Exploring the Zone of Tolerance for Internal Customers in IT-Enabled Call Centers

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Abstract
Today, call center employees' service encounters with external customers are extensively supported with modern information technology (IT). However, prior research on service quality and zone of tolerance (ZOT) focuses primarily on external customers with little attention paid to how internal customers (e.g., service employees) respond to services provided by internal functions, particularly IT function that supports employees' IT use. Drawing on theory of administrative behavior and IT success literature, we conducted a study at a call center of a telecommunications firm and found that the impact of internal IT service quality (ITSQ) on employees' service quality (ESQ) to external customers, as well as on their satisfaction with and use of the deployed technology, exhibits a positive diminishing pattern as ITSQ increases from below to within and to above the ZOT. We also found that ITSQ's impact on ESQ employees' satisfaction with technology changes more dramatically around adequate service level than desired service level. Finally, we show that call center employees' satisfaction with technology partially mediates ITSQ's impact on ESQ. Besides adding to the service and IT literature, our findings suggest that managers should understand internal customers' different levels of expectations toward internal IT service and the differential performance impacts of those levels.

Keywords
call center, internal customers, internal services, service quality, zone of tolerance, theory of administrative behavior, IT success, IT-enabled service

Introduction

Studies have shown that customer satisfaction contributes to excess financial returns (Fornell et al. 2006), and that high employee service quality (ESQ) is the key to attaining customer satisfaction (Fornell et al. 1996). To improve ESQ, a growing number of organizations are implementing modern information technology (IT), such as customer relationship management technology (CRMT), to assist employees' service encounters with customers (Hsieh, Rai, and Xu 2011). Empirical evidence shows that CRMT can indeed amplify frontline employees' capacity to better satisfy customers (Ramasubbu, Mithas, and Krishnan 2008).

Organizations implement CRMT in various service channels (e.g., retail stores, call centers, websites, and others), among which call centers are used most extensively by external consumers (Wickham and Collins 2004). It is estimated that (1) 70% of service encounters occur via call centers, (2) each of the Fortune 500 firms operates, on average, 30 call centers, and (3) 3% of the U.S. and U.K. working population is employed in call centers (Mandelbaum 2006). Furthermore, every year at least $700 billion worth of goods and services have been sold via call centers since the mid-1990s, and this volume of business has been growing at an annual rate of 20% (Mandelbaum 2006). Hence the call center industry is not

only vast in terms of economic scope and workforce size, but it is also of significant business and societal importance.

Against this backdrop, our study investigates service interactions in call centers where frontline service employees undertake customer service work, such as answering customer inquiries, offering information about products and promotions, processing transactions and payments, and providing postsales support (Sergeant and Frenkel 2000). Today, such service interactions are enabled by CRMT that provides call center service employees with immediate and comprehensive information about a specific customer, as well as information about the firm's products and services (Mithas, Krishnan, and Fornell 2005). As call center

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employees need to use CRMT for service provision (McCalla, Ezingeard, and Money 2003), it is important that a firm's supporting IT function, which responds to hardware and/or software problems with the technology, addresses technology-related issues in a responsive and reliable manner. IT service quality (ITSQ), or the quality of the service provided by the internal IT function to frontline service employees (Pitt, Watson, and Kavan 1995), is critical for employees' ability to apply the technology to deliver high-quality service to their customers (Heskett, Sasser, and Wheeler 2008).

Anecdotal evidence suggests that call center employee dissatisfaction with the quality of internal IT services can have negative consequences, including damage to a firm's image. For example, after a troubled implementation of a CRMT at a leading Australian telecommunication firm's call center, the "I Hate Siebel" Facebook group was developed (Sharma 2008) with more than 3,000 members involved in an active forum of employees and customers sharing their negative views and experiences emanating from the CRMT implementation. Besides many employees' complaints about the IT function's ineffectiveness in supporting their service work (Sharma 2008), the call center also noticed a sharp increase in customer dissatisfaction (Tindal 2008). As one employee noted, "The level of client dissatisfaction and aggression is overwhelming as is the feeling of not being able to do my work effectively" (Tindal 2008). Clearly, the call center failed to understand and manage their employees' expectations and perceptions with respect to the deployed IT.

A plausible reason for such failures is the limited theoretical understanding about the concept of *internal marketing*, which concerns the relationship between the quality of internal services provided by a firm to its employees and the quality of service provided by the firm's employees to its external customers. Scholars studying internal marketing have long supported the view that "satisfied employees lead to satisfied customers" (Rust, Moorman, and Dickson 2002), and suggested that organizations should treat frontline service employees as "internal customers" and focus on providing them with superior service so they can, in turn, deliver high service quality to external customers (e.g., Wieseke et al. 2009).

Unfortunately, most prior research on service quality focuses on issues related to the interactions between service employees and external customers, such as the impact of ESQ on customer responses (Zeithaml, Berry, and Parasuraman 1996), different types of customer expectations (Zeithaml, Berry, and Parasuraman 1993), and factors (e.g., customer satisfaction, perceived value, etc.) that mediate the impact of ESQ on customer responses (Brady et al. 2005). In contrast, with a few exceptions that study the influence of organizational support (e.g., human resources function and service climate) on ESQ (e.g., Schneider, White, and Paul 1998), there is almost no research on how the quality of internal services (e.g., ITSQ) affects internal customers, especially in the IT-enabled service contexts such as call centers.

To address this void, we first apply the zone of tolerance (ZOT) concept, which involves two distinct types of customer expectations—adequate service level (ASL) and desired

service level (DSL)—to understand the differences in the influence of call center internal ITSQ on internal customers' responses when perceived ITSQ is lower, within, or above the ZOT (Zeithaml, Berry, and Parasuraman 1993). Next, drawing on the theory of administrative behavior, which suggests that call center employees are generally willing to settle for an adequate solution rather than seeking a desired or optimal one (Simon 1976), we hypothesize that ASL may play a more important role than DSL in the relationship between internal ITSQ and ESQ to external customers. Specifically, we propose that call center ESQ may be more sensitive to ITSQ when ITSQ fails to meet employees' ASL rather than when ITSQ falls short of their DSL. Our premise is that the benefits to ESQ are likely to be greater when ITSQ increases to meet ASL relative to when ITSQ increases to exceed ASL.

Moreover, the IT success literature suggests that high-quality IT service can foster user satisfaction and stimulate technology usage behavior, which, in turn, leads to positive performance outcomes (DeLone and McLean 2003). However, the proposed mediation relationships have received limited attention and empirical support (Petter and McLean 2009). To fill this gap and investigate the proposed mediations, we hypothesize that call center service employees' satisfaction with and use of deployed technology will mediate the effect of internal ITSQ on ESQ to external customers.

To test our hypotheses, we conducted a multisourced field study to collect time-lagged data from the service employees and quality assurance team in a call center of a large telecom service firm. The results support our hypotheses. Specifically, we found the following:

1. A positive diminishing impact of ITSQ on call center ESQ (as well as call center employees' satisfaction with and use of deployed technology) as ITSQ increases from below to within to above the employees' ZOT.
2. The positive impact of ITSQ on call center ESQ and user satisfaction diminishes more dramatically when ITSQ moves from below to within the ZOT than when it moves from within to above the ZOT.
3. While user satisfaction partially mediates the impact of ITSQ on call center ESQ, technology use has no mediation effect.

Theoretical Background and Hypotheses

Characteristics of Call Center Employees as Internal Customers

The unit of analysis in our study is the individual call center employee. Call center employees' service provision is supported by internal services offered by various functions (Mandelbaum 2006). As such, scholars have drawn from the internal marketing concept and conceived call center employees as internal customers of firm-provided internal services (e.g., Chan, Chen, and Geng 2000).

The internal marketing literature suggests that internal customers have several characteristics that distinguish them from

external customers. First, internal customers, relative to external customers, have fewer perceived service alternatives with little or no choice in terms of alternative service providers; they are virtually "captive" customers (Nagel and Cilliers 1990). Internal customers, by virtue of having more knowledge about the environment and circumstances of service delivery, are more realistic in their expectations regarding internal service quality and even cynical about the promises made by internal service providers (Mudie 2003). Furthermore, they may experience pressures that external customers do not, such as compliance with organizational mandates and the need for loyalty and commitment to their employer, coupled with an emphasis on efficiency, quality, and punctuality so as to meet their organization's performance standards (Mudie 2003; Seddon 1997). The aforementioned characteristics of internal customers are important in that they need to be considered explicitly when investigating the impact of internal service quality on internal customers.

IT Success and ITSQ

Organizations create and implement IT to achieve some type of success, and success is described differently based on the context of the technology and its purpose. DeLone and McLean (1992) first proposed the IS success model, which describes the relationships between six distinct but interdependent success variables (i.e., information quality, technology quality, technology use, user satisfaction, individual impact, and organizational impact) that comprise the notion of successful IT implementation. Others have modified DeLone and McLean's (1992) work over time and have called for changes. In response, DeLone and McLean (2003) have updated their original model. To address the criticism that IT can exercise influence at various levels, such as at the individual, workgroup, organization, industry, and society levels (Seddon 1997), DeLone and McLean (2003) replaced the individual impact and the organizational impact constructs with the "net benefits" construct and argued that the benefits of IT should be considered according to the context in which it is applied. As the goal of CRMT is to assist call center employees in providing high-quality service to external customers, this study focuses on call center ESQ to external customers as the core benefit, and hence the focal dependent construct, of interest.

In addition, DeLone and McLean (2003) added ITSQ as an important antecedent that goes above and beyond the informational and technical properties of the investigative technology (i.e., technology quality and information quality) and affects technology use, user satisfaction and, ultimately, net benefits. This addition suggests that the impact of ITSQ on net benefits will be mediated through technology use and user satisfaction. Surprisingly, a recent meta-analysis of the IT success literature (Petter and McLean 2009) (a) revealed no empirical support to the proposed influence of ITSQ on technology use, user satisfaction, or net benefits and (b) could not identify the mechanisms through which ITSQ exerts its downstream effect. We believe the lack of findings in this area could be attributed to

the failure to consider (1) the unique characteristics of internal customers and (2) the different levels of employees' expectations toward internal IT services. Indeed, Johns (2006) recommends that integrating the unique aspects of the investigative context and potential sources of heterogeneity in the population of interest can be a useful strategy to elaborate on theory and reconcile inconsistent or surprising empirical findings.

Toward this end, this study invokes the aforementioned characteristics of internal customers to theorize about the impact of internal ITSQ on call center ESQ across different levels of the employees' expectations.

The Zone of Tolerance (ZOT)

Different levels of customer expectations exist in a service encounter (Zeithaml, Berry, and Parasuraman 1993). As mentioned before, the DSL is the level of service that the customer hopes to receive, a blend of what a customer believes "can" and "should" be the service level, while ASL is the minimum level of service the customer will accept, or the threshold of acceptable service. Interpersonal service encounters are heterogeneous in that performance may vary across providers, across employees from the same provider, and even within the same employee (Zeithaml, Parasuraman, and Berry 1985). The ZOT represents the extent to which customers recognize and are willing to accept this heterogeneity and is operationalized as the difference between DSL and ASL (Zeithaml, Berry, and Parasuraman 1993).

Prior research explores differences in the impact of service quality on various customer responses (e.g., loyalty, repeat purchase, switching, willingness to pay more, propensity to complain, etc.) across different levels of the ZOT (i.e., below, within, and above the ZOT) in a variety of external marketing contexts, such as restaurants (Liljander and Strandvik 1993), retail stores, auto/life insurance firms (Zeithaml, Berry, and Parasuraman 1996), airlines (Chen 1997), retail banks (Gwynne, Devlin, and Ennew 2000; Yap and Sweeney 2007), student services (Teas and DeCarlo 2004), travel agencies (Lobo, Martiz, and Mehta 2007), hotels (Nadiri and Hussain 2005), life insurance and stock brokerage firms (Durvasula et al. 2006), and passenger rail services (Cavana, Corbett, and Lo 2007). Our review of these studies reveals the dominant patterns for the influence of the ZOT, as summarized in Figures A1, A2, and A3.

Specifically, the relationships between service quality and *positive* dependent variables (e.g., loyalty, repeat purchase intentions, willingness to pay more, willingness to recommend, perceived value, and customer satisfaction) generally assume one of the following patterns[1]:

1. A positive linear pattern such that there is no difference in the positive slope across different levels of the ZOT (e.g., Lobo, Martiz, and Mehta 2007; Teas and DeCarlos 2004; Yap and Sweeney 2007; Zeithaml, Berry, and Parasuraman 1996), as shown in Figure A1.
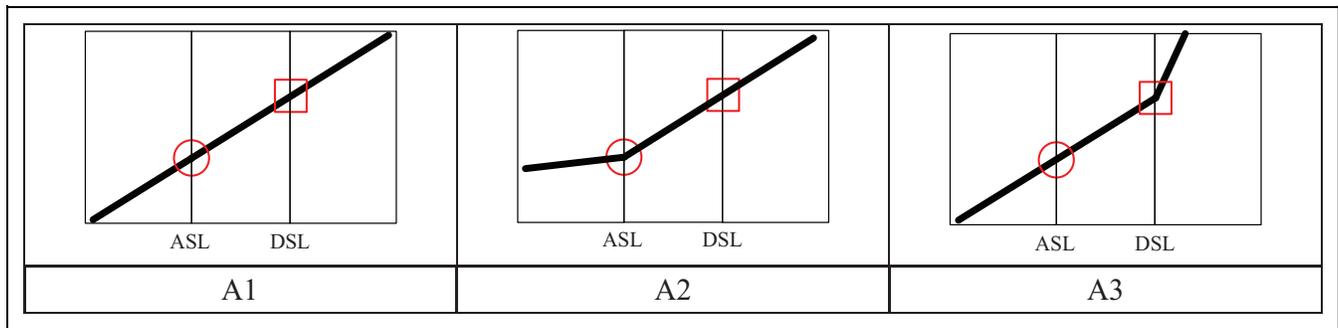
Figures A1, A2, and A3. ZOT influence patterns for positive dependent variables in external marketing contexts. Note: X-axis represents service quality to *external* customers. Y-axis represents the dependent variables of consideration. Circles denote the points where service quality meets *external* customers' adequate service level (ASL). Squares denote the points where service quality meets *external* customer' desired service level (DSL).

2. An upward increasing pattern such that the slope becomes more positive as service quality moves from below to within to beyond the ZOT, as shown in Figure A2 (e.g., Teas and DeCarlos 2004; Yap and Sweeney 2007) and Figure A3 (e.g., Lobo, Martiz, and Mehta 2007; Teas and DeCarlo 2004).

Notwithstanding these important findings in external service contexts, there is no research on the influence pattern of the ZOT on the relationship between service quality and outcome variables in internal service settings. Thus, we have very little knowledge about the role of the ZOT with regard to internal services (e.g., internal IT service) or if the previous findings in external service context are generalizable to the internal service context. Such generalizability cannot be assumed, given the aforementioned significant differences between internal and external customers. Accordingly, we draw on the theory of administrative behavior to address this important gap in the ZOT literature, thereby integrating the ZOT concept into our understanding of IT success from the perspective of internal customers.

Theory of Administrative Behavior

As part of the seminal work by Simon (1976), the theory of administrative behavior describes the behaviors of employees working in organizations, challenging the "rational man" and "economic man" assumptions and proposing that "administrative man" is aware of only some of the possible decision alternatives (i.e., bounded rationality) and is willing to settle for an *adequate* solution rather than invest additional effort to continue looking for an *optimal* solution (Simon 1976). According to this theory, *satisficing* is a behavior that attempts to achieve some minimum level of a particular variable or outcome but does not strive to maximize it (Simon 1976). Thus, employees may not necessarily look for the *best possible* solutions for their assigned tasks; rather, they may seek a solution that is adequate, or *good enough*.

One unique aspect of internal customers (i.e., employees) is that they need to meet predefined performance standards

specified for their roles in the organization (Mudie 2003). In the call center context, frontline service employees, whose primary responsibility is to respond to external customer inquiries, need to comply first with the minimum or *adequate* service standards set by the organization. Then, if possible and resources permit, they make extra effort to provide the *optimal* service to delight their customers.

To provide adequate service to external customers, the call center employees, as internal customers, need to receive internal IT service that is at least *good enough* for them to be able to apply the CRMT effectively to perform service tasks at the level required to meet the organizational performance standards. However, if the internal IT service providers extend the *best possible* service to the service employees, the employees would be endowed with high-quality internal IT service that may enable them to perform service tasks at a level that could delight their customers. In this vein, the concepts of *adequate* (*good enough*) and *optimal* (*best possible*) services are akin to the notions of ASL and DSL, which we use in the following section to theorize about the differential impact of ITSQ on call center employees' service quality across the various levels of the ZOT.

Moderating Role of the ZOT on the ITSQ-ESQ Link

Although prior research shows that the ZOT may moderate the relationships between service quality and a wide range of outcomes (e.g., Yap and Sweeney 2007; Zeithaml, Berry, and Parasuraman 1996), to the best of our knowledge, the moderating role of the ZOT in internal service contexts such as a call center has not been examined in past research. Given the insignificant and inconsistent effects of ITSQ on user appraisals of the IT and IT use (Petter and McLean 2009) and the need to integrate key contextual characteristics to elaborate on theory in such situations (Johns 2006), we investigate the differences in the influence of ITSQ on call center ESQ when those employees' assessment of ITSQ falls below, within, and above their ZOT.

We map the concepts of ASL and DSL to the notions of *adequate* (*good enough*) and *optimal* (*best possible*) solutions,

respectively, that are offered by the internal service providers. Using the theory of administrative behavior, we propose that meeting the minimum performance standards specified by the organization may be a higher priority for call center employees than trying to excel in their job. Hence, having an *adequate* level of internal service may be more important for those employees than having an *optimal* level. In this vein, the employees' priority toward obtaining *good enough* over *best possible* internal service will affect how positively they respond to increases in ITSQ that supports them, as follows:

- Below the ZOT: Call center employees who perceive the level of ITSQ to be below the ZOT (i.e., below ASL) may find the support from the IT function insufficient to help them serve their external customers even at a minimally acceptable level that meets predefined performance standards. Hence, any improvement in ITSQ helps them deliver better service to their external customers, thereby making these employees more sensitive to improvement in ITSQ compared to those who perceive ITSQ to be within or above the ZOT.
- Within the ZOT: Call center employees who perceive the level of ITSQ as being within the ZOT (i.e., above ASL but below DSL) may find the support from the internal IT function to be sufficient for them to perform a good enough external service function, thereby meeting the organization's performance standards for service to external customers. In this case, ITSQ enhancement can still help call center employees deliver better customer service (i.e., positive association between ITSQ and ESQ). Nevertheless, the improvement in ESQ derived from enhancing ITSQ for employees who perceive the quality of internal services to be within the ZOT will not be as great compared to employees who perceive the quality to be below the ZOT. This is because the risk of sanctions for not meeting performance standards is not an issue for employees who perceive ITSQ to be within the ZOT.
- Above the ZOT: Call center employees who perceive the level of ITSQ to be above the ZOT (i.e., above DSL) may feel that the quality of service provided by the IT function already enables them to provide the best possible service to external customers. According to the theory of administrative behavior, employees may have limited motivation to go beyond providing normal service to customers. As such, call center employees who perceive ITSQ to be above the ZOT may see lower marginal benefit from a further increase in ITSQ; thus, improvements in ITSQ for employees who perceive ITSQ to be above the ZOT may lead to less improvement in ESQ compared to employees who perceive ITSQ to be below or within the ZOT.

The above discussion suggests that the positive impact of ITSQ on call center ESQ may vary across the three different ZOT levels, such that the impact of ITSQ on ESQ will exhibit a decreasing pattern when ITSQ moves upward from below to within to above the ZOT. We therefore hypothesize:

Hypothesis 1: The positive effect of ITSQ on call center ESQ follows a diminishing pattern as the level of ITSQ increases from (a) below to within the ZOT and (b) within to above the ZOT.

In addition to having very few or no service alternatives, internal customers, as compared to external customers, tend to have a better understanding of the environment and circumstances associated with the provisioning of internal service (Mudie 2003). Hence, they are likely to be practical and realistic in their expectations from the internal services provided by other departments (Mudie 2003). In the call center context, given employees' realistic expectations and higher priority toward having an *adequate* level over a *desired* level of ITSQ, it is possible that ASL plays a more important role than DSL in anchoring their response to ITSQ. First, call center employees may feel anxious about whether they can perform their roles adequately if ITSQ is lower than the minimum level expected by them to support their assigned tasks. Second, while it may be nice to have delightful internal IT service (i.e., above DSL), it may not be as essential for call center employees to be able to meet organizational standards for service to external customers and to avoid sanctions associated with failure to meet those standards.

Hence, we expect the effect of ITSQ on call center ESQ to change more dramatically when ITSQ increases from below the ZOT to within the ZOT as compared to when ITSQ increases from within to above the ZOT. In other words, a decrease in ITSQ from a level within the ZOT to below the ZOT will lead to a much greater drop in call center ESQ than would a similar decrease in ITSQ from a level above the ZOT to within the ZOT. As such, we propose:

Hypothesis 2: The change in the magnitude of the positive effect of ITSQ on call center ESQ will be larger when ITSQ moves from below to within the ZOT than when ITSQ moves from within to above the ZOT.

Mediating Role of Technology Use and User Satisfaction on the ITSQ-ESQ Link

Next, we propose that user satisfaction and technology use will mediate the effect of ITSQ on ESQ. DeLone and McLean (2003) submit that the quality of internal IT services can affect the benefits derived from IT through employees' technology use and satisfaction with the deployed technology. In the call center context, ESQ is the key benefit of employees using the deployed IT to serve external customers. Thus, following DeLone and McLean's (2003) logic, call center employees' use of and satisfaction with the deployed IT will mediate the impact of ITSQ on ESQ. Prior research has shown that the quality of service extended by a provider can affect the recipients' perceptions about the service and their use of the service (e.g., Brady et al. 2005; Zeithaml, Berry, and Parasuraman 1996). Moreover, employees' interaction with service-enabling technologies can affect the quality of service extended

by the employees to their customers (e.g., Ray, Muhanna, and Barney 2005). Therefore,

> *Hypothesis 3:* The positive effect of ITSQ on call center ESQ is mediated by employees' (a) satisfaction with the technology and (b) use of the technology.

Method

Research Site

To test the hypotheses empirically, we collected data at multiple time points as part of a multisource field study at a Chinese telecommunications firm's call center. By the end of 2008, the firm achieved a subscription base of 457.3 million. To support inquiries from its hundreds of millions of customers, the firm recognized the strategic importance of implementing a CRMT to support its customer service processes in different channels, including its call centers. At the time of data collection, the firm had implemented the CRMT, along with standardized service processes, across all 31 provinces in China.

The subjects are frontline call center employees who utilize the CRMT to support their interactions with customers. The internal IT function provides services to support the employees' CRMT use. Consistent with most CRMT initiatives, employees in the call center are mandated to use the technology to serve external customers (McCalla, Ezingeard, and Money 2003). Our interviews with the call center's managers revealed that even though calls were routed to employees randomly and employees are required to use the CRMT during their work, they may spend different amounts of time using the technology to support their interactions with customers. The managers suggested that this variation in the time employees spent using IT occurred due to the degree to which employees relied on their personal service skills and knowledge rather than on the CRMT alone to address specific customer service situations. Our follow-up interviews with the call center employees further confirmed that they indeed had control over, as well as varied significantly in, the extent to which they spent their time using the CRMT to support their work.

Measures

We developed the construct measures that focused on individual call center employees (the units of analysis in our study) who use the CRMT to serve external customers. We operationalized employees' usage duration of the technology and ESQ as single-item measures. For all other constructs, we used multi-item measures from established scales with minor modifications to fit our study context.

User Satisfaction. User satisfaction was measured using three 7-point semantic differential scales ranging from 1 to 7, adapted from Bhattacherjee (2001): (1) I am very dissatisfied/very satisfied with the use of the CRMT, (2) I am very displeased/very pleased to use the CRMT, and (3) It is absolutely terrible/absolutely delightful to use the CRMT.

Technology Use. Following Rai, Lang, and Welker (2002), we measured technology use as the percentage of employees' work time spent using CRMT (Use_Time) on a 0–100% scale.

ZOT Measures. For the IT service–related constructs (i.e., ASL, DSL, and ITSQ), we used the three-column ZOT survey format proposed by Parasuraman, Zeithaml, and Berry (1994) and the items adapted for the IT context by Kettinger and Lee (1994; Appendix).

To measure ITSQ, we originally intended to adapt all the items for the five dimensions (i.e., tangibles, assurance, reliability, responsiveness, and empathy) of the SERVQUAL scale developed by Parasuraman, Zeithaml, and Berry (1988), which has been adapted to the IT services context by Kettinger and Lee (1994), Jiang, Klein, and Carr (2002), and others. However, the extant literature shows that the original five dimensions proposed by SERVQUAL do not replicate well across studies (e.g., Cronin and Taylor 1992; Gotlieb, Grewal, and Brown 1994). Researchers have hence cautioned that the most appropriate SERVQUAL dimensions should be selected carefully to fit the investigative context (e.g., Olorunniwo, Hsu, and Udo 2006). For instance, Malhotra and Mukherjee (2004) indicated that some dimensions, such as the tangibles dimension that represents visual aspects like the appearance of the facility and personnel, may be irrelevant in certain circumstances when these visual aspects are not routinely accessible to customers in the service delivery process. Parasuraman, Zeithaml, and Berry (1994) found empirical support for merging the empathy dimension with other dimensions like responsiveness and assurance, suggesting the unidimensionality of these dimensions. Olorunniwo, Hsu, and Udo (2006) also argue that when the service tasks are rather standardized and require little customization, a service dimension that pertains to customization and personal attention (i.e., empathy) may not be as relevant as the other service quality dimensions.

The preliminary investigation that we conducted in this study also suggested that the tangibles and the empathy dimensions are not particularly relevant to the study context. During our initial visits to the call center, the managers and employees described the interactions between the employees and the IT function. In general, when a call center employee encounters a problem during CRMT use, the IT staff may come to the employee's location to address the issue. However, all IT staff wear the same uniform as the employees, and the employees have little chance or need to visit the physical facility housing the IT function, rendering tangibles a less relevant dimension. Moreover, the CRMT is a standardized technology that requires no customization for any specific service employee; instead, responsiveness to IT-related issues, assurance that these issues are being handled well, and having reliable and dependable IT-related service, would be far more important for these employees' service work than would empathy per se. Also, although the empathy dimension of service quality encompasses other customer-oriented aspects, the results from a pilot study (described later) we conducted to identify the dimensions of ITSQ relevant to our study context showed low internal consistency (coefficient α) for empathy,

suggesting that it may not be a distinct dimension in our study. Thus, on the basis of prior literature that suggests excluding the empathy dimension when service tasks are standardized and demand little personalization (Olorunniwo, Hsu, and Udo 2006), previous findings that empathy may be subsumed under other dimensions (Parasuraman, Zeithaml, and Berry 1994), our discussions with call center managers and service employees, the nature of our study context, and the findings from our pilot study, we excluded the tangibles and empathy dimensions in our main study.

Employee Service Quality. For this construct, we used a performance score assessed by the firm's quality assurance personnel. At the research site, all service interactions are recorded and the quality assurance personnel systematically review a random sample of these interactions for each employee to evaluate the extent to which his or her service quality conforms to the criteria set by the firm for service interactions. As the company has millions of customers, management recognized the importance of having well-rounded evaluation criteria as the gauge for high-quality service. To accomplish this goal, the firm invited leading marketing scholars and consultants to develop evaluation criteria that focus on whether an employee delivers timely, accurate, reliable, attentive, and courteous service. These dimensions are in accordance with the concepts of assurance, reliability, responsiveness, and empathy underlying the notion of service quality proposed in the literature (Parasuraman, Zeithaml, and Berry 1988). At the end of the month, an overall score, ranging from 0 to 25, is assigned to each employee based on the reviews performed by the quality assurance personnel throughout the month. We used this overall score as our single-item measure of ESQ, which is consistent with the approaches employed by Witt, Andrews, and Carlson (2004), who used a similar measure in their study of call center employees, and by Zeithaml, Berry, and Parasuraman (1996), who also used a single-item measure to evaluate overall service quality.

Control Variables. Prior literature has indicated that employee differences in gender (Roth, Purvis, and Bobko 2010), education (Ng and Feldman 2009), age (Hedge, Borman, and Lammlein 2006), service experience (Crandall, Jackson, and Singer 2003), and technology usage experience (Morris and Venkatesh 2010), may affect job-related outcomes like ESQ. Similarly, studies also report that individual responses to IT may vary across such personal factors as gender, education, age, functional experience, and technology usage experience (Agarwal and Prasad 1999).

In view of the above, we used multiple demographic variables as controls. Specifically, we collected data from the employees about their gender, age, education level, experience using the CRMT at the focal firm (in months) and the duration of their service experience at the focal firm (in months). To better capture the effect of ITSQ on the three dependent variables (Use_Time, user satisfaction, and ESQ) across different ZOT levels, we also controlled for the endogenous effect of these variables by including the values of all these variables measured four months prior to the main study, as additional control variables.

Data Collection

Data collection consisted of three steps. First, two certified professional translators independently carried out questionnaire translation and back-translation between English and Chinese. Next, we conducted a pilot study to preliminarily examine construct validity and reliability. The instrument used in the pilot study contained measures for all five dimensions of ITSQ. Questionnaires in Chinese were distributed to 35 employees. As expected based on our previous discussions with the managers and employees, responses from the pilot study suggested limited relevance of the tangibles and empathy dimensions for call center employees' interactions with the IT staff. The reliabilities of the multi-item constructs representing the five ITSQ dimensions were above the 0.70 threshold except for the tangibles and empathy dimensions. As a result, we only retained the assurance, reliability, and responsiveness dimensions in the final survey. We also made minor modifications to some items based on the respondents' comments.

The survey was administered at the beginning of the month (Time 0) to 300 randomly sampled employees in the call center. Each respondent received the instrument with a cover letter explaining the purpose of the study and emphasizing that their responses were confidential and that the results would only be reported in an aggregated format. Each questionnaire was coded with a unique identification number for us to later match data from different sources with regard to each individual employee. In total, 233 respondents returned complete surveys. Four months later (Time 1), we distributed the survey instrument to these 233 respondents and received 195 completed surveys. provided with ESQ at Time 0 and again one month after Time 1 (i.e., Time 2). Table 1 summarizes our data collection timeline.

Table 2 presents the demographic characteristics of the 195 sampled employees. A majority of them were females with an education level less than a bachelor's degree. This profile is similar to that of prior call center studies, which reported most call center employees as being female (e.g., Malhotra and Mukerjee 2004), with education levels lower than a bachelor's degree (Sergeant and Frenkel 2000). Of our total sample, 69, 96, and 30 respondents perceived ITSQ to be below, within, and above their ZOT, respectively.

Data Analysis and Results

Measurement Model

We evaluated the properties of the measurement model prior to hypothesis testing. Table 3 shows the descriptive statistics, correlations, reliabilities, and average variance extracted (AVE). We conducted principal component analysis (PCA; rotation: direct oblique) to evaluate the measurement model. As shown in Table 4, each item loaded higher on its principal construct

Table 1. Data Collection Time Line.

Time Source	Time 0 (Control Variables)	Time 1 (Four Months after *T0*)	Time 2 (One Month after *T1*)
Employee data Desired service level Perceived IT service quality % of time using IT	% of time using IT	Adequate service level	—
User satisfaction (233 respondents)	User satisfaction (195 respondents)		
Firm data	Employee service quality	—	Employee service quality
Demographics	Age, gender, education level, CRMT usage experience, service experience	—	—

Note. IT = information technology; CRMT = customer relationship management technology.

Table 2. Sample Demographics.

	Category	Percentage
Education	Senior high school	38.5
	College (associate degree)	59.9
	Bachelor's or higher	1.6
Gender	Male	4.8
	Female	95.2
	M	*SD*
Age (years)	23.27	2.64
CRMT usage experience (months)	13.94	4.19
Service experience (months)	21.96	12.33

Note. CRMT = customer relationship management technology.

than on other constructs, suggesting convergent and discriminant validity (Hair et al. 1998). Cronbach's α values and composite reliabilities are all greater than the recommended threshold of 0.70 (Nunnally and Bernstein 1994), suggesting high internal consistency and reliability for all the scales used. The AVE values of multi-item constructs are also higher than 0.50, suggesting that the observed items explained more variance than the error terms; the square root of AVE for each multi-item construct is also higher than its zero-order correlations with other constructs, thereby supporting discriminant validity (Fornell and Larcker 1981).

Note that while SERVQUAL was originally proposed as having five dimensions (Parasuraman, Zeithaml, and Berry 1988), empirical evidence shows mixed support for this structure. For instance, Cronin and Taylor (1992) found all 22 items of SERVQUAL loaded on one factor; others propose a two-factor structure: one factor consisting of only the tangibles dimension and another factor consisting of the other four dimensions (Gotlieb, Grewal, and Brown 1994; Wakefield and Blodgett 1999). Gotlieb, Grewal, and Brown (1994) conceived these two factors of service quality as the focal stimuli (which a consumer directly responds to) and the contextual stimuli (the background against which the focal stimuli are perceived), and

others show empirical evidence supporting this two-factor structure (e.g., Yap and Sweeney 2007). As we excluded the tangibles and empathy dimensions, our results showing that the items for the other three dimensions load on the same factor are consistent with the above literature.[2]

Hypothesis Testing

The first three hypotheses (i.e., Hypotheses 1a, 1b, and 2) focus on whether the impact of ITSQ varies as it moves from below to within to above the ZOT. Following the ZOT testing procedure proposed by Zeithaml, Berry, and Parasuraman (1996), we created two dummy variables to test the hypotheses relating to changes in slopes across the three zones. We used dummy variables to indicate if ITSQ perceived by an employee is below, within, or above his or her own ZOT. Specifically, d_1 and d_2 are dummy variables in the following equation, which represents the relationship between ITSQ and its outcome variables (Y) across the different ZOT levels. According to Zeithaml, Berry, and Parasuraman (1996), the regression equation can be expressed as below:

$$Y = \beta_0 + \beta_{d1} \times d_1 + \beta_{d2} \times d_2 + \beta_1 \times (\text{IT service quality})$$
$$+ \beta_2 \times (d_1 \times \text{IT service quality}) + \beta_3$$
$$\times (d_2 \times \text{IT service quality}) + \text{error}.$$

Y: dependent variable.
d_1: 1 when perceived IT service quality is below ASL; 0 otherwise.
d_2: 1 when perceived service quality is above DSL; 0 otherwise.
β_0: Constant.
$\beta_{d1}, \beta_{d2}, \beta_1, \beta_2, \beta_3$: Unstandardized regression coefficients.

In this equation, the slope is β_1 inside ZOT, $\beta_1 + \beta_2$ below the ZOT and $\beta_1 + \beta_3$ above the ZOT. Table 5 shows the results of hypothesis testing in terms of the path coefficients and R^2 values. Since we have included gender, education, age, technology usage experience, and service experience, as well as the

Table 3. Descriptives, Reliabilities, and Zero-Order Correlations.

	M	SD	α	AVE	Sqr of AVE	Gender	Age	Education	Tech. Exp.	Serv. Exp.	ASL	DSL	ITSQ	Use_Time	User Sat
Gender	1.05	.22	NA	NA	NA										
Age	23.27	2.64	NA	NA	NA	.12									
Edu	3.63	.516	NA	NA	NA	−.13	.11								
Tech.Exp	13.94	4.19	NA	NA	NA	.06	**.30**	−.11							
Serv.Exp.	21.96	12.33	NA	NA	NA	**.21**	**.43**	−**.27**	**.51**						
ASL	5.52	1.15	.97	0.79	0.89	.06	−.09	−.06	−.01	.05					
DSL	7.05	1.39	.97	0.79	0.89	.11	.04	−.10	.07	.11	**.38**				
ITSQ	5.81	1.79	.98	0.80	0.89	.13	−.06	−.13	.02	.07	**.47**	**.46**			
Use_Time	77%	19%	NA	NA	NA	.06	−.05	.10	−.05	−.04	**.25**	**.24**	**.21**		
UserSat	3.94	1.19	.95	.86	.93	.04	.00	−.09	.14	.08	**.45**	**.23**	**.43**	**.15**	
ESQ	16.36	5.72	NA	NA	NA	−.01	−.08	.01	−.15	−.11	**.23**	.11	.12	.08	.11

Note. AVE = average variance extracted; Sqr of AVE = square root of average; Tech. Exp. = CRMT usage experience; Serv. Exp. = service experience; ASL = adequate service level; DSL = desired service level; ITSQ = IT service quality; Use_Time = % of work time using CRMT; UserSat = user satisfaction; ESQ = employee service quality.
Values in boldface indicate significant correlations ($p < .05$, two-tailed).

Table 4. Principal Component Analysis Factor Loadings and Cross-Loadings.

	1	2	3	4
IT_SrvQual_Assurance_1	**0.84**	0.08	−0.04	0.00
IT_SrvQual_Assurance_2	**0.81**	0.10	−0.03	0.08
IT_SrvQual_Assurance_3	**0.83**	0.03	0.07	0.23
IT_SrvQual_Assurance_4	**0.89**	0.01	−0.04	0.11
IT_SrvQual_Resonsiveness_1	**0.93**	−0.08	−0.17	−0.04
IT_SrvQual_Resonsiveness_2	**0.94**	0.00	−0.15	0.02
IT_SrvQual_Resonsiveness_3	**0.90**	−0.03	−0.02	0.06
IT_SrvQual_Resonsiveness_4	**0.87**	0.03	−0.08	0.01
IT_SrvQual_Relaibility_1	**0.77**	0.09	0.13	−0.25
IT_SrvQual_Relaibility_2	**0.72**	0.09	0.21	−0.23
IT_SrvQual_Relaibility_3	**0.72**	0.03	0.17	−0.21
IT_SrvQual_Relaibility_4	**0.72**	−0.05	0.18	−0.14
IT_SrvQual_Relaibility_5	**0.68**	0.14	0.22	−0.12
User Satisfaction_1	−0.02	**0.90**	0.11	−0.02
User Satisfaction_2	0.00	**0.95**	−0.05	−0.02
User Satisfaction_3	0.03	**0.93**	−0.09	0.05
% of time using the information technology	−0.03	0.02	**0.89**	0.13
Employee service performance	0.04	−0.01	0.14	**0.92**

Note. Bold values indicate that the item loads onto the corresponding factor.

dependent variable measured four months prior to the main study, as control variables, the complete regression equation in our investigative context should be:

$$Y = \beta_0 + \beta_{d1} \times d_1 + \beta_{d2} \times d_2 + \beta_t \times \text{Tech Experience} + \beta_s$$
$$\times \text{Service Experience} + \beta_g \times \text{Gender} + \beta_a \times \text{Age} + \beta_e$$
$$\times \text{Education} + \beta_c \times \text{Controlled DV@}T0 + \beta_1$$
$$\times (\text{IT service quality}) + \beta_2 \times (d_1 \times \text{IT service quality})$$
$$+ \beta_3 \times (d_2 \times \text{IT service quality}) + \text{error}.$$

Y: dependent variable.
d_1: 1 when perceived ITSQ is below ASL; 0 otherwise.
d_2: 1 when perceived service quality is above DSL; 0 otherwise.
β_0: Constant.
β_{d1}, β_{d2}, β_t, β_s, β_g, β_a, β_e, β_c, β_1, β_2, β_3: Unstandardized regression coefficients.

To assess Hypotheses 1a, 1b, and 2, Model 1 in Table 5 tests the effect of ITSQ on call center ESQ below, within, and above the ZOT. To assess Hypothesis 3a and b, Models 4 and 5 in Table 5 include user satisfaction and Use_Time, one at a time, assessing whether these variables mediate the effect of ITSQ on ESQ. Moreover, since Hypothesis 3a and b proposes that user satisfaction and Use_Time, respectively, mediate the effect of ITSQ on ESQ, the hypothesized moderation effect of ZOT on the link between ITSQ and ESQ (i.e., Hypotheses 1a, 1b, and 2) may be applicable to both user satisfaction and Use_Time. In other words, ZOT may moderate the effect of ITSQ on both user satisfaction and Use_Time, so that the positive impacts of ITSQ on user satisfaction and Use_Time, if

any, may be strongest at the level of ITSQ below ZOT compared to within and above ZOT. Similarly, the difference in these impacts could be stronger between below and within ZOT, as compared to the difference between within and above ZOT. As such, Models 2 and 3 test the effect of ITSQ on user satisfaction and Use_Time across different levels of ZOT.

Impact of ITSQ on ESQ Across Different Levels of ZOT

Hypothesis 1a and b states that the impact of ITSQ on call center ESQ decreases as ITSQ moves upward from below to within to above the ZOT. As discussed above, there could be a similar effect of ITSQ on Use_Time and user satisfaction. Models 1–3 in Table 5 show the differential impact of ITSQ on each of the three dependent variables (i.e., user satisfaction, Use_Time, and ESQ) across levels of the ZOT. Specifically, ITSQ has a significant positive impact (β_1) on all three variables. Also, for all three variables, the changes in slope below the ZOT (β_2) are positive and significant, suggesting that the influence of ITSQ within the ZOT (β_1) is significantly weaker than below the ZOT ($\beta_1 + \beta_2$). Moreover, for Use_Time (Model 3), the changes in slope above the ZOT (β_3) are significantly negative; hence, the influence of ITSQ above the ZOT ($\beta_1 + \beta_3$) is significantly weaker than within the ZOT (β_1). These findings collectively suggest a general diminishing pattern of the positive impact of ITSQ on the call center employees' service quality to customers (supporting Hypothesis 1a and b), user satisfaction, and technology use.

Differences in the Roles of ASL and DSL

Hypothesis 2 suggests that the changes in the slopes when ITSQ shifts from below to within the ZOT are greater than the changes in slopes when ITSQ shifts from within to above the ZOT. Again, given the proposed mediating role of user satisfaction and Use_Time (i.e., Hypothesis 3a and b), we expect a similar effect of ITSQ on both user satisfaction and Use_Time. We examined if the absolute value of β_2 (i.e., $|\beta_2|$) is greater than the absolute value of β_3 (i.e., $|\beta_3|$) for each dependent variable. First, for both ESQ and user satisfaction, β_2 is positive and significant, whereas β_3 is not significant. Hence, Hypothesis 2 is supported. However, this is not exactly the case for Use_Time; when considering the beta coefficient for Use_Time, the absolute value of β_2 is only slightly larger than the absolute value of β_3 ($|\beta_2| = 0.025$ vs. $|\beta_3| = 0.024$); hence, for Use_Time, the change in slope when ITSQ shifts from below to within the ZOT is not necessarily significantly greater than the change in slope when ITSQ shifts from within to above the ZOT. To develop a better understanding of the identified influence patterns of the ZOT, we plotted the above results in Figures B1, B2, and B3. These patterns are significantly different from those identified in the external services context (Figures A1, A2, and A3).

Mediation Mechanisms

Hypothesis 3a and b, respectively, concern whether user satisfaction and Use_Time mediate the effect of ITSQ on

Table 5. Testing the Moderation Effect of the ZOT.

| Dependent variable (DV)	Direct effect on ESQ	Direct effect on UserSat and Use_Time		Mediation effect via UserSat and Use_Time	
	Model 1	Model 2	Model 3	Model 4	Model 5
	Employee service quality	User satisfaction	Use_Time	Employee service quality	Employee service quality
Constant and control variables					
β_0: Constant	**7.53 (1.95)**[a],**	**1.07 (0.44)****	**0.41 (0.13)****	**8.14 (2.09)****	**9.33 (2.45)****
β_t: CRMT usage experience	−1.06 (0.91)[b]	0.13 (0.10)	−0.01 (0.02)	−1.15 (0.88)	−0.85 (0.87)
β_s: Service experience	−0.15 (0.65)	0.01 (0.09)	−0.02 (0.02)	−0.14 (0.63)	−0.24 (0.58)
β_g: Gender	−0.70 (0.27)	−0.10 (0.35)	0.08 (0.07)	−0.77 (0.91)	−0.87 (0.91)
β_{ad1}: Age	−0.09 (0.49)	0.00 (0.09)	−0.01 (0.02)	−0.04 (0.49)	−0.01 (0.43)
β_e: Education	−0.31 (0.47)	−0.09 (0.09)	0.01 (0.02)	−0.33 (0.46)	−0.21 (0.42)
β_c: Controlled DV @ Time 0[c]	**0.39 (0.09)****	**0.47 (0.10)****	**0.44 (0.11)****	**0.38 (0.10)****	**0.41 (0.10)****
β_{d1}: d1	0.54 (0.43)	0.09 (0.15)	0.03 (0.03)	0.52 (0.43)	0.50 (0.41)
β_{d2}: d2	0.07 (0.06)	0.37 (0.27)	−0.06 (0.05)	0.06 (0.05)	0.05 (0.06)
Mediator		User Satisfaction	Use_Time		
β_m: Mediator				**0.64 (0.31)***	1.67 (2.15)
R^2	14.2%	42.5%	24.1%	16.3%	14.8%
IT service quality across ZOT levels					
β_1: Slope within the ZOT	**0.88 (0.39)***	**0.27 (0.10)****	**0.033 (0.012)****	0.62 (0.41)	**0.88 (0.40)***
β_2: Change in slope below the ZOT	**0.83 (0.37)***	**0.15 (0.05)****	**0.025 (0.012)***	**0.75 (0.36)***	**0.81 (0.38)***
β_3: Change in slope above the ZOT	−0.10 (0.29)	−0.07 (0.06)	**−0.024 (0.011)***	−0.04 (0.24)	−0.04 (0.25)
R^2	18.5%	48.5%	29.3%	19.2%	18.9%
ΔR^2	4.3%	6.0%	5.2%	2.9%	4.1%
Significance of F-test(P value)	**0.024***	**0.000****	**0.005****	0.092	
Hypothesis supported?	Hypothesis 1a(√) Hypothesis 1b(√) Hypothesis 2(√)			Hypothesis 3a(√) Partial mediation	Hypothesis 3b(×)No mediation

Note. ZOT = zone of tolerance; ESQ = employee service quality; CRMT = customer relationship management technology.

[a]Significant coefficients are highlighted in boldface.

[b]Numbers without parentheses represent the unstandardized β coefficients. Numbers inside parentheses represent corresponding standard errors.

[c]Dependent variable measured at Time 0 to control for and rule out its impact.

*p< .05. **p< .01.

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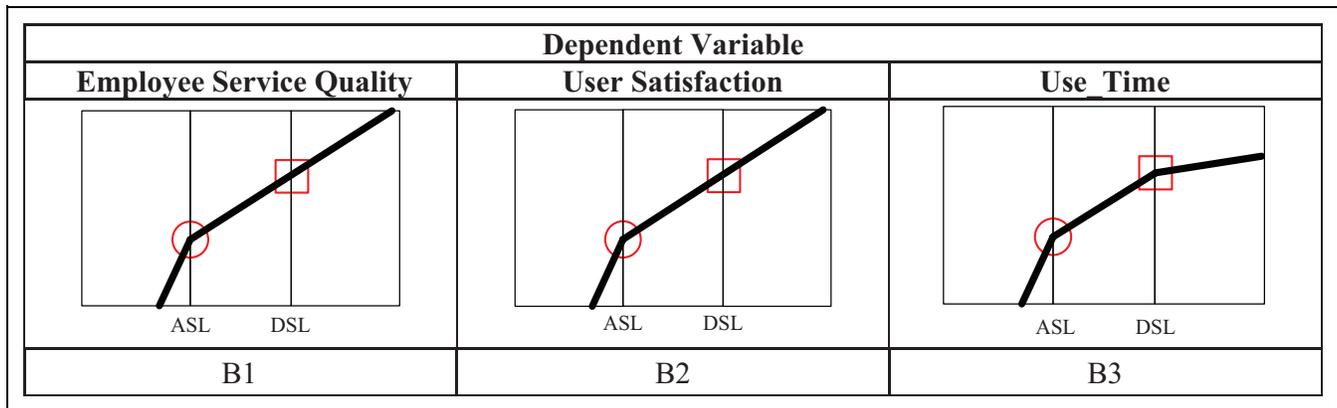
Figures B1, B2, and B3. Pictorial illustration of the effect of IT service quality below, within, and above the ZOT. Note: X-axis represents internal IT service quality (ITSQ). Y-axis represents the dependent variables of consideration. Circles denote the points where ITSQ meets call center employees' adequate service level (ASL). Squares denote the points where ITSQ meets call center employees' desired service level (DSL).

ESQ. According to Baron and Kenny (1986), if (a) X impacts Z and (b) Y impacts Z, we can assess whether Y mediates X's effect on Z by including Y as a control variable when regressing Z on X. If the result shows that X's impact on Z decreases due to the inclusion of Y, and that Y significantly affects Z, we can then conclude that Y mediates the impact of X on Z. Table 5 shows that (a) ITSQ affects ESQ differentially across different ZOT levels (Model 1) and that (b) ITSQ also affects user satisfaction and Use_Time differentially across different ZOT levels (Models 2 and 3). Based on Models 1–3, Models 4 and 5 test whether user satisfaction and Use_Time mediate the differential effect of ITSQ on ESQ. This was done by adding each of the two variables (i.e., user satisfaction and Use_Time) as an additional control variable in Models 4 and 5, respectively. The results indicate that while user satisfaction did affect ESQ significantly (Model 4), Use_Time had no such impact (Model 5).

Furthermore, β_1 and β_2 in Model 1 dropped significantly after including user satisfaction as the control variable (Model 4). In particular, β_1 and β_2 of ITSQ for ESQ are 0.88 and 0.83, respectively (Model 1); however, when we controlled the effect of user satisfaction on ESQ, β_1 became insignificant, and β_2 dropped to 0.75 (Model 4), thereby suggesting a partial mediation effect. Thus, although Hypothesis 3b is rejected because Use_Time had no mediating effect, Hypothesis 3a is supported, as user satisfaction partially mediated the effect of ITSQ on ESQ across different ZOT levels.

Discussion and Implications

In this research, we draw on the theory of administrative behavior to formulate several hypotheses and conduct empirical analyses to generate insights into (1) how internal ITSQ affects (a) the quality of service that call center employees (or internal customers) provide to external customers and (b) call center employees' satisfaction with and use of the deployed IT, across different levels of the ZOT; (2) the differential roles of ASL and DSL in shaping call center employees' response to ITSQ; and (3) the mechanisms through which ITSQ impacts call center ESQ. Given the aforementioned economic and societal importance of the call center industry, our findings bear significant value for both theory and practice. We now discuss the key contributions of our research in the following section.

ZOT's Role in Understanding ITSQ's Effect on Service Employees

Our findings contribute to service marketing theory by demonstrating the need for and value of considering the unique characteristics of internal customers when applying concepts derived from external marketing contexts, such as the ZOT, to an internal marketing setting such as a call center. By considering call center employees as customers of the internal IT function, we investigated the nature and the effects of internal customers' unique circumstances. Specifically, viewing the internal customer setting through the lens of the theory of administrative behavior, we examined patterns of the ZOT's influence on the relationship between internal ITSQ and ESQ to external customers in an IT-enabled call center context.

Findings from our investigation offer strong evidence of two distinct patterns that we hypothesized regarding the influence of ITSQ across different levels of the ZOT. First, there is a *diminishing positive impact* of ITSQ on ESQ, user satisfaction, and technology use, from below to within to above the ZOT. Second, we showed that internal customers' ASL plays a more pivotal role than their DSL in shaping the extent of the positive returns from ITSQ for call center employees' service performance (i.e., ESQ) and their interactions with the deployed technology (i.e., user satisfaction and technology use). As such, the difference in the positive response between employees below and within the ZOT is significantly larger than the difference in the positive response between employees within and above the ZOT.

Both these patterns of influence have important implications for call centers' investments directed at improving their ITSQ and the return on these investments that are likely to result in terms of call center employees' service quality, user satisfaction, and technology use. Specifically, call center managers should recognize that ensuring the IT service support for their employees meets the minimum threshold (i.e., ASL) is likely to generate greater benefits than increasing ITSQ above ASL. Managers should evaluate the benefits against the costs of increasing ITSQ by considering how both the marginal benefits and the costs associated with increasing ITSQ change below, within, and above the ZOT. In other words, call center managers are likely to do well by placing emphasis on at least consistently meeting employees' ASL regarding internal ITSQ as this level of ITSQ will equip call center employees to meet performance standards expected of them. We caution that managers should not misinterpret our findings to suggest that the optimal level of ITSQ is ASL but rather should recognize that the marginal benefits can be expected to decline beyond ASL. Apart from recognizing that the benefits from increasing ITSQ decline beyond ASL, call center managers should proceed to evaluate the marginal net benefits (i.e., the marginal benefits and costs) of continuing to enhance ITSQ beyond ASL and determine if these marginal net benefits are substantial given competing resource allocation priorities to support the work of call center employees.

Importantly, the influence patterns of the ZOT we found for internal customers in call centers appear to be different from, and almost opposite to, those identified in prior studies (which are typically conducted with external customers). In particular, the pattern of the ZOT's influence for positive variables in external marketing settings is either a positive linear pattern (Figure A1) or an upward increasing pattern (Figures A2 and A3) as service quality moves from below to within to beyond the ZOT. In contrast, findings from our study reveal an *upward decreasing* influence pattern of the ZOT for all the positive variables (i.e., ESQ, user satisfaction, and technology use) for call center employees (Figures B1, B2, and B3, respectively). These findings serve to reinforce our view that a conscious conceptualization of the distinct characteristics of internal service environments such as in a call center (vis-à-vis external service contexts that have dominated scholarly investigations to date) could lead to commensurate differences in how the recipients of internal ITSQ respond to incremental improvements in it.

IT Success and the Mediation Mechanisms Through Which ITSQ Affects ESQ

This study also contributes to the IT success literature. First, it is among the first to provide evidence about the effects of ITSQ on user satisfaction and technology use. More importantly, while the model proposed by DeLone and McLean (2003) has long implied that user satisfaction and technology use are two potential mediators through which ITSQ exerts its downstream impact on the net benefits of technology, to our

knowledge this study is the first to empirically test these mediation mechanisms. Specifically, our findings suggest that call center employees' user satisfaction partially mediates the effect of ITSQ on ESQ, whereas employees' technology use does not.

This differential outcome is perhaps attributable to the mandatory technology use setting of our investigation and, for that matter, most call center operations. Recent IT success literature has indicated that, in IT-enabled service contexts, service employees' performance could be affected by a variety of factors, including employees' technology use, satisfaction with the technology, personal service skills and knowledge, prior performance, and so on (e.g., Heskett, Sasser, and Schlesinger 1997). Moreover, the performance effects of resources accessed through IT use and those that are embodied in employees (e.g., personal service skills and knowledge) are substitutive in nature (Hsieh et al. 2012). Hence, employees may draw upon different kinds of resources (e.g., IT-based and embodied resources) to deliver quality service and satisfy their customers. As such, even though their technology use is mandatory, they may vary in terms of the *extent* to which they use the technology.

Moreover, scholars have conceived UserSat from the needs fulfillment perspective and argued that employees' satisfaction with implemented CRMT reflects the extent to which their need to provide quality service that satisfies their customers is facilitated by their technology use (Au, Ngai, and Cheng 2008). Some have further differentiated user satisfaction from technology use in mandatory contexts by arguing that while employees' technology use could be influenced by organizational mandate and its effect on employee performance is interchangeable with the effect of other embodied factors (e.g., personal service skills and knowledge), user satisfaction, which reflects the extent to which employees' work needs are fulfilled, is independent of the organizational mandate (Hsieh et al. 2012). Use_Time and UserSat, in essence, represent different types of IT success in mandatory contexts. Our findings with regard to the differential mediation effects between UserSat and Use_Time provide empirical support for this critical distinction between the psychological and behavioral success when IT use is mandated.

Finally, prior literature shows that factors like job satisfaction mediate the impact of human resources on employee job performance (Schneider, White, and Paul 1998; Schneider et al. 2009). Our work complements this research by identifying user satisfaction as the partial mediator through which internal ITSQ affects call center employees' service quality.

- Differential Effects of User Satisfaction and Technology Usage Behaviors

Our results reveal two noteworthy differences between user satisfaction and technology use (Use_Time), which warrant elaboration. First, the pictorial illustrations in Figures B2 and B3 suggest a difference in the influence pattern of the ZOT between call center employees' user satisfaction and

Use_Time. For both variables, the effect of ITSQ generally displays a diminishing pattern as ITSQ increases. For Use_Time, there is a significant decrease in the effect of ITSQ when moving from within the ZOT to above the ZOT. For user satisfaction, however, there is no such change in the effect/slope. In other words, there are two inflection points for Use_Time, but there is only one for user satisfaction. Once the quality of the provided IT service goes beyond the DSL, the marginal utility of additional ITSQ remains the same for employees' user satisfaction but drops for their Use_Time. One possible explanation is that an increase in usage behaviors requires more (physical) effort from employees who use the technology, whereas an increase in positive psychological evaluations requires almost none. Given that the provided internal service has surpassed the desired level and that longer Use_Time may require more effort from employees, they may not necessarily keep increasing their technology use as much as when the provided ITSQ is below the desired level.

Finally, we notice that the pattern for the ZOT's influence on ESQ (Figure B1) is the same as the pattern for user satisfaction (Figure B2) but different from the pattern for technology use (Figure B3). This result may be attributed to the fact that UserSat partially mediates the effect of ITSQ on ESQ but Use_Time does not.

Limitations and Future Research

As is typical of all empirical studies, our study also has its limitations. First, our study was conducted in one call center of a large Chinese telecom firm. While we believe that the nature of employee-customer interactions is similar across many service industries, the dynamics of social interactions could vary across cultural settings. Moreover, since China has become one of the most important emerging markets, multinational firms that are interested in the Chinese market should pay attention to research findings pertaining to this region. Further research can verify if our findings are applicable to call centers in other cultural and economic settings, as well as to other internal marketing contexts.

Prior ZOT studies have examined the effect of (external) service quality on both positive outcome variables (e.g., satisfaction, loyalty, repurchase, etc.) and negative outcome variables (e.g., complaining, switching, etc.). However, the present study only investigated the effect of internal service quality on positive outcome variables (i.e., user satisfaction, technology use, and ESQ). Future research can incorporate a broader range of variables, including both positive and negative outcome variables, when studying the pattern of the ZOT's influence in other internal service contexts. While we evaluated the changes in positive outcome variables as ITSQ increases from below to within to above the ZOT, future research can also extend our work to evaluate the net benefits (i.e., benefits vs. costs) of increasing ITSQ from below to within to above the ZOT.

Finally, research on the ZOT has tended to investigate both the tangible and the intangible aspects of service quality on customer responses (e.g., Yap and Sweeny 2007). However, due to the unique nature of the interactions between the IT function and call center employees in our study, we only captured the intangible aspects of internal service quality. In future studies, scholars should investigate internal services that have tangible components and examine whether tangible and intangible aspects share similar patterns for the ZOT's influence.

Appendix

Operationalization of the IT ZOT Service Quality Constructs

IT ZOT ServQual's Anchor Questions and Format for Item Descriptions (Adapted from Kettinger and Lee 2005):			
Minimum Service Level—The Expected *Minimum* Level of Service Performance You Consider Adequate Desired Service Level—The Level of Service Performance You Desire			
Regarding the Service Offered by the IT Service Staff	My Minimum Service Level Is Low Middle High	My Desired Level of Service Is Low Middle High	My Perception of Service Quality by the IT Staff Is Low Middle High
	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9
Item descriptions			
When it comes to		(the Reliability dimension)	
1. Providing service as promised ...			
2. Dependability in handling customer's service problems ...			
3. Performing service right at the first time ...			
4. Providing services at the promised time ...			
5. Maintaining reliable technology and system ...			
When it comes to		(the Responsive dimension)	
1. Keeping customers informed about when service will be made ...			
2. Prompt service to customers ...			
3. Willingness to help customers ...			
4. Readiness to respond to customers' requests ...			
When it comes to		(the Assurance dimension)	
1. IT staff whose behaviors install confidence in users ...			
2. Making users feel comfortable and safe during their interactions with IT staff ...			
3. IT staff who are consistently courteous ...			
4. IT staff who have the knowledge to answer employee users' questions			

Declaration of Conflicting Interests

Funding

Notes

1. The relationships between service quality and negative dependent variables (e.g., complaint intentions and switching behavior) are essentially the opposite to those of the positive variables.
2. We also conducted confirmatory factor analysis (CFA) using AMOS 5 as a supplementary analysis to gauge further the quality of the measurement model of multi-item constructs (i.e., user satisfaction and IT service quality) that we derived from our PCA (an approach typically used in exploratory factor analysis [EFA]). The CFA results ($\chi^2/df = 1.854$, comparative fit index = 0.973, root mean square error of approximation = 0.06, and standardized root mean square residual = 0.078) provided triangulation evidence on the adequacy of the proposed measurement model.

While it would have been ideal for us to conduct EFA and CFA with two different data sets (i.e., two entirely different data sets or two randomly split subgroups based on a single data set), our research design and sample size prevent us from doing so. However, we were motivated to conduct CFA as a supplementary analysis using the same sample as some methodology scholars suggest performing CFA using the same data set used in EFA as a necessary assessment before moving further to conduct CFA using a different data set (Roy 2010; van Prooijen and van der Kloot 2001). These methodologists (van Prooijen and van der Kloot 2001) have cautioned that, by testing EFA and CFA using different data sets, if there is a lack of correspondence between the EFA and CFA results, we cannot rule out the possibility that the discrepancy is due to using two different data sets. Therefore, recent empirical studies have also adopted this approach to conduct EFA and CFA with the same data set (e.g., Knutson et al. 2009; Shi, Kunnathur, and Ragu-Nathan 2005).

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