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IMPACT OF USER SATISFACTION WITH MANDATED CRM USE ON EMPLOYEE SERVICE QUALITY¹

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An increasing number of organizations are now implementing customer relationship management (CRM) systems to support front-line employees' service tasks. With the belief that CRM can enhance employees' service quality, management often mandates employees to use the implemented CRM. However, challenges emerge if/when employees are dissatisfied with using the system. To understand the role of front-line employee users' satisfaction with their mandated use of CRM in determining their service quality, we conducted a field study in one of the largest telecommunications service organizations in China and gathered time-lagged data from self-reported employee surveys, as well as from the firm's archival data sources. Our results suggest that employees' overall user satisfaction (UserSat) with their mandated use of CRM has a positive impact on employee service quality (ESQ) above and beyond the expected positive impacts that job dedication (JD) and embodied service knowledge (ESK) have on ESQ. Interestingly, the positive effect of UserSat on ESQ is comparable to the positive effects of JD and ESK, respectively, on ESQ. Importantly, UserSat and ESK have a substitutive effect on ESQ, suggesting that the impact of UserSat on ESQ is stronger/weaker for employees with lower/higher levels of ESK. Finally, ESQ predicts customer satisfaction with customer service employees (CSWCSE); ESQ also fully mediates the impacts of UserSat and ESK, and partially mediates the impact of JD, on CSWCSE. The results of this study emphasize the importance of user satisfaction in determining employees' task outcomes when use of an information system is mandated.

Keywords: User satisfaction, mandatory use, customer relationship management systems, employee service quality, job dedication, embodied service knowledge, task performance

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The appendix for this paper is located in the "Online Supplements" section of the *MIS Quarterly*'s website (<http://www.misq.org>).

²Posthumously.

Introduction

Managers realize that the quality of service provided by front-line service employees (hereafter referred to as employees) impacts customer satisfaction, which, in turn, influences an organization's ability to attract new customers, retain existing customers, and cross-sell and up-sell products/services (Bolton and Tarasi 2006). To improve employees' service quality and customer satisfaction and to reap the economic benefits associated with satisfied customers, a growing number of organizations are implementing customer relationship management systems (hereafter referred to as CRM) to support employees' service activities (Goodhue et al. 2002; Hsieh et al. 2011) and mandating their employees to use these systems (McCalla et al. 2003).

The service profit chain (SPC) literature indicates that satisfied employees offer high-quality service that satisfies customers and stresses the importance of providing support, including information systems, such as CRM, that fulfill employees' needs in performing their job (Heskett, Jones et al. 1994; Heskett, Sasser, and Schlesinger 1997). SPC research has shown that employees' service quality is influenced by individual characteristics, notably employees' personal knowledge about conducting customer service tasks and their job dedication (Heskett et al. 1997). Yet, the expanding role of CRM in service interactions (Bitner et al. 2000) raises questions about the importance of employees' satisfaction with CRM use in determining their service quality, particularly in contexts where employees are mandated to use the system (Brown et al. 2002).

Scholars have conceived and measured user satisfaction (UserSat) in various ways. (For a review, see Petter et al. 2008.) For instance, Ives et al. (1983) proposed the user information satisfaction instrument, and Doll and Torkzadeh (1988) offered the end-user computer satisfaction instrument. Because both instruments

contain items related to system quality, information quality, and service quality, rather than only measuring overall user satisfaction with the system,... some researchers have chosen to parse out the various quality dimensions from these instruments (Petter et al. 2008, p. 242)

to measure UserSat as overall satisfaction with an information system (e.g., Ay et al. 2008; Rai et al. 2002). Toward this end, drawing on the needs fulfillment perspective, Au et al. (2008) conceptualize user satisfaction as the "overall affective and cognitive evaluation of the pleasurable consumption-related fulfillment experienced with IS" (p. 46). From the needs fulfillment view, user satisfaction can be interpreted as

the extent to which individuals' IS usage experience fulfills their needs (Au et al. 2008; Gelderman 1998; Oliver 1995). This view of user satisfaction is fitting with the SPC's focus on fulfilling front-line employees' work needs to provide quality service that satisfies their customers. Hence, consistent with Au et al., we define user satisfaction as the user's overall affective and cognitive evaluation of the pleasurable consumption-related needs fulfillment experienced with IS.

Employees' use of CRM during customer interactions is mandated in many organizations (McCalla et al. 2003). Although studies show that employee users' satisfaction with organizational information systems leads to positive work outcomes, anecdotal evidence suggests that when employees are dissatisfied with the mandated use of CRM, the consequences can be quite counterproductive and public. For example, after a troubled implementation of a CRM at a leading Australian telecommunication firm's call center, the "I Hate Siebel" Facebook group was developed (Sharma 2008b), with more than 3,000 members involved in an active forum of employees and customers sharing their negative views and experiences with Siebel's CRM at both the firm and other organizations.³ Besides many employees' complaints about the system's ineffectiveness in supporting their service work (Sharma 2008a), 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). The mandated use of the system not only frustrated employees and compromised their work, but it also negatively impacted customers.

In these mandatory-use contexts (such as with CRM use at many organizations), employees' IS use (e.g., time of use and frequency of use) is largely determined by managerial expectations and does not reveal employees' real perceptions about the system (e.g., satisfaction) or inform these perceptions' downstream impacts (e.g., the ensuing usage behaviors and task outcomes as discussed by Seddon 1997). In contrast, even when IS use is obligatory, user satisfaction is discretionary, captures the user's own mental acceptance of the system, and can engender significant behavioral consequences (e.g., Wang et al. 2008); thus, UserSat has a unique and potentially critical role in influencing system success in mandatory contexts (Brown et al. 2002). As the relationships among constructs in voluntary-use settings can be very different in mandatory-use settings due to the differences in the two usage contexts (Johns 2006; Wu and Lederer 2009), the downstream impact of user satisfaction on employee service quality requires further theoretical development and empirical

³We thank the senior editor for suggesting this example.

investigation in mandatory contexts.

In short, while the SPC literature argues that personal knowledge related to customer service tasks and job dedication may remain important for employees' service quality, employees' satisfaction with their mandated use of CRM may also impact their service quality. This motivates us to examine the impact of front-line service employees' satisfaction with their CRM use above and beyond their personal knowledge about the service and their job dedication. Thus,

RQ1. In mandatory CRM use contexts, what is the effect of service employees' satisfaction with CRM use on service quality above and beyond their personal knowledge about customer service and their job dedication?

CRMs are equipped with various functions to support employees' service work (Ahearne et al. 2008; Bolton and Tarasi 2006). Employees' satisfaction (or dissatisfaction) with their use of CRM reflects the extent to which these functions adequately (or inadequately) fulfill their work needs (Au et al. 2008; Gelderman 1998). Employees are dissatisfied when these functions fail to support their service activities (Sharma 2008a; Tindal 2008); in this case, employees with higher personal knowledge (about the customer, product/service, market, and/or organizational knowledge for service activities) (Goodhue et al. 2002; Zeithaml and Bitner 2002) may be able to leverage their knowledge to compensate for the CRM's ineffectiveness and maintain their service quality, whereas employees with lower personal knowledge are unlikely to be able to cope similarly with the CRM's limitations. Furthermore, employees with higher/lower levels of personal knowledge may have lower/higher dependence on the system. This suggests that the relationship between user satisfaction and employee service quality could be contingent upon employees' personal knowledge. To develop a more nuanced understanding about the impact of user satisfaction, we investigate the nature of the joint effect of user satisfaction and embodied service knowledge on employees' service quality. Thus, we propose the following:

RQ2: In mandatory CRM use contexts, how do service employees' satisfaction with CRM use and their personal knowledge for customer service jointly affect their service quality?

While CRM can be applied by different groups of users (e.g., managers, analysts, front-line service employees, etc.) for distinct purposes (Bolton and Tarasi 2006), we focus on the impact of front-line employees' satisfaction on their service quality when CRM use is mandated. To answer our two research questions, we conducted a field study of call center

service employees who are mandated to use CRM in the largest telecommunications firm in China. We obtained the following multisource data: employees' self-reported user satisfaction, employees' job dedication as evaluated by their direct supervisors, employees' personal knowledge based on monthly examinations, and employees' service quality as assessed by the quality assurance team. Our findings reveal that in this mandatory CRM use context (1) employees' user satisfaction positively affects employees' service quality above and beyond their personal knowledge about customer service and their job dedication and (2) employees' user satisfaction and personal knowledge about customer service have a substitutive effect on employees' service quality.

Research Model

Employee service quality (ESQ) pertains to employees' ability to address customer demands (Ray et al. 2005) and is defined as employees' conformance to an organization's requirements to deliver services to its customers (Chakrabarty et al. 2007-2008; Parasuraman et al. 1988). ESQ is a major aspect of employees' performance evaluations in service organizations, as it significantly impacts customer satisfaction (Cronin et al. 2000). The SPC literature has identified two key employee characteristics that influence ESQ (Heskett et al. 1997): (1) *job dedication* (JD), which refers to employees' initiative, self-discipline, and compliance with organizational rules in their work (Van Scotter and Motowidlo 1996), and (2) *embodied service knowledge* (ESK), which refers to employees' personal knowledge that is relevant and applicable to their service tasks (e.g., knowledge about market conditions, customer trends, product/service offerings, and organizational policies and processes) (Leonard and Sensiper 1998; Massey et al. 2001; Zeithaml and Bitner 2002). Understandably, employees who are more dedicated to their jobs (i.e., take initiative, are disciplined in their work, and follow organizational rules) are more likely to provide better quality service (Heskett et al. 1997). Also, employees' embodied service knowledge to address customer demands is an important part of their personal competency that influences their service quality (Heskett et al. 1997; Zeithaml and Bitner 2002).

Direct Impact of User Satisfaction with CRM Use on Employee Service Quality

User satisfaction (UserSat) is an accumulative experience-based evaluation developed over time and represents users' overall affective and cognitive assessment of the entire IS user experience (Au et al. 2008). In the context of telecommunications service providers, organizations mandating the

use of CRM often emphasize that it can help fulfill employees' needs to perform quality service work through the following three core functions: (1) *order fulfillment*, which enables employees to manage the cross-departmental flow of customer orders (e.g., the flow of orders across departments to activate and deactivate services/products); (2) *transaction record-keeping*, which enables employees to access billing history and records of previous interactions with customers; and (3) *knowledge repository*, which enables employees to access cataloged information about the organizations' services/products, pricing and promotions, and customers' frequently asked questions (FAQs) and corresponding answers (Bolton and Tarasi 2006; Goodhue et al. 2002; McCalla et al. 2003). Employees' level of satisfaction with CRM use can be interpreted as the extent to which their personal needs to perform service work are fulfilled by these functions (Gelderman 1998).

Prior literature has indicated that employees' needs in performing their service work may vary across individuals with different education levels, tenure, service experience, and so forth, one major reason why employees develop different levels of satisfaction when they are offered the same service within organizations (Zeithaml et al. 1993). Thus, even when using the same system, employees may differ in their satisfaction with the CRM, as their use of the system will satisfy their individual work needs to differing extents. Employees' cumulative experience with the CRM (i.e., UserSat) can "influence their morale, their disposition toward [the IS] innovation, and ultimately, performance [e.g., service quality]" (Straub et al. 1995, p. 1338). That is to say, employees' satisfaction (dissatisfaction) with CRM will positively (negatively) impact their service quality (Abraham 2004).

Unlike system usage behavior that could be required by management, in the mandatory-use context, UserSat captures users' own perceptions about their usage experiences with a system (Scheepers et al. 2006); these perceptions are discretionary and cannot be mandated even if system use is mandated. Thus, UserSat can be viewed as the users' post-consumption evaluations signifying if they psychologically accept the implemented system (Wang et al. 2008). Employees are satisfied (or dissatisfied) with the system when they feel the system adequately (or inadequately) fulfills their needs to deliver quality service to customers. When employees are satisfied with the mandated use of CRM, their favorable perceptions of the CRM are aligned with their behavioral use of the system. In such conditions, employees apply the CRM to support their service tasks and garner work benefits because of their system use (Petter and McLean 2009). However, the challenge emerges when employees have to use a system with which they are dissatisfied or have psychologically rejected: they confront dissonance due to the

managerial pressure to use a technology that they have mentally rejected (Markus 1983; Ram and Jung 1991). In such conditions, employees' mental states are at odds with their actual behaviors, creating psychological tension that could negatively affect their service quality. They may also question managerial judgment in mandating employees to use the specific system (Pratkanis 1988) and may develop negative feelings about the work process and the managerial environment (Zuboff 1988), thus hampering their service quality to customers (Brown et al. 2002).

The above discussion demonstrates that while prior studies have shown that ESK and JD are salient determinants of ESQ (Heskett et al. 1997; Zeithaml and Bitner 2002), the mechanisms through which UserSat impacts employees' service quality in mandatory use contexts are distinct from employees' personal service knowledge and their job dedication. Thus, we expect

H1: In mandatory CRM use contexts, user satisfaction with CRM use positively affects employee service quality, controlling for the effect of embodied service knowledge and job dedication.

Moderating Role of Embodied Service Knowledge

Effective service delivery requires the personalization of services to individual customer demands (Bolton and Tarasi 2006). The SPC literature argues that "the most cost-effective way in which services are adapted to individual [customer] needs is through front-line employees or support systems, such as information technology [e.g., CRM]" (Heskett et al. 1997, p. 133), suggesting that employees' personal competencies could substitute for CRM functions in employees' responding to some customer demands.

As discussed earlier, an employee's dissatisfaction with CRM accumulates when its functions are ineffective in fulfilling personal work needs; when this occurs, the employee may work around the system's limitations by leveraging ESK about market conditions, customer trends, product/service offerings, and/or organizational processes and policies. For example, (1) if the CRM's order fulfillment function is ineffective in supporting the employee in activating or deactivating services/products for a customer, the employee can draw upon his/her knowledge about workflow processes to contact relevant parties/departments for specific activation and deactivation requests; (2) if the CRM's transaction record-keeping function is ineffective in assisting employees in responding to a customer's inquiries about billing history, usage records, or prior interactions, the employee can rely on

his/her knowledge about organizational policies to explain how the organization tracks transactions, charges for services, and addresses problematic service encounters to deal with the customer's concern; the employee can also draw on ESK to discuss other services that can benefit the customer if the employee is required to wait for the system to provide the relevant information to address the customer inquiry; and (3) if the knowledge repository function is ineffective in aiding the employee to propose appropriate products/services to a customer, the employee can utilize his/her knowledge about market conditions, customer trends, and the organization's product/service offerings, pricing plans, and promotions to recommend products and services that are likely to be beneficial to the customer.

The above discussion suggests that in the case of low UserSat, employees' ESK enables them to compensate for CRM functions that do not fulfill their personal needs for service work. However, as employees' ESK varies (Zeithaml and Bitner 2002), its sufficiency/deficiency can make employees less/more vulnerable to the unfavorable impact of user dissatisfaction on service quality (Bolton and Tarasi 2006; Goodhue et al. 2002). As low-ESK employees cannot compensate for the CRM's ineffectiveness with their personal knowledge when responding to customers, their dissatisfaction with the CRM will compromise their service quality. In contrast, high-ESK employees can readily draw on their embodied knowledge to make up, at least in part, for the CRM's inadequacies when responding to customer inquiries, thereby reducing the unfavorable impact of user dissatisfaction on service quality. Thus, compared to employees with high ESK, employees with low ESK have to rely on the system to a greater extent, suggesting that user satisfaction will exert a stronger impact on low-ESK employees' service quality. The above discussion leads to our second hypothesis:

H2: In mandatory CRM use contexts, embodied service knowledge will moderate the positive relationship between user satisfaction with CRM use and employee service quality such that the relationship is stronger for service employees with a lower level of embodied service knowledge than for those with a higher level of embodied service knowledge.

Methodology

To test the hypotheses empirically, we collected data at multiple points in time as part of a field study at a call center in a Chinese telecommunications firm that had implemented a CRM system to support its customer service process. The employees under study are front-line service employees in the

call center who utilize the system to support service interactions with customers. This section describes the site, instrument development, and data collection procedure.

Call Center Research Site

The telecommunications firm is the largest mobile phone service provider in China and is publicly listed on both the Hong Kong and New York stock exchanges. To support inquiries from its hundreds of millions of customers, the company recognized the strategic importance of implementing a CRM to support its customer service processes in different service channels, including in its call centers. At the time of data collection, the firm had implemented the CRM along with standardized service processes across all 31 provinces in China for one-and-a-half years. As service employees are assigned to the same tasks, customer calls, regardless of the purpose, are routed to service employees based on their availability. Consistent with most CRM initiatives, service employees in the call center are mandated to use the CRM to serve customers (McCalla et al. 2003). The CRM not only enables employees to respond to customer inquiries and solve problems, it also helps them promote additional sales when appropriate to enhance customer value. The general manager of the call center effectively described the CRM and the ways in which the employees interact with the system:

The CRM system stores all the information about the customer: his/her personal information, billing history, and usage records. The system also has the information about our products, services, promotions, and policies in different local markets. The system offers most of the necessary information for a service employee to identify customer records, retrieve relevant information with regard to customers' inquiries, activate services, solve problems, offer the necessary products/services, and promote add-on sales.

Measurement of Constructs

Employee Service Quality and its Hypothesized Determinants

Since the unit of analysis is the front-line service employee, construct measures were designated to center on individual employees who use the CRM to serve customers. To measure *employee service quality* (ESQ), 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/her service quality conforms to the criteria set by the firm for service delivery. 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.⁴ These dimensions are in accordance with the concepts of assurance, reliability, responsiveness, and empathy underlying the notion of service quality proposed by marketing researchers (Parasuraman et al. 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 applied this organizational rating of employees' service quality as the single-item measure of ESQ, which is consistent with the approaches used by Witt et al. (2004), who used a similar measure in their study of call center employees, and by Zeithaml et al. (1996), who also used a single-item measure of service quality.

Second, to measure *user satisfaction* (UserSat), we used the following three 7-point scales ranging from 1 to 7 informed by Au et al. (2008) and Bhattacharjee (2001): (1) I am very dissatisfied/very satisfied with the use of the CRM, (2) I am very displeased/very pleased to use the CRM, and (3) It is absolutely terrible/absolutely delightful to use the CRM.

To measure *embodied service knowledge* (ESK), we use scores from exams administered by the firm to evaluate employees' service knowledge. The firm administers such exams monthly to test the employees' ESK in three major categories: (1) market knowledge, (2) offering knowledge, and (3) organizational knowledge. Consistent with the marketing literature, these are the critical types of knowledge needed for service employees to perform customer-service tasks effectively (Zeithaml and Bitner 2002). Exam items for market knowledge include current trends and fashions that are most popular among customers, major competitors' promotional and campaign activities that may affect customer preferences and loyalty, tax incentives (e.g., tax deductions or subsidies) that may stimulate customer consumption, and government regulations that may affect customer decisions. Exam items regarding offering knowledge include questions about the firm's current key product/service offerings, instruc-

tions for how to use the firms' products/services, the opportunities for up-selling and cross-selling products/services and the associated benefits for customers (e.g., price deductions, cost savings, or bonuses), and the planned phase-in and phase-out of products/services. Exam items for organizational knowledge include questions regarding important service processes (e.g., sales, activation/deactivation, payments, complaints, etc.) and organizational policies (e.g., returns, exchanges, etc.).⁵ While the exam is computer based, the employees must take the exam without the CRM's aid. In other words, the exam is used to evaluate the extent to which the employees possess the aforementioned knowledge. The resulting grade assigned to each employee ranges from 0 to 10. We used this score as the single-item measure for employees' ESK. This measure is similar to the measures used in education literature where exam grades are used as measures of students' knowledge levels (Lekholm and Cliffordson 2008; Robles and Braathen 2002).

Control Variables

We operationalized *job dedication* (JD) using the supervisors' evaluation of employees. Every month, each employee's direct supervisor evaluates his/her JD on a 10-point scale based on the following equally weighted criteria: attendance, discipline, attitude, and compliance with organizational rules (e.g., dress code, workplace interactions with colleagues and supervisors, conduct). Our single-item measure of JD is consistent with the practice in organizational behavior research to assess employees' dedication to their jobs from the supervisors' viewpoint (Van Scotter and Motowidlo 1996) and also with the recommendation that employees' JD should be assessed according to organizational goals and stated rules (Robbins 2000).

Prior literature has indicated that employee differences in gender (Roth et al. 2010), education (Ng and Feldman 2010), age (Hedge et al. 2006), service experience (Crandall and Perrewé 1995), and technology usage experience (Morris and Venkatesh 2010) may affect job-related outcomes. Accordingly, to account for any potential influence of these individual differences on ESQ, we obtained survey data for these five variables from the employees and included them as control variables for ESQ.

⁴The firm equally weights each of the five aspects (i.e., timely, accurate, reliable, attentive, and courteous service) to determine ESQ scores.

⁵The firm allocates 30%, 40%, and 30% of the exam to assess employees' market knowledge, offering knowledge, and organizational knowledge, respectively.

Table 1. Construct and Measurement Summary

Construct Name	Definition	Operational Measure
CRM User Satisfaction (UserSat)	A user's overall affective and cognitive evaluation of the pleasurable level of consumption-related needs fulfillment experienced with IS (Au et al. 2008)	1. I am very dissatisfied/very satisfied with the use of the CRM. 2. I am very displeased/very pleased to use the CRM. 3. It is absolutely terrible/absolutely delightful to use the CRM. (1–7 Scale) (Au et al. 2008; Bhattacharjee 2001)
Job Dedication (JD)	The initiative, self-discipline, and compliance with organizational rules that an employee exhibits while working (Van Scotter and Motowidlo 1996)	A single-item 0–10 scale based on the direct supervisors' monthly rating with regard to employees' attendance (25%), discipline (25%), attitude (25%), and compliance with organizational rules (25%) (e.g., dress code, workplace interactions with colleagues and supervisors, conduct) (Van Scotter and Motowidlo 1996).
Embodied Service Knowledge (ESK)	An employees' personal knowledge about customers, products/services, the organization, and the market, the knowledge that is relevant and applicable for their service tasks (Leonard and Sensiper 1998; Massey et al. 2001; Bolton and Tarasi 2006)	A single item 0–10 scale based on the results of the organizational monthly computer-based examination taken by all employees (without the aid of the CRM) to assess their market knowledge (30%), offering knowledge (40%), and organizational knowledge (30%) that is relevant and useful to their service tasks (Zeithaml and Bitner 2002; Lekholm and Cliffordson 2008; Robles and Braathen 2002).
Employee Service Quality (ESQ)	Conformance to requirements in the delivery of a service (Chakrabarty et al. 2007-2008; Parasuraman et al. 1988)	A single-item 0–25 scale based on the quality-assurance personnel's systematic assessment regarding the extent to which an employee's service quality conforms to the criteria set by the firm for service delivery (i.e., whether the employee provides customers with timely, accurate, reliable, attentive, and courteous service) (Witt et al. 2004; Zeithaml et al. 1996). The firm equally weights each of the five aspects (i.e., timely, accurate, reliable, attentive, and courteous service) to determine ESQ scores.
Customer Satisfaction with Customer Service Employees (CSWCSE)	The degree to which the customers are satisfied with their service encounters with a specific employee (Bitner and Hubbert 1994; Boulding et al. 1993)	A single-item 0–10 monthly aggregated rating of customer-reported satisfaction with regard to their service encounters with a specific employee (Froehle 2006; Smith et al. 1999).

Construct to Evaluate Nomological Validity

Because the marketing literature has consistently shown that high service quality leads to satisfied customers, we measure customer satisfaction with customer service employees (CSWCSE) to evaluate the predictive validity of ESQ. Satisfaction can be either transaction-specific or cumulative (Boulding et al. 1993). As our focus is on the effectiveness of CRM in terms of employees' service delivery to their customers, we measure transaction-specific customer satisfaction for each employee (Bitner and Hubbert 1994). The call center invites each customer to rate his/her satisfaction with the service provided by the employee immediately after each service encounter using a single-item 0–10 scale (0 = not at all satisfied, 10 = completely satisfied). The call center aggre-

gates this customer feedback on a monthly basis from all responding customers to create an index score for each employee; we used this index score as our measure of CSWCSE. This is consistent with the many studies that have measured customer satisfaction using a one-item global response by the customer (e.g., Froehle 2006; Smith et al. 1999). Table 1 summarizes the definitions and measures of each construct in this study.

Data Collection

Data collection consisted of the following three steps: (1) questionnaire translation and back-translation between English and Chinese by two certified professional translators

(UserSat, education, gender, age, service experience, and CRM experience were measured using the survey) (Brislin et al. 1973), (2) a pilot study of 31 employees at the firm to conduct a preliminary examination of construct validity and reliability, and (3) a survey of 250 randomly sampled employees in April 2007. Each questionnaire was coded with a unique identification number to match data from different sources for each employee. Of the 250 surveyed employees, 238 responses were complete and usable for statistical analysis.

The firm also provided us with the following data at different time points: embodied service knowledge (July 2007, three months after the survey), job dedication (July 2007, three months after the survey), employee service quality (September 2007, five months after the survey), and customer satisfaction with customer service employee (October 2007, six months after the survey). As our analysis requires matching data from different data sources, only employees with complete data (i.e., UserSat, ESK, JD, ESQ, and CSWCSE) qualified as complete observations. Promotions, job transfers, sick/personal leave, and absences through the six-month data collection time span (i.e., from April 2007 to October 2007) led to some sample attrition, resulting in a complete dataset for 163 of the 238 employees who responded to the survey. We found no significant differences in the demographic variables (i.e., gender, age, education, service experience, and CRM experience) between the 163 employees that were included in the analysis and the 75 respondents that were dropped from the analysis due to incomplete data.

Results

Table 2 presents the demographic characteristics of the sample; there are more females and more employees without a bachelor's degree. This profile corresponds closely to the demographic characteristics reported in recent industrial reports (e.g., Batt et al. 2004; Paten 2010) and research studies (e.g., Wang et al. 2011) in that the majority of call center employees are female and have education levels lower than a bachelor's degree.

Measurement and Structural Models

We used PLS-Graph 3.00 Build 1126 for the analysis. We chose partial least squares (PLS) for the analysis, as it is especially suitable when a study's objective is to explain an outcome of interest and the measures for constructs are derived from archival data (e.g., corporate databases) (Gefen

et al. 2011), corresponding well to our study's objectives and the sources of measures for some of our constructs.

For the measurement model, UserSat (a multi-item construct) was modeled as reflective. Table 3 shows the descriptive statistics, correlations, reliabilities, and average variance extracted (AVE) for the constructs. The item loadings and cross-loadings were calculated based on the procedure recommended for PLS (Gefen and Straub 2005). As expected, each item loaded higher on its principal construct than on other constructs (Appendix A). The item zero-order correlation matrix (Appendix B) shows that the items for UserSat are highly correlated with one another, suggesting convergent validity. For internal consistency, the values of both Cronbach's alpha and composite reliability for UserSat were greater than the recommended 0.707 threshold (Table 3) (Nunnally and Bernstein 1994). The AVE of UserSat was also higher than 0.50, suggesting that the observed items explained more variance than the error terms (Fornell and Larcker 1981). Furthermore, the square root of AVE for UserSat (0.94) was higher than its zero-order correlations with other constructs, thereby supporting discriminant validity (Fornell and Larcker 1981).

Figure 1 shows the results of the model evaluation in terms of path coefficients and R^2 values. The model successfully explained 22.3 percent and 23 percent of the variance in employee service quality (ESQ) and customer satisfaction with customer service employee (CSWCSE), respectively. Table 4 shows the results of the hierarchical PLS analysis and the incremental change in the R^2 values of ESQ. Supporting H1, ESQ was directly impacted by UserSat ($\beta = 0.209$, $p < 0.01$) after controlling for embodied service knowledge (ESK) ($\beta = 0.204$, $p < 0.01$) and job dedication (JD) ($\beta = 0.216$, $p < 0.01$), as well as for the demographic characteristics (only gender was significant; $\beta = 0.131$, $p < 0.01$; male = 0, female = 1). (See the results for Model 10 in Table 4.) Also, supporting H2, ESK negatively moderated the positive relationship between UserSat and ESQ ($\beta = -0.191$, $p < 0.01$). Thus, both H1 and H2 were supported.⁶ We further included CSWCSE to examine the nomological validity of our model. As expected, ESQ was a significant predictor of CSWCSE.

⁶As the three ESQ predictors were measured at different points in time (i.e., UserSat in April 2007; JD and ESK in July 2007), it is reasonable to question whether employees' JD and ESK scores were stable over time. We obtained archival data for employees' JD and ESK scores at the end of year prior to our investigation (December 2006), enabling us to evaluate matched pair differences between December 2006 and July 2007 for employees' JD scores, as well as for employees' ESK scores. Using matched pair t-tests, we found no significant changes in either employees' JD or ESK scores between these two time points, suggesting that these construct scores exhibited stability (Hedeker and Gibbons 2006).

Table 2. Sample Demographics

	Category	Percentage
Education	Senior High School	39.3%
	College (Associate Degree)	58.9%
	Bachelor's or Higher	1.8%
Gender	Male	5.5%
	Female	94.5%
	Mean	Std. Deviation
Age (years)	23.27	2.72
Prior CRM Use Experience (months)	13.95	4.32
Prior Customer Service Experience (months)	21.69	12.45

Table 3. Descriptive, Internal Consistency, Convergent and Discriminant Validity

Constructs (a)	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. UserSat (3)	4.16	1.21	0.94									
2. ESK (1)	3.56	2.32	-0.06	N/A								
3. JD (1)	6.57	1.30	0.09	0.20	N/A							
4. ESQ (1)	17.58	4.21	0.19	0.24	0.28	N/A						
5. CSWCSE (1)	9.60	0.20	0.02	0.19	0.26	0.48	N/A					
6. Gender (1) (c)	0.95	0.23	0.06	-0.09	-0.09	0.09	0.14	N/A				
7. Edu (1) (d)	1.63	0.52	-0.18	0.02	-0.02	0.06	0.14	-0.14	N/A			
8. Age (1)	23.27	2.72	-0.15	0.11	0.03	0.13	0.09	0.12	0.12	N/A		
9. TExp (1)	13.95	4.32	-0.18	0.01	0.00	0.05	0.15	0.06	-0.11	0.31	N/A	
10. SExp (1)	21.68	12.45	-0.16	0.12	0.03	0.10	0.14	0.23	-0.28	0.42	0.56	N/A
Cronbach's α			0.93	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Composite Reliability			0.91	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ave. Variance Extracted (AVE)			0.88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

a. Number of Measurement Items

b. Diagonal values represent the square root of average variance extracted (AVE)

c. Male=0, Female=1

d. Senior High School = 1, College (Associate Degree) = 2, Bachelor's or Higher = 3

*Shaded areas indicate significant correlations ($p < 0.05$).

**ESQ = Employee Service Quality; CSWCSE = Customer Satisfaction with Customer Service Employee; ESK = Embodied Service Knowledge; JD = Job Dedication; TExp = CRM Use Experience; SExp = Service Experience

Table 4. Hierarchical PLS Analysis Results (Dependent Variable: Employee Service Quality)

MODEL	1	2	3	4	5	6	7	8	9	10
Control Variables										
Gender	0.088	0.078	0.110	0.109	0.059	0.090	0.091	0.131*	0.112*	0.131*
Age	0.11	0.08	0.070	0.063	0.088	0.07	0.077	0.057	0.064	0.079
Education	0.053	0.075	0.083	0.068	0.129	0.123	0.129	0.076	0.124	0.124
Service Experience		0.072	0.057	0.029	0.111	0.067	0.092	0.024	0.059	0.050
CRM Use Experience		-0.006	0.004	0.017	0.021	0.046	0.028	0.022	0.047	0.035
Job Dedication			0.292**					0.270**	0.258**	0.234**
Embodied Serv. Know (ESK)				0.236**		0.242**		0.189**	0.199**	0.204**
Theorized Effects										
User Sat with CRM Use (UserSat)					0.249**	0.247**	0.210**		0.219**	0.209**
UserSat × ESK										-0.191**
R-Square	2.50%	2.90%	11.3%	8.2%	8.4%	13.7%	15.2%	14.60%	18.80%	22.30%
ΔR-Square Against Model (#)									4.2% (Model 8)	3.5% (Model 9)

Notes: 1. Standardized beta coefficients are shown.
 2. *p < 0.05 **p < 0.01

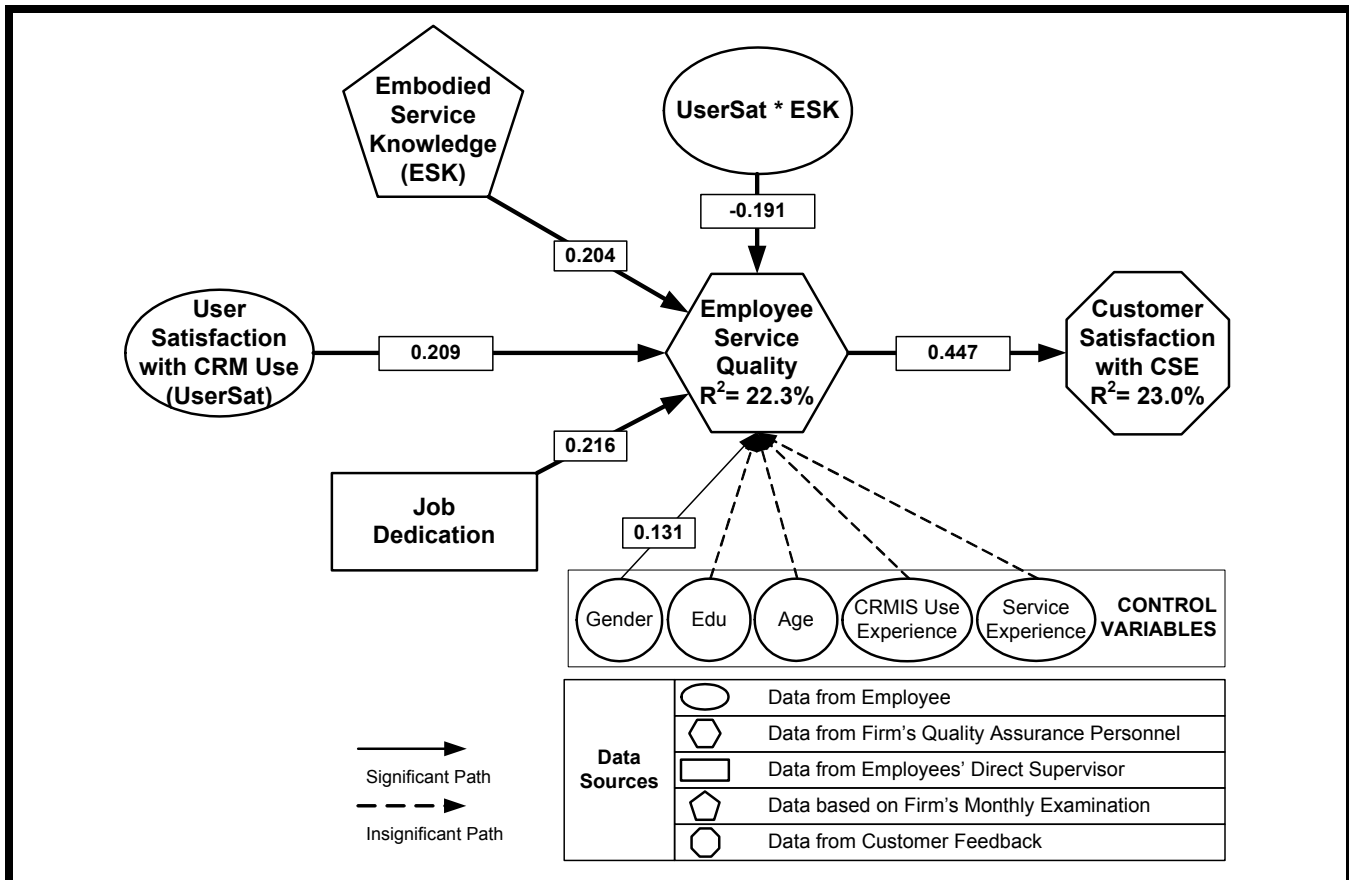


Figure 1. Structural Model Results

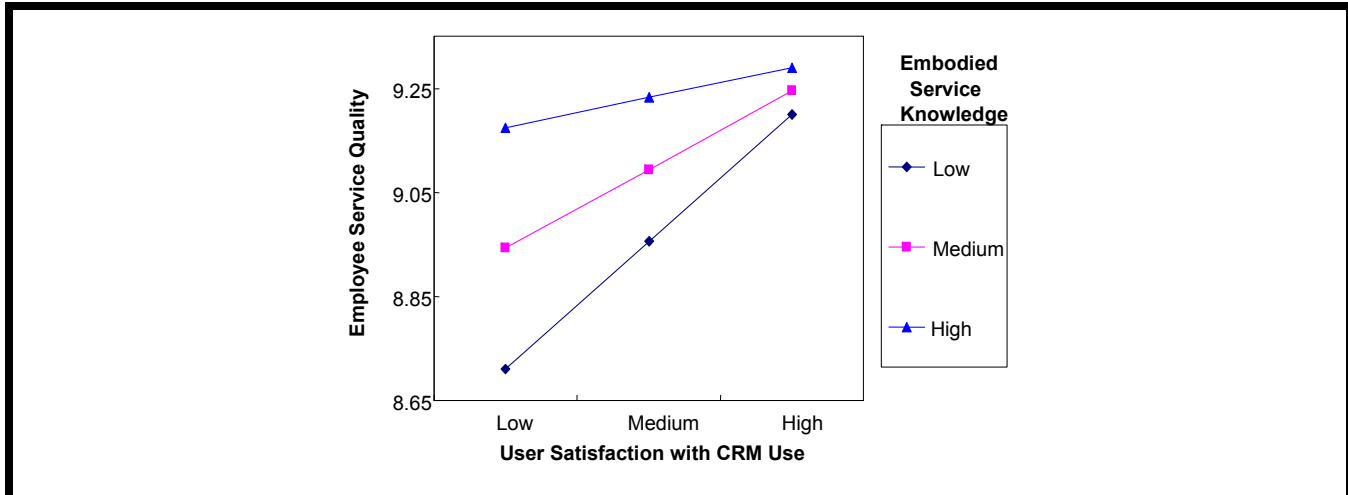


Figure 2. Substitution of User Satisfaction with CRM Use and Embodied Service Knowledge

Importantly, while the marginal contribution of UserSat to ESQ is small in absolute terms (the correlation between UserSat and ESQ = 0.19, see Table 3; $\Delta R^2 = 4.2\%$ for the direct effect and $\Delta R^2 = 3.5\%$ for the interaction effect, see Table 4), methodologists have noted that small effects in the social sciences must be evaluated in the context of the significance of the practical problem and the theoretical gaps, the nature of the research design, and the measures (Ellis 2010; Rosnow and Rosenthal 2003). In our context (1) the problem domain is of significant practical value, (2) the research design involves multisourced data with a time lag, (3) the independent variables and/or dependent variables are cumulative in nature, and (4) the relationships are theoretically important. As such, the identified effects, though small in size, are indeed of considerable theoretical and practical value.

To develop a more nuanced understanding about the nature of the interaction effect between ESK and UserSat on ESQ, following the procedure proposed by Aiken and West (1991), we plotted the interaction diagram shown in Figure 2. The results reveal a substitutive effect: when considering ESQ, user satisfaction with CRM use was more important for employees who embodied less service knowledge than for those who embodied more.

Post Hoc Analyses

Since the research model (Figure 1) implies that ESQ mediates the impact of UserSat, ESK, their interaction (UserSat \times ESK), and JD on CSWCSE, we examined these four mediation effects by conducting two additional analyses. (See

Appendix C for detailed procedures.) The results suggest that ESQ fully mediated the direct effects of UserSat and ESK, as well as their interaction effect on CSWCSE and that ESQ partially mediated the impact of JD on CSWCSE.

Limitations and Future Research

Like most empirical studies, there are limitations that should be noted regarding this research. First, our empirical study was conducted in a single telecommunications service organization in China. While caution should be exercised when generalizing the findings to other national and cultural settings, the continuous growth of domestic markets in countries like Brazil, Russia, China, and India signals the need for more research into these developing economic regions. In addition, although the demographic profile of our subjects corresponds closely to those reported in prior studies, the results must be interpreted recognizing that our sample consists of a large majority of employees who are females and have education levels lower than a bachelor's degree.

While service quality is a customer-oriented measure that incorporates the customer's view (Ray et al. 2005) and predicts customer satisfaction, service productivity (e.g., cycle time) is another important measure of service activities (Parasuraman 2002). Yet, service productivity does not always lead to satisfactory customer experiences, and service quality and productivity are sometimes competing objectives (Collins and Porras 1994). Although this study focuses on service quality as the key outcome variable, future research should examine how the utilization of CRM affects the tradeoff between service quality and productivity.

Discussion

We formulated two hypotheses and conducted a field study to develop our understanding of how user satisfaction with CRM use impacts employee service quality in an organizational context where employees' CRM use is mandated and how user satisfaction and embodied service knowledge jointly determine employee service quality. Our study makes several theoretical and practical contributions as outlined below.

Contribution to Research

Informed by the service profit chain (SPC) literature, we investigated whether employees' overall satisfaction with CRM use (UserSat) influences their service quality (i.e., ESQ) above and beyond two key personal characteristics, namely embodied service knowledge (ESK) and job dedication (JD). Importantly, we focused on user satisfaction in a context in which employees' CRM use is mandated. Drawing on the needs fulfillment perspective, we view UserSat as users' overall affective and cognitive assessment of their work needs fulfillment experienced with CRM, reflecting the extent to which employees' personal work needs are fulfilled through their CRM use. We argued that UserSat positively influences ESQ. We further suggested that as IT-enabled customer service operations are becoming pervasive, employees experience psychological conflict when they are mandated to use CRM but are dissatisfied with the system and that this psychological conflict can compromise their service quality.

Our empirical study reveals that JD (evaluated by direct supervisors, $\beta = 0.216$), ESK (assessed by quality-assurance personnel, $\beta = 0.204$), and UserSat (reported by employees, $\beta = 0.209$) had almost equivalent impacts on ESQ.⁷ The results suggest that (1) while being important determinants for ESQ in traditional service contexts (without IT support) (Heskett et al. 1997), JD and ESK remain important in the IT-enabled service context and that (2) in the IT-enabled service context, UserSat is as important as JD and ESK for ESQ. Thus, a comprehensive consideration of both factors related to human resources (i.e., JD and ESK) and to employees' IS perceptions (i.e., UserSat) is necessary to manage the service quality provided by employees.

While prior literature has rarely considered the contingencies that influence the impact of user satisfaction on task out-

comes, we conceive employees' embodied market, customer, offerings, and organizational knowledge (i.e., ESK) as their personal competency to cope with the system's limitations and incorporate ESK as a moderator that affects the impact of user satisfaction on ESQ. Our finding that UserSat and ESK have a substitutive interaction effect on ESQ suggests that UserSat is particularly important for employees with moderate or low levels of embodied service knowledge (Figure 2), as they are likely to rely more on the CRM during their service work. This finding points to the importance of developing a more nuanced theoretical understanding of how non-IT resources (e.g., personal competencies) and user satisfaction with a particular type of system in a given context jointly affect task outcomes, providing more insight into the mechanisms that influence the downstream impacts of systems.

Consistent with the SPC research, our findings on the predictive validity of ESQ support the importance of ESQ for customer satisfaction with customer service employee (CSWCSE) (Heskett et al. 1997). Interestingly, the *post hoc* mediation analysis revealed differences in the mechanisms through which employees' personal factors (JD and ESK) and UserSat influence customer satisfaction: while ESK and UserSat impacted CSWCSE only indirectly through their impacts on ESQ, JD impacted CSWCSE both directly and indirectly through its impact on ESQ. This suggests that regardless of the service quality, customers do care if employees are dedicated to their tasks. Even when customers are dissatisfied with the service quality provided to them, their satisfaction is positively impacted by the employees' dedication to perform their best.

Furthermore, methodologically, our research design with multisource data collected across different time points has important implications. Most prior studies about the associations between ESQ and such interrelated factors as customer satisfaction or employees' perceptions about their work settings have typically relied on data from a single source (e.g., employees or customers). These research designs cannot rule out the possibility that the identified relationships were the result of common method bias (Podsakoff et al. 2003). Moreover, the validation of causality requires the measurement of variables with time lags (Cook and Campbell 1979). Thus, our field study with data gathered from different sources with time lags offers more confidence in the causal relationships in our model and complements past work in this regard.

Implications for Practice

For practitioners, this research holds implications, as the service economy presents both challenges and opportunities

⁷Following the approaches suggested by Cohen and Cohen (1983) and Cohen et al. (2003), we compared these three path coefficients; the results revealed no statistical difference among these coefficients.

for information systems in service delivery by front-line service professionals. While mandating system use appears to be a quick solution to obtaining a large number of CRM users, our findings suggest that a more nuanced managerial perspective is warranted to realize performance benefits from these systems. Although a CRM can assist front-line employees in serving customers, simply installing the system and mandating employee use may not guarantee benefits. Instead, managers should ensure that the system provides the functions that fulfill front-line employees' needs to perform their service activities. By improving key CRM functions and better supporting employee work needs, managers can foster user satisfaction and thereby promote the achievement of the often-elusive CRM benefits of employee service quality and customer satisfaction.

While CRM can certainly assist employees' task performance, organizations should not naively view CRM as the silver bullet for their service operation, nor should they underestimate the importance of CRM. The salient and comparable effects of embodied service knowledge, job dedication, and user satisfaction indicate that organizations should balance employees' satisfaction with CRM use, service training, and hiring processes to manage the quality of services provided by their employees. For employees with moderate and lower levels of service knowledge, managers should ensure that such employees' use of CRM is satisfying so as to deliver quality services.

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IMPACT OF USER SATISFACTION WITH MANDATED CRM USE ON EMPLOYEE SERVICE QUALITY

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Appendix A

Item Loadings and Cross-Loadings

Construct	Items	1	2	3	4	6
1. User Satisfaction with CRM Use	UserSat1	0.93	-0.04	0.08	0.18	0.03
	UserSat2	0.94	-0.04	0.08	0.18	0.04
	UserSat3	0.95	-0.08	0.10	0.19	0.00
2. Embodied Service Knowledge	ESK	-0.06	1.00	0.19	0.24	0.19
3. Job Dedication	JD	0.09	0.19	1.00	0.28	0.26
4. Employee Service Quality	ESQ	0.19	0.24	0.28	1.00	0.48
5. Customer Satisfaction with Customer Serv. Emp.	CSWCSE	0.00	0.18	0.24	0.49	1.00

Appendix B

Item Zero-Order Correlation Matrix

	Usat1	Usat2	Usat3	ESK	JD	ESQ	CSWCSE	Gender	Edu	Age	TExp	SExp
Usat1	1.00											
Usat2	0.82	1.00										
Usat3	0.82	0.83	1.00									
ESK	-0.04	-0.04	-0.08	1.00								
JD	0.08	0.08	0.10	0.20	1.00							
ESQ	0.18	0.18	0.19	0.24	0.28	1.00						
CSWCSE	0.02	0.02	-0.03	0.19	0.26	0.48	1.00					
Gender	0.05	0.01	0.12	-0.09	-0.09	0.09	0.14	1.00				
Edu	-0.17	-0.13	-0.21	0.02	-0.02	0.06	0.14	-0.14	1.00			
Age	-0.14	-0.18	-0.11	0.11	0.03	0.13	0.09	0.12	0.12	1.00		
TExp	-0.17	-0.17	-0.18	0.01	0.00	0.05	0.15	0.06	-0.11	0.31	1.00	
SExp	-0.14	-0.17	-0.13	0.12	0.03	0.10	0.14	0.23	-0.28	0.42	0.56	1.00

*Shaded areas indicate significant correlations ($p < 0.05$).

**ESQ = Employee Service Quality; CSWCSE = Customer Satisfaction with Customer Service Employee; ESK = Embodied Service Knowledge; JD = Job Dedication; TExp = CRM Use Experience; SExp = Service Experience

Appendix C

Additional Mediation Analyses

Since the proposed model (Figure 1) implies that ESQ mediates the impact of (1) UserSat, (2) ESK, (3) their interaction, and (4) JD on CSWCSE, we conducted two additional analyses to test these mediation effects. First, we compared the research model (*a full mediation model* proposing that the relationship, for example, between UserSat and CSWCSE is completely mediated by ESQ) against a competing model (*a partially mediated model* which, for example, incorporates a direct link from UserSat to CSWCSE). Since the models are nested, they can be compared statistically using PLS results (Chin et al. 1996; Subramani 2004). The significance of the added direct path is assessed using a procedure similar to that applied to test nested models in hierarchical regression. The f^2 statistic is computed based on difference in R^2 ; the significance of the f^2 is assessed based on a pseudo F test (Chin et al. 1996). The results of these tests (Table C1) suggest that although the additions of direct links from UserSat, ESK, and UserSat * ESK to CSWCSE did not significantly increase R^2 in CSWCSE, the direct link from JD to CSWCSE marginally increased the explained variance in CSWCSE.

Table C1. Nested Model Comparison

Direct Path	R ² in Fully Mediated Model	R ² in Partially Mediated Model	f ² Statistic	Pseudo F	Significance of the Direct Path
UserSat → CSWCSE	0.230	0.235	0.006	0.309	Not Significant
ESK → CSWCSE	0.230	0.236	0.001	0.266	Not Significant
UserSat * ESK → CSWCSE	0.230	0.230	0.000	1.000	Not Significant
JD → CSWCSE	0.230	0.247	0.022	0.062	Marginally Significant

Table C2. Significance Test of Mediated Paths

Mediated Path	Path Magnitude	Z Statistic	Significance of Mediation Effect
UserSat → ESQ → CSWCSE	0.0934	2.80 **	Significant
ESK → ESQ → CSWCSE	0.0912	2.58 **	Significant
UserSat * ESK → ESQ → CSWCSE	-0.0854	-2.75 **	Significant
JD → ESQ → CSWCSE	0.0966	3.02 **	Significant

*p < 0.05 **p < 0.01

In addition, we applied the bootstrapping procedure (Edwards and Lambert 2007; Mackinnon 2002) together with mediation analysis techniques (Hoyle and Kenny 1999; Subramani 2004) to assess the significance of the above four mediation effects. Specifically, we used bootstrapping results derived from PLS to calculate the extent to which a construct mediates the relationship between the independent variable (IV) and the dependent variable (DV) under consideration (Hoyle and Kenny 1999). For example, the magnitude of the mediation effect between UserSat (IV) and CSWCSE (DV) mediated by ESQ (mediating variable, or MV) is the product of the paths between IV and MV and between MV and DV. The standard error of the mediated path can be computed based on the magnitudes and the variance of the paths among IV, MV, and DV.¹ The computations yield a z-statistic for evaluating the significance of the mediated path. Similar to those in the previous analysis, the results of this procedure (Table C2) also reveal four significant mediating effects. The above evidence, as a whole, suggests that ESQ (1) fully mediated the impacts from UserSat, ESK, and their interaction on CSWCSE, and (2) partially mediated the impact of JD on CSWCSE.

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¹The standard error of the mediated path can be computed using the formula $\sqrt{p_1^2 s_2^2 + p_2^2 s_1^2 + s_1^2 s_2^2}$ where p_1 is the path coefficient of the path from IV to MV, p_2 is the path coefficient from MV to DV, and s_1 and s_2 are the corresponding standard deviations (Hoyle and Kenny 1999).