virtual team literature to technology-mediated customer support. While it has been proposed that all teams have varying degrees of virtualness, virtual teams are primarily distinguished by their extensive use of technology-mediated communication, although there is as of yet no generally agreed-upon definition for determining the degree at which a team becomes “virtual” (Martins et al., 2004).

Studies of media richness features have found that synchronous computer-mediated exchanges allow for more equality across participants, which can enhance consensus building, whereas asynchronous exchanges more closely resemble face-to-face, small-group interaction in this regard (Culnan & Markus, 1987). Technology-mediated communications also tend to retard emergence of a leader and foster the formation of coalitions, although neither of these findings is obviously relevant to the one-on-one customer support context.

More broadly, media effects in virtual teams have been significant and varied. Martins et al. (2004) summarize the literature by stating, “. . . media richness has been found to positively impact team effectiveness, efficiency, amount of communication (Carlson & Zmud, 1999; Hinds & Kiesler, 1995; Jarvenpaa, Rao, & Huber, 1988; May & Carter, 2001), the relationships among team members (Pauleen & Yoong, 2001), and team commitment (Workman, Kahnweiler, & Bommer, 2003) [and] levels of performance and trust (Burgoon, Bonito, Ramirez, Dunbar, Kam, & Fischer, 2002)” (p. 811, citations in original).

Lean media strip out cues that help participants get to know each other, hindering intimacy and trust building. This “depersonalization” effect has been linked to diffusing conflict, allowing participants to focus more on issues and less on interpersonal annoyances/antagonisms, and enabling groups to face conflict instead of avoiding it (Poole et al., 1991). This suggests that lean media affect how participants perceive one another, an important finding.

Research also suggests that, over time, members of virtual teams may adapt their own behavior to how the medium is being used within the group context and use it in ways that (at least partially) mitigate the lean medium’s limitations.

Walther and Burgoon (1992) found that while long-term use does reduce this effect, depersonalization is significant initially: “limited-time encounters in computer conferencing preempt normal social penetration processes in relational development. Extended interactions, however, should provide sufficient information exchange to enable communicators to develop interpersonal knowledge and stable relations . . . Thus, the depersonalizing effects of CMC may be limited exclusively to initial interactions, especially among unacquainted partners” (p. 55). Customer support processes in many, if not most, consumer industries do not typically engage the same CSR–customer dyad over long periods of time, so most interactions would be of the “limited-time” nature as just discussed. This suggests that customers and CSRs are likely to face highly depersonalized interactions in technology-mediated environments, with leaner media accentuating this depersonalization.

However, there are some limitations to extending this virtual team analogy to the one-on-one customer service context studied here. For example, there is unlikely to be the same “strain toward uniformity” that has been observed motivating team members to agree and conform with teammates (Schmidt et al., 2001). In addition, the customer support dyad does not seek to establish a “leader” (at least not in the traditional team sense), and two people are insufficient to create coalitions. One aspect of the virtual teams literature that does seem relevant to technology-mediated customer support is the initially strong depersonalizing effect lean media can have. This suggests a media-attribute interaction, which is discussed further below.

Customer Service Personnel

One of the principal elements in the technology-mediated customer service model (Figure 1D) is the participation of a human CSR, which can have a dramatic influence on customer satisfaction (Heskett, Jones, Loveman, Sasser, & Schlesinger, 1994; Parasuraman & Colby, 2001). While researchers have long understood the operational implications of variability among *customers*, much less attention has been paid to the operational implications of variability among customer service *personnel*, despite the importance individual differences have regarding technology-related outcomes (Zmud, 1979).

CSRs can differ from one another on a variety of dimensions and attributes. These are often collectively referred to in the Organizational Behavior/Human Resources literature as “knowledge, skills, and abilities” (KSAs), but can also include personality and other individual traits (Gatewood & Field, 2001; Napoleon & Gaimon, 2004). Some of these characteristics can influence the employee’s customer support effectiveness. Hurley (1998) found that “superior service providers tend to be higher in extroversion and agreeableness” (p. 115). Similarly, Williams and Sanchez (1998) found that certain personality characteristics, including agreeableness and extroversion, predicted extra-role and role-prescribed service behavior. Lin, Chiu, and Hsieh (2001) empirically demonstrated that “. . . employees with different personality traits perform differently on customers’ perceptions of service quality” (p. 57). In the virtual teams literature, there has been relatively little study of how KSAs influence team performance outside the team member characteristics

of technical expertise and technology experience, suggesting that a broader net be cast in this regard (Martins et al., 2004).

Another literature examines the impact of various KSAs on related employee roles, such as sales (e.g., Saxe & Weitz, 1982; Darian, Tucci, & Wiman, 2001). Perhaps the most relevant in that stream is George (1991), which examined managers' perceptions of "customer-service behavior" (prosocial behavior directed at customers) of salespeople. That study measured how courteously, politely, and promptly the employee treated the customer; the employee's pleasantness and sincerity; listening attentiveness; and the salesperson's knowledge of the merchandise (among other things).

These and other studies, and judgmental job performance data in general, typically rely on either self-assessments or supervisor assessments of a CSR's personality or other personal attributes (Gatewood & Field, 2001). While information derived from manager- and employee-based assessments can be useful, that approach ignores the important contributions available through considering the *customer's* perceptions of the CSR (Frei & McDaniel, 1998). An employee could be categorized one way on a self-assessment instrument, but perceived quite differently by a supervisor, the customer, or when providing support over a technology-based medium (Gatewood & Field, 2001; Alge, Gresham, Heneman, Fox, & McMasters, 2002). This study hopes to add to our understanding of this issue by taking an approach different from the majority of the previous literature: It employs *customer* perceptions of CSR characteristics gathered almost immediately after a support experience.

Beyond limitations regarding the source of the data, a second shortcoming of the extant literature base is generalizability to the technology-mediated context studied here. The empirical data used in most previous studies were gathered in face-to-face contexts. For example, Nguyen and LeBlanc (2002) examined the influence of the appearance, competence, and professionalism of the customer service personnel on perceptions of service quality. Shao, Baker, and Wagner (2004) investigated the influence of employee dress on customers' service quality perceptions. However, in technology-mediated settings typical of today, the customer and CSR cannot generally see each other (Short et al., 1976), so the CSR's personal appearance should not have a significant influence on customer satisfaction. Additional examples, including Hurley (1998), Darian et al. (2001), Williams and Sanchez (1998), Alge et al. (2002), and Shao et al. (2004), were based on data gathered in face-to-face settings like retail food service and public transportation. Generalizing from face-to-face encounters to technology-mediated encounters (the focus of this study) is possible, but certainly not ideal for obvious reasons. This difference limits the usefulness of existing literature both for understanding specific relationships involving technology and customer service personnel and for selecting key CSR characteristics to study.

Based on extensive conversations with managers overseeing customer support operations at a leading, international Internet service provider (ISP), this research focused on six CSR characteristics often measured in industry surveys: Courtesy, Professionalism, Attentiveness, Knowledgeableness, Preparedness, and Thoroughness. These six were among the most commonly employed metrics (based on an internal survey of its major competitors) in the ISP industry, and were thought

to be applicable to all commonly used customer support media at the time of the study. Furthermore, each of these CSR characteristics seemed to be associated with one of the two important types of communication: task-oriented and relationship-building, as discussed earlier and expanded upon below.

While a variety of CSR characteristics have been examined in prior research (and were considered for use here), these six are highly managerially relevant, prevalent in practice, and are easily assessed by the customer even over a lean medium like e-mail—all important considerations. In contrast, many of the characteristics and KSAs employed in other studies, such as extroversion, service orientation, and technology readiness, would not be as readily distinguished by customers in the technology-mediated environments examined here. Perhaps reflective of their prevalence in the customer service industry, these six CSR characteristics mirror some of the critical dimensions of service quality underlying the SERVQUAL instrument (Parasuraman, Zeithaml, & Berry, 1985, 1988), as discussed below.

It is important to note that support for SERVQUAL-based service quality measures applied to technology-based contexts has been uneven (Van Dyke, Kappelman, & Prybutok, 1999; Carr, 2002; Kettinger & Lee, 2005) and new scales continue to be developed and refined (e.g., Parasuraman et al., 2005; Kettinger & Lee, 2005). Both despite and because of this ongoing evolution, the service quality literature is relevant and quite useful in thinking about how CSRs influence the customer experience in technology-mediated settings. But, while the emerging technology-centric service quality literature is motivating and influential, its scales cannot be directly reapplied here due to these contextual (automated Web site use vs. person-to-person interaction) and conceptual (service quality vs. customer satisfaction) differences (Kettinger & Lee, 2005). For example, the recent E-RecS-QUAL scale (Parasuraman et al., 2005) examines “Web site features” (p. 218), including the ability to “get help” and “reach the company when needed” (p. 219), but does not assess the customer’s experience once technology-mediated contact with a human CSR is initiated (that latter element is the subject of this study).

The six CSR characteristics examined in this study, as well as the corresponding structural hypotheses (stated in the alternative form), are defined and described as follows. The first three characteristics relate to relationship-building communication, while the latter three are associated with more task-oriented communication.

Relationship-Building CSR Characteristics

Courtesy (X_1)

Being courteous (i.e., well-mannered, polite, and considerate) to customers is such a basic and fundamental attribute that its presence in virtually any industry assessment of CSR characteristics is almost assumed. Courteous behavior is desired by service customers (Schneider, Parkington, & Buxton, 1980; George, 1991; Verma, 2003) and reinforces the *assurance* dimensions of service quality (Parasuraman et al., 1985, 1988; Lin et al., 2001), or the *rappport* dimension of IS service quality (Kettinger & Lee, 2005), by helping to establish a personal and trusting relationship between the customer and the service employee.

H1: CSR courtesy explains variance in customer satisfaction.

Professionalism (X_2)

The benefits of employees' professional behavior and appearance are well-established in a variety of industrial and service environments (Gatewood & Field, 2001; Nguyen & Leblanc, 2002) and help establish trust and confidence in the relationship. However, in situations where technology mediates the customer contact, the impact of this CSR characteristic is not clearly understood. There exists some empirical evidence to suggest that professionalism can be a performance differentiator, at least in commercial services (Chao & Scheuing, 1994). Professionalism relates to the *assurance* and/or *rapport* dimensions of service quality in that it helps to engender a sense of confidence in the service provider's ability to perform adequately.

H2: CSR professionalism explains variance in customer satisfaction.

Attentiveness (X_3)

While listening to the customer has long been considered a hallmark of world-class organizations (Prokesch, 1995), paying careful attention to individual customers during the contact episode can be a valuable CSR skill (George, 1991). Agrawal and Schmidt (2003) offer a preliminary theoretical foundation suggesting that service personnel who engage in attentive, perceptive, and responsive listening to customers can increase sales. Listening also engenders a sense of trust and relationship between the customer and the service provider, thereby helping to reinforce the concepts of *responsiveness*, *assurance*, and *empathy* vital to service quality (Parasuraman et al., 1988; Lin et al., 2001) and enabling both *responsiveness* and *rapport* (Kettinger & Lee, 2005). It should be noted that listening, as used here, is taken broadly to encompass being attentive to a customer's statements about his issue, his psychological or emotional state, and so on, regardless of the medium employed (i.e., some online media, such as e-mail, have no, or a greatly reduced, aural/audio component, so it would not be appropriate to assess a *strict* interpretation of "listening" in those contexts).

H3: CSR attentiveness explains variance in customer satisfaction.

Task-Oriented CSR Characteristics

Knowledgeableness (X_4)

Knowledgeable employees are better trained, up-to-date, and educated with respect to the details of their functions and their firms' products and services (George, 1991) and help ensure that problem-solving and other functional tasks are performed well. Knowledgeable sales reps have higher predicted performance (Darian et al., 2001). Anecdotal evidence for the value of knowledgeable service personnel has been found in face-to-face settings (Higgins, 2003) and is demanded in online settings as well (Burke, 2002). Knowledgeable CSRs also may help reinforce the *assurance/rapport* dimension of service quality due to engendering confidence in their expertise (Parasuraman et al., 1988; Kettinger & Lee, 2005).

H4: CSR knowledgeableness explains variance in customer satisfaction.

Preparedness (X₅)

A prepared CSR is more informed about the particular customer he is serving and, as a result, assumedly better able to address that customer's current need. Preparation for the task at hand is paramount to excellence in customer service. The recent deluge of e-CRM (electronic customer relationship management) systems and solutions is primarily driven by the desire to get better (more accurate, up-to-date, detailed, etc.) information into the hands of personnel throughout the firm, primarily focusing on the marketing, sales, operations, and customer service functions (Rigby, Reichheld, & Scheffer, 2002). These information systems can greatly enhance the ability of the CSR to be prepared to perform his task (Berry & Parasuraman, 1997). By having access to the right information and tools at the right time, the CSR is better equipped to render effective and relevant assistance to the customer. Being prepared enables the CSR to respond more capably and quickly to customer requests and helps engender a sense of *assurance* and *empathy* (Parasuraman et al., 1988), or *rapport* (Kettinger & Lee, 2005).

H5: CSR preparedness explains variance in customer satisfaction.

Thoroughness (X₆)

The sixth and final CSR attribute examined by this research is that of thoroughness, which represents the desire and effort associated with ensuring that the customer's issue is addressed completely and systematically, and that the support task is fully executed. Asking probing questions about a customer's needs is a sign of positive customer service behavior (George, 1991). CSR thoroughness may also reinforce the service quality dimensions of *reliability* and *assurance* (Parasuraman et al., 1985, 1988). The service provider has a vested interest in the CSR being thorough as well, because it can reduce customer service expenses. A thorough CSR is more likely to address a customer's issue correctly and completely on the first contact, making that customer less likely to contact the firm again about the same issue. This has obvious operational and service quality benefits.

H6: CSR thoroughness explains variance in customer satisfaction.

The above justification of these six CSR characteristics is not the primary theoretical focus of this article, as they are commonly measured in industry. The objective of this research is to understand how, and why, the communication technology interacts with these CSR characteristics to influence customer satisfaction differently based on the richness of the medium.

As stated, a growing body of evidence in computer-mediated communication research suggests that the type of interaction (task execution vs. relationship-building) influences the effect of the media/technology involved. Three of the CSR characteristics studied here—*Courtesy*, *Professionalism*, and *Attentiveness*—seem relevant to establishing a relationship, creating a trusting environment, and building a connection with the customer. Therefore, like the socio-emotive communications examined in prior studies, these personnel attributes should have a different interaction with the medium than the more task-oriented attributes of *Knowledgeableness*, *Preparedness*, and *Thoroughness*.

In their description of Social Presence Theory, Dennis and Kinney (1998) stated that “task-oriented activities (such as information exchange or problem solving) can be carried out equally well using any medium, but . . . media conveying low social presence (such as text-only) should prove unsatisfactory only for tasks requiring high personal involvement (such as getting to know someone)” (p. 268).

We know that media that provide multiple cues and higher synchronicity are richer. Richer media enable greater socio-emotional communication, and leaner media result in a more negative socio-emotional climate (Kahai & Cooper, 2003). Extrapolating these relationships to service personnel, we would expect those CSR characteristics related to social/interpersonal exchange, establishing trust, and relationship building (i.e., the Courtesy, Professionalism, and Attentiveness characteristics) would be much more difficult to convey over a lean medium due to their reliance on such socio-emotional communication (consider how much harder it can be to express sarcasm or sincerity, for example, in a plain-text e-mail vs. in a telephone conversation). Therefore, these three socio-emotional CSR characteristics should become *less* influential on customer satisfaction as the richness of the media *decreases*.

In contrast, based on the prior research (e.g., the quotation above by Dennis and Kinney, 1998), those CSR characteristics associated primarily with facilitating task execution (i.e., the Knowledgeableness, Preparedness, and Thoroughness characteristics) are not as dependent upon this socio-emotional exchange (enabled by media richness and/or social presence), so we would *not* expect to see a similar reduction in their influence on customer satisfaction.

Thus, we hypothesize that the communication technology (i.e., the medium) will have a moderating effect on the relationships tying the CSR characteristics related to socio-emotional exchange to customer satisfaction (our outcome variable) due to differences in richness across the three media examined here:

H7: The relationship between the relationship-building CSR characteristics (Courtesy, Professionalism, and Attentiveness) and customer satisfaction will be moderated by the communication medium.

Outcome Measure: Customer Satisfaction

The outcome (endogenous) variable of the model is customer satisfaction. More specifically, this variable reflects the customer’s impression of the service experience *relative to expectations* (see Appendix A for a complete description). The midpoint of the scale represents “met expectations,” with higher scores equating to exceeding expectations and lower scores signifying that the experience did not live up to expectations.

This “experience versus expectation” approach to measuring customer satisfaction is similar to previous models of service quality, such as the “gap” model foundation of SERVQUAL (Parasuraman et al., 1985; Zeithaml, Parasuraman, & Berry, 1990). The item format used here, which combines in a single item the comparison of perception and expectation, has often been suggested in the literature

(e.g., Cronin & Taylor, 1994; Van Dyke et al., 1999; Kettinger & Lee, 2005) due to better validity and/or predictive qualities.

Other Model Elements

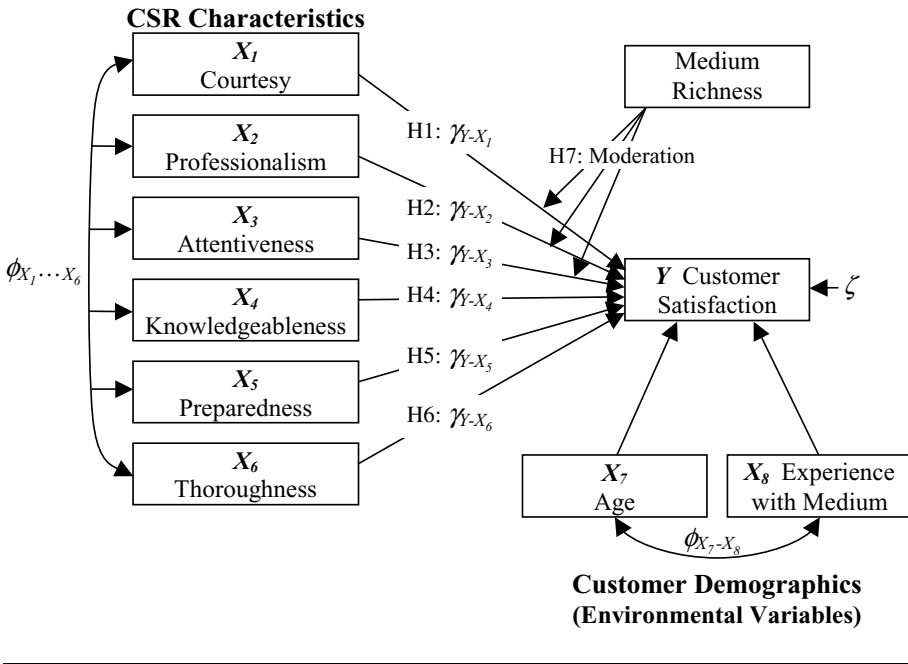
Two customer demographic variables were also included as exogenous environmental factors. First, we expect the customer's age (X_7) to be negatively related to satisfaction in all media. The older a customer is, the less positive he is likely to be about obtaining customer service over a technology-based medium (Dulude, 2002; Burke, 2002). This is at least partly due to the newness of automated phone systems, e-mail, and chat as media over which customer service is obtained; a decade from now, this may not be a valid expectation.

Second, the customer's experience with the communication medium (X_8) is expected to be negatively related to customer satisfaction (i.e., drive the measurement below expectation) due to the continuous evolution and elevation of his expectations over time (Zeithaml & Bitner, 1996; Harvey, 1998). Disconfirmation theory suggests that as a user's experience with a medium increases, and that user's comfort level becomes more established, it should become more difficult to *delight* him (i.e., to significantly surpass his expectations in a positive manner) because past delights will have already become internalized, thus escalating his expectations (Van Dyke et al., 1999; Khalifa & Liu, 2002; Bhattacharjee & Premkumar, 2004).

Because these customer demographic variables were not expected to correlate with the CSR characteristics, they provide a means for diagnosing common method variance (see the next section) as well as potentially providing some additional, independent explanatory power for our endogenous outcome variable. Our model assumes a priori that covariances would exist among the six CSR characteristic variables and also between the two customer demographic variables. The CSR characteristics (X_1 – X_6) were expected to covary with each other to some degree if only because the six observations all concern the same CSR and are all being provided by the same customer (common respondent, common object) (Gatewood & Field, 2001). The customer's age (X_7) was expected to covary *negatively* with the customer's experience with the communication medium (X_8). This was expected because younger people have been shown to be generally quicker to adopt new technologies, such as e-mail and instant messaging, than those who are older (Morris & Venkatesh, 2000; Evans et al., 2001; Burke, 2002).

Because it would be inappropriate to ignore these assumedly nonzero covariances, ordinary least squares (OLS) regression cannot be reasonably employed as an analysis tool. Structural equation modeling permits the estimation of structural parameters (i.e., regression coefficients) even though the exogenous variables are correlated (Bollen, 1989), and our application of that technique is described in the next section. Because accommodating the expected covariances among the exogenous variables is necessary, the elements composing the Φ matrix are represented in the model in Figure 3. As with the two environmental variables, these expected covariances are not translated into formal hypotheses because they are not structural relationships of interest.

Figure 3: Hypothesized direct and moderating effects on customer satisfaction.



RESEARCH METHODS

Sampling and the Data Set

Using a modified behavioral observation scale format (Gatewood & Field, 2001), the six CSR characteristics were operationalized with single-item variables (due to survey length limitations imposed by the organization whose customers were being surveyed—see Appendix A for construction of all observed variables). The items were subjected to review by managers actively involved in running call center operations. Their feedback over several rounds of iterative refinement provided confidence in the face and content validity of these measures. However, future research in this area should include the development of reliable and valid multiitem scales for the CSR characteristic constructs found to be influential.

The primary data set used to test the models consists of survey responses from customers of a large, U.S.-based consumer ISP. This ISP provides both automated online support (via its Web site) and human-based customer support services via telephone, e-mail, and chat (instant messaging). The sampling frame consisted of customers of this ISP who had used its human-based customer support function less than 24 hours prior to being invited to participate in the survey. This short time frame between service and survey helped ensure that customers’ perceptions of the support they just experienced were still quite fresh in their minds.

Table 1: Pearson correlations and descriptive statistics for observed variables.

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	Y
X_2	.88								
X_3	.76	.79							
X_4	.62	.70	.75						
X_5	.61	.68	.73	.76					
X_6	.66	.73	.83	.84	.78				
X_7	.03	.01	.03	.04	.00	.02			
X_8	.05	.06	.04	.01	.04	.03	-.08		
Y	.51	.54	.60	.64	.58	.67	.04	-.06	
Mean	6.17	6.08	5.76	5.38	5.25	5.44	4.62	5.96	.54
<i>SD</i>	1.37	1.42	1.68	1.86	1.95	1.99	1.61	1.38	3.43

Notes: $n = 2,001$. Pearson correlations are significant at $p < .01$ unless *italicized*.

Random sampling of respondents was stratified across the three media (telephone, e-mail, and chat). Responses for any one medium were to represent between 20% and 50% of all responses collected. In total, 12,050 e-mail invitations to participate in the survey were sent out. Each invitation contained a description of the purpose of the survey, a clear message that participation was optional, and a unique hyperlink to the Web-based survey instrument. The invitation also stated that recipients would be given a small credit to their monthly Internet service bill for completing the survey.

Data collection was stopped at 2,001 responses, yielding a response rate of 16.6% (this response rate would likely have been higher had the survey not been closed at 2,001 responses). Responses collected within each media were as follows: telephone = 987 (49%), e-mail = 603 (30%), and chat = 411 (21%), which satisfied the sampling stratification objectives.

A nonstatistical examination of summary demographics (time since customer service contact, medium used, length of relationship with the ISP, and type of account) revealed no obvious or meaningful differences between respondents and nonrespondents who had been invited to participate, suggesting that the sample is adequately representative of the ISP's overall customer base (due to its privacy policy, the ISP was not able to provide raw customer profile data beyond what we gathered from survey respondents, so the demographic comparisons could not include significance tests). Managers who regularly surveyed customers at the ISP concurred as to the sample's characteristics in this regard. The data set contained no missing data. Descriptive statistics and correlations for observed variables in the model are shown in Table 1.

A potential concern associated with all self-report data sets is that of common method variance (CMV). A post hoc assessment using Harmon's one-factor test (Podsakoff & Organ, 1986) indicated that CMV, if present, does not exist in these data to any worrisome degree (see Appendix B for results of this test). While this is only one way of assessing this condition, the results are generally accepted evidence suggesting that the CMV does not pose a significant problem.

Testing the Structural Equation Models

First, a structural equation model representing Figure 3 was constructed. Structural equation modeling was employed so that we could accurately reflect the nonzero covariances likely to exist among some pairs of exogenous variables, which OLS regression would (incorrectly) assume not to exist.

In order to assess whether the communication medium had moderated the effects of the CSR characteristics on customer satisfaction, per the original research question, the model was subjected to a two-stage multigroup analysis (MGA) (Bollen, 1989; Rigdon, Schumacker, & Wothke, 1998; Jöreskog, 1998). MGA is a type of structural equation modeling that permits the analysis of moderating effects due to a categorical variable (in this case, the medium). In the MGA, three groups, one for each medium (telephone, e-mail, and chat), were simultaneously tested using maximum-likelihood estimation in two stages.

In the first stage of the MGA, we tested a model where all structural parameters were freely estimated within each media group. This was done to test the adequacy of the model's *form* (its overall pattern of estimated path coefficients, covariances, and error terms). The second step, and the requisite action to address our initial research question, was to determine if the MGA showed a significant change in fit when constraining the structural parameters associated with the CSR characteristics and customer demographics to be equal across all three communications media. If a noteworthy reduction in fit is found, this would suggest that the media (richness) factor moderates the effect of the CSR characteristics on customer satisfaction (the outcome variable). A parametric bootstrap of 200 iterations was used to estimate the standard errors of all model parameters.

RESULTS

The first stage of the MGA exhibited excellent fit ($\chi^2 = 62.8$ with 36 d.f. ($p = 0.004$), $\chi^2/\text{d.f.} = 1.74$, GFI = 0.993, AGFI = 0.974, NFI = 0.995, RFI = 0.986, IFI = 0.998, RMSEA = 0.019 ($p_{\text{close}} = 1.00$)). Given that the χ^2 statistic is less than twice the available degrees of freedom, the significant χ^2 is likely due to the large sample size rather than true misfit in the model. Model parameters also seemed appropriate as no large modification indices were observed. This high degree of model fit suggests that the MGA exhibits *invariance of form*—the same pattern of relationships is applicable across all three media groups (Bollen, 1989). But, at this point in the analysis, we cannot say whether or not the *values* for the structural parameters are necessarily the same across all media (Bollen, 1989); that is determined in the second stage.

The second stage of the MGA, the constrained model, also exhibited excellent fit overall ($\chi^2 = 79.9$ with 52 d.f. ($p = 0.008$), $\chi^2/\text{d.f.} = 1.54$, GFI = 0.991, AGFI = 0.977, NFI = 0.994, RFI = 0.988, IFI = 0.998, RMSEA = 0.016 ($p_{\text{close}} = 1.00$)). The resulting nonsignificant inflation in the χ^2 statistic (from $\chi^2 = 62.8$ w/36 d.f. to $\chi^2 = 79.9$ w/52 d.f.; $\Delta\chi^2 = 17.1$ w/16 d.f., $p = .38$) indicates that these additional constraints had no significant effect on overall model fit. Therefore, the model *also* exhibits *structural invariance* (i.e., the same pattern of structural relationships exist for all media groups and the magnitudes of those coefficients are

Table 2: MGA results: Standardized effects (betas) on customer satisfaction across all media.

Variable	Parameter	Beta Value	<i>t</i> Value
X_1 : CSR Courtesy	(γ_{Y-X_1})	.058	1.61
X_2 : CSR Professionalism	(γ_{Y-X_2})	-.009	-.22
X_3 : CSR Attentiveness	(γ_{Y-X_3})	.035	1.05
X_4: CSR Knowledgeableness	(γ_{Y-X_4})	.201	6.28
X_5: CSR Preparedness	(γ_{Y-X_5})	.073	2.60
X_6: CSR Thoroughness	(γ_{Y-X_6})	.359	10.55
X_7 : Customer Age	(γ_{Y-X_7})	.015	.91
X_8: Customer Medium Experience	(γ_{Y-X_8})	-.056	-4.33

Notes: $n = 987$ (Phone), 603 (e-mail), and 411 (Chat); effects significant at $p < .01$ indicated in bold.

Table 3: Results of hypothesis testing.

Hypothesis	Parameter or Test	Result
$H1$: X_1 (Courtesy) \rightarrow Satisfaction	γ_{Y-X_1}	Not supported
$H2$: X_2 (Professionalism) \rightarrow Satisfaction	γ_{Y-X_2}	Not supported
$H3$: X_3 (Attentiveness) \rightarrow Satisfaction	γ_{Y-X_3}	Not supported
$H4$: X_4 (Knowledgeableness) \rightarrow Satisfaction	γ_{Y-X_4}	Supported
$H5$: X_5 (Preparedness) \rightarrow Satisfaction	γ_{Y-X_5}	Supported
$H6$: X_6 (Thoroughness) \rightarrow Satisfaction	γ_{Y-X_6}	Supported
$H7$: Medium Moderates Effects of $X_1 - X_3$	Structural variance	Not supported
$H8$: X_7 (Age) \rightarrow Satisfaction	γ_{Y-X_7}	Not supported
$H9$: X_8 (Medium Experience) \rightarrow Satisfaction	γ_{Y-X_8}	Supported

not meaningfully different among the three media). In other words, these results suggest that the relationships between CSR characteristics and customer satisfaction can be appropriately modeled using the form shown in Figure 3 and that the pattern of magnitudes of these structural relationships is roughly equivalent across all three media. Table 2 shows the quantitative results (standardized beta values) for our model as determined in the second step of the MGA (the constrained model), and the results of our hypothesis testing are shown in Table 3.

DISCUSSION

Drawing from research on customer contact, computer-mediated communication, virtual teams, and customer service personnel, this study tested hypotheses involving six CSR characteristics and their interaction with the richness of the medium to influence customer satisfaction. Several findings merit further discussion.

First, the finding that the model exhibits structural invariance suggests that there is *no substantial moderating effect* due to the communication medium, meaning our results do not support hypothesis $H7$. So, the answer to our original research question is clearly “no,” managers need not look for CSRs with specifically

different profiles of the characteristics we tested depending on the medium they will be using to provide customer service. This suggests that CSRs who are appropriate for one medium will be similarly appropriate for other media, assuming no added barriers related to skills (e.g., typing vs. talking), technical environment (e.g., access to customer information), policies (e.g., reward structure), and so on, constrain their performance.

A second important result is the pattern of CSR characteristic effects we observed. Table 3 shows that the three CSR characteristics related to task execution—Thoroughness, Knowledgeableness, and Preparedness—were influential in creating a positive customer experience across all three media environments. The CSR attribute of Thoroughness had the largest effect on customer satisfaction of any variable. This underscores the importance to customers of taking care of their issues as completely as possible during the first encounter. Customers generally prefer not to have to contact the service provider multiple times to resolve an issue, and a thorough CSR can be perceived as a key to achieving this goal regardless of the medium used to obtain customer service. The other two influential CSR characteristics—Knowledgeableness and Preparedness—both seem to relate to the CSR having information necessary for the service transaction to be executed. According to our definitions and item verbiage, knowledgeable CSRs have accurate information about the firm's products and services, and prepared CSRs have ready access to relevant information, such as about the particular customer. The significance of these variables is consistent with the large and growing emphasis on customer support tools like e-CRM systems and distributed online knowledge bases (Berry & Parasuraman, 1997).

The nonsignificant effects on customer satisfaction of the three CSR characteristics related to relationship building—Courtesy, Professionalism, and Attentiveness—in all of the media we looked at are somewhat surprising. A re-examination of the literature yields two alternative possible explanations for this observation.

First, because we do not quantify the degree to which these three media differ in richness from face-to-face settings, one possible explanation is that all three media are so much lower in richness than face-to-face communication (where professionalism, attentiveness, and courtesy have long been held as important) that these CSR characteristics are simply no longer significantly influential on customer satisfaction. While the richness of the three media differ relative to one another (per Figure 2), the absence of visual cues in all three media could have led to the depersonalization effect discussed earlier, thereby creating a low social presence environment that is simply unable to adequately convey the relationship-building nature of these three CSR characteristics.

A second alternative explanation has to do with the nature of the communication task itself, which was not explicitly factored into the analysis. Our assumption was that customers engaging technical support at an ISP would not, in general, be seeking highly relationship-oriented interaction with the CSRs. So, if the customers did not consider relationship building to be an objective for the customer support exchange in which they engaged, and were primarily focused on executing the support task, then they may not have placed significant value in those CSR characteristics that would help engender trust and establish a rapport. Rather, they

would concentrate on those characteristics that most directly helped complete the task to their satisfaction. In that sense, our findings seem consistent with Dennis and Kinney (1998), who state that “the supportive findings for media richness theory in prior studies may be due primarily to the inclusion of both person-oriented and task-oriented tasks” (p. 268). Task-oriented activities can be carried out equally well regardless of the medium’s richness/social presence, as our results seem to confirm. However, tasks involving significant interpersonal involvement (which may not have been present here to any significant extent) may not be as easily achieved in leaner/lower social presence media, so we cannot be certain whether the task type is an explanatory factor in our results.

Our findings suggest some further evidence of the complexity of technology-mediated interaction in general, and customer service in particular. The next section explores the implications of these findings, draws conclusions for practitioners, examines limitations to this study, and outlines opportunities for future research motivated by these results.

CONCLUSIONS, LIMITATIONS, AND OPPORTUNITIES

Despite the rapid deployment of new communications technologies in the customer service function, relatively little is known about the interaction between service personnel and technology and their influence on customer satisfaction (Ray et al., 2005). Specifically, there is a lack of empirical evidence indicating which CSR characteristics are most beneficial given the varying levels of media richness in the spectrum of communication technologies (Parasuraman & Colby, 2001). Knowing this, managers would be better equipped to hire and train service customer personnel as well as make technology investment decisions. We explored this issue using customer survey data sampled from a large, international ISP and analyzed the data using multigroup structural equation methods.

Overall, the results suggest a high level of consistency across varying degrees of media richness for how CSR characteristics influence customer service satisfaction. No evidence was found to suggest a moderating effect due to media richness, thus directly addressing the research question originally posed. In general, these results indicate that personnel who are appropriate for deployment to one of the technology-based media considered here are very likely to be appropriate for the other media (assuming no specific barriers hinder their transition, such as requisite speaking or typing skills). This is likely to be considered good news by customer service managers for it suggests that specialization on, or specialized hiring for, a single medium is not something that their customer support personnel need, or should attempt, to achieve.

Those CSR characteristics related to task execution were influential on customer satisfaction, whereas those CSR characteristics related to relationship development were not, regardless of the medium. While the first part of that result is consistent with theory, we explored two alternative explanations for the latter finding. While we believe that the leanness of all three media precluded any significant influence by CSR characteristics related to relationship building is a viable explanation, there is as much credibility in the idea that the nature of the customer service activity (task execution more than relationship building) potentially overshadows

the influence of CSR characteristics on customer satisfaction. Additional research in the future will be needed to resolve these dueling explanations.

One of the original motivations for this research was a desire to extend traditional customer contact theory and thinking to technology-mediated settings. Customer contact has been empirically operationalized in terms of information richness, intimacy, and total time spent in communication (Kellogg & Chase, 1995). The first two dimensions correspond directly to elements discussed in this article. As the richness of the media declines, it is likely that participants will find it more challenging to convey richer communication. As the original operationalization was done using only face-to-face situations, how declining media richness influences information richness can only be speculated. Our findings here suggest that while task-related communication may not be negatively affected, communication that seeks to develop relationships and engender trust may not fare as well in lean technology-mediated environments. Similarly, lean media may put pressure on the intimacy dimension that was so vital in face-to-face environments, perhaps reducing its influence below that of other elements considered by that study. The final dimension, total time spent in communication, may also need to be reexamined when applying customer contact theory to technology-mediated settings. Time that a customer may spend “in communication” may not actually involve the service provider (e.g., composing an e-mail), so does this time influence customer contact the same as time spent, for example, talking on the phone? Our study did not deal with time directly, but this aspect of customer contact, among others, needs to be revisited in light of the “virtual” contact that is becoming so prevalent (Sampson & Froehle, forthcoming).

Implications for Practice

Perhaps the most relevant finding is for practitioners involved in managing multichannel customer contact centers. It appears that they do not need to engage in special recruiting and training related to developing CSR attributes unique to each communication medium. Managers are best served by focusing on providing the CSRs with the best and most up-to-date information regarding the company’s goods, services, and customers (to help maintain high levels of Knowledgeableness and Preparedness) and on ensuring that CSRs are given the time and motivation to make certain that each customer’s issue is fully resolved in as few contacts as possible (Thoroughness). This may require some reengineering of performance metrics, because contemporary contact centers still often focus more on turnaround time than resolution rates.

Regardless of our finding that Courtesy, Professionalism, and Attentiveness had no significant effects on customer satisfaction in the environments tested, it is not advisable to overlook these CSR characteristics entirely. Unprofessional, discourteous, or inattentive CSRs can easily create, or at least reinforce, negative customer impressions, resulting in lower customer satisfaction. While our results suggest that special investments in acquiring or developing these three specific CSR characteristics for technology-mediated customer service may not yield improvements in customer satisfaction, ignoring them altogether in hiring

considerations and training efforts would be ill-advised when attempting to sustain a strong service culture (Schneider et al., 1980; Schneider, White, & Paul, 1998).

One significant business trend relevant to this study is the growing interest in, and practice of, outsourcing and offshoring of the customer service function. Given the low barriers related to proximity (by virtue of the very same technologies examined here), regulation (few laws so far restrict the practice), and other strategic elements (Stack & Downing, 2005), customer service work has been one of the most prominent organizational functions outsourced/offshored. Our findings suggest that firms hiring a customer service supplier, either domestic or overseas, should be concerned with stipulating clear service levels regarding the three task-oriented CSR characteristics. In addition, it may be desirable to negotiate cost metrics that resolve less around turnaround times and more directly focus on reducing repeated contacts by the same customer for the same issue. Both constant monitoring by call center supervisors and continuous feedback from customers regarding perceptions of the service and the CSRs are recommended to aid in ensuring the most appropriate service level for the firm's customers, which may require additional discussion before entering into a long-term outsourcing service agreement.

Limitations

Like all research, this study involved trade-offs that limit it in certain aspects. First, the generalizability of the research is somewhat restricted. The data used to examine these relationships were taken from a single U.S.-based firm with a majority of its customers and CSRs located in the United States. Given that this firm's customer base represented a significant percentage of overall Internet users when the data were collected, we hope this issue is somewhat mitigated.

A second limitation is the ever-present issue of causality. The data used to examine these issues are cross-sectional in nature. Therefore, no claims of causality can be empirically supported. Third, we did not consider interaction terms among our eight exogenous variables. Because we tested only the main effects, we cannot speak to how certain combinations of characteristics might further influence customer satisfaction.

Finally, as mentioned above, single-item measures were used for all variables. Just as in traditional regression methods and path models, single-item measures assume zero measurement error. To overcome this limitation in future studies, we hope researchers interested in this topic will pursue development of valid, multi-item measurement scales for the CSR characteristics studied here and tailored to technology-mediated environments. Scale development approaches such as those discussed in Parasuraman, Zeithaml, and Berry (1994) and Froehle and Roth (2004) may aid in that endeavor. Revalidation and reapplication of recently released customer satisfaction measures developed in other contexts and discussed above may also provide a more diverse and robust assessment of satisfaction outcomes as well.

Extensions

Given the exploratory nature of this research, it is not surprising that a wide array of possible future extensions have come to light. For example, this study only considered the communication medium as a moderating variable. Other variables may also have important and interesting moderating effects. For example, Lin et al. (2001), Burke (2002), and Shao et al. (2004) found that gender moderated perceptions of service quality. In addition, work in virtual teams found that team gender composition influenced satisfaction with the team's processes and outcomes (Lind, 1999), suggesting that understanding the moderating role of gender (of both the customer and the CSR) may be a valuable future extension of this research.

Causality between CSR characteristics and customer satisfaction is an important issue, but one that cannot be addressed with cross-sectional data. A controlled experiment involving both objective and subjective measurements of CSR characteristics gathered at various time points and in various technology-mediated environments would help strengthen the evidence for the relationships found in this research. Alternately, combining surveys with customer relationship and retention field data from a larger variety of firm types, such as banking (Hitt & Frei, 2002) may lead to additional validation for our findings and/or other insights.

Also, as mentioned, examining the time factor in online and technology-mediated services seems like a valuable line of research. The ways in which both waiting time and interactive time are experienced, perceived, and evaluated has a rich research foundation (e.g., Maister, 1985; Rafaeli, Barron, & Haber, 2002). Applying this existing base of knowledge to online media and contexts, and combining it with new sources of insight like the findings from this research, suggests a wealth of opportunities to extend our understanding of how customers, technology, and service providers can operationally interact in the most effective, efficient, and satisfying ways possible.

Future research could also extend and expand the conceptual model tested here, such as by considering user perceptions of the medium, both initially and over time; the nature of the communication task being undertaken; the user's task-relevant knowledge (Kahai & Cooper, 2003) or technology-readiness (Zeithaml et al., 2002; Parasuraman & Colby, 2000); or even specific CSR skills (Napoleon & Gaimon, 2004). These may be either direct or moderating influences on changing beliefs and attitudes toward future usage of the medium (Bhattacharjee & Premkumar, 2004), and reflect the larger CMC literature in that regard.

Alternately, recent literature suggests that there may be benefit in expanding the scope of measures. For example, "responsiveness" as a CSR attribute describing "anticipated preparedness to perform a service" (Kettinger & Lee, 2005, p. 614). While the E-RecS-QUAL dimensions of responsiveness, compensation, and contact (Parasuraman et al., 2005) were devised as properties of a firm's Web site, can they be extended to attributes of a CSR as well? In general, this suggests that CSR characteristics, along with traditional technology adoption drivers (usability, usefulness, subjective norm, and behavioral control) (Szajna, 1996), could be viewed as antecedents to service quality perceptions (i.e., service quality as a mediator between CSR characteristics and customer satisfaction).

The ongoing evolution of the technology adoption and acceptance literature (e.g., Venkatesh & Davis, 2000) suggests this is still a ripe and relevant area for further investigation; adoption drivers may also be influential on the relationship between CSR characteristics and customer satisfaction. An individual customer's decision to use a particular medium (Agarwal & Prasad, 1999; Morris & Venkatesh, 2000; Morris et al., 2005) is likely to be influenced not only by perceptions of that technology, but also by previous outcomes, which CSRs can influence. From an organizational perspective, Venkatesh, Speier, and Morris (2002) found that pre-training and training environment interventions influence technology adoption and use. Therefore, if organizations want to drive customers to media with lower per-contact costs, then targeted customer training could be a wise investment. While the technology adoption "choice" is not at issue for most customer support personnel (using the technology is a requirement of employment), employee exposure to, and feedback about, new media/systems under development can reduce usability problems. This is important because postintroduction "fixes" do not seem to be helpful in improving user perceptions (Venkatesh et al., 2002), meaning that predeployment customer feedback for proposed support systems and media may help improve the firm's technology return on investment. [Received: January 2005. Accepted: January 2006.]

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APPENDIX A: SURVEY QUESTIONS FOR OBSERVED VARIABLES

Variable	Survey Question	Response Scale
X_1 – Courteous	How courteous was the consultant?	7-point ordinal scale bounded by “Not at all” (1) and “Extremely” (7)
X_2 – Professional	How professional was the consultant?	7-point ordinal scale bounded by “Not at all” (1) and “Extremely” (7)
X_3 – Attentiveness	How well did the consultant “listen” to you?	7-point ordinal scale bounded by “Not at all” (1) and “Extremely” (7)
X_4 – Knowledgeable	How knowledgeable was the consultant regarding your issue?	7-point ordinal scale bounded by “Not at all” (1) and “Extremely” (7)
X_5 – Prepared	How informed and prepared was the consultant regarding you, your account, and your previous communication with [the firm] (if any)?	7-point ordinal scale bounded by “Not at all” (1) and “Extremely” (7)
X_6 – Thorough	How thorough was the consultant in addressing your needs?	7-point ordinal scale bounded by “Not at all” (1) and “Extremely” (7)
X_7 – Customer Age	What is your age?	7-point interval scale with age ranges given for each scale value
X_8 – Customer Experience with Medium	How experienced are you using [this medium]?	7-point ordinal scale bounded by “Not at all experienced” (1) and “Extremely experienced” (7)
Y – Customer Satisfaction	How well did your customer service experience match your expectations?	13-point ordinal scale; bounded by “Much worse than my expectations” (–6) and “Much better than my expectations” (+6)

Notes: The phrase “[the firm]” was dynamically replaced in the survey with the actual name of the company of which the respondent was a customer. The phrase “[this medium]” was dynamically replaced in the survey with the name of the medium the customer used while communicating with customer support about this issue (e.g., “e-mail,” “instant messaging,” or “the telephone”).

APPENDIX B: RESULTS OF ONE-FACTOR TEST SUGGESTING NO SIGNIFICANT COMMON METHOD VARIANCE

	Factor Loadings of Exogenous Variables	
	Factor 1	Factor 2
X_3	.92	-.00
X_6	.91	.01
X_2	.90	-.04
X_4	.88	.04
X_5	.86	-.02
X_1	.85	-.02
X_7	.04	.73
X_8	.05	-.73

Notes: Orthogonal rotation; $n = 2,001$.

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