LEVERAGING CUSTOMER KNOWLEDGE AND IT RESOURCES TO ENHANCE SERVICE EXPERTISE AND SERVICE QUALITY

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LEVERAGING CUSTOMER KNOWLEDGE AND IT RESOURCES TO ENHANCE SERVICE EXPERTISE AND SERVICE QUALITY

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Abstract

This study examines determinants of the service expertise and service quality of customer service representatives (CSRs) working for call centers which have become a firm’s typical service encounter. More specifically, as such determinants, the study proposes customer knowledge accumulated in electronic knowledge repositories (EKR) as a digital knowledge source along with expertise location as a human knowledge source. Moreover, the study considers technological IT resources (TIR) as another determinant of CSRs’ service expertise and service quality. Finally, the study examines the relationship of service expertise and service quality. A total of 292 responses were collected from CSRs working at call centers and were used for the analysis. The key findings are as follows: first, customer knowledge in EKR, expert location and TIR considerably increased CSRs’ service expertise. Second, customer knowledge in EKR and expert location were positively associated with service quality, but TIR had no significant effect on service quality. Finally, CSRs’ service expertise greatly enhanced service quality. The results imply that CSRs’ service expertise and service quality depend on knowledge sources and IT resources provided by the call center.

Keywords: Knowledge Management, Electronic Knowledge Repository, Customer Knowledge, Organizational Memory, Expertise Location, IT Resource, Service Expertise, Service Quality, Call Center
1. INTRODUCTION

Organizational knowledge can be a source of developing the organization’s further business capabilities (Alavi and Leidner, 2001). Knowledge management (KM) has received considerable attention as a systematic approach to create, share and use knowledge across the organization (Alavi and Leidner, 2001). Consequently, KM enables firms to accumulate a wide range of knowledge in their own electronic knowledge repositories (EKRs), such as knowledge management systems (KMS) and online databases, based on cutting-edge information technologies (IT). Such EKRs serve as a great reservoir of knowledge, past experience and know-how obtained from internal and external sources that could be electronically codified and stored (Bock et al., 2010; Gray and Durcikova, 2005-6; Kankanhalli et al., 2005; Watson and Hewett, 2006). Therefore, it is time that firms attempt to exploit knowledge accumulated in EKRs for enhancing their core business capabilities beyond simply having the knowledge. Accordingly, this study focuses on how organizational knowledge in EKRs can be used to enhance a firm’s business capabilities and performance in the context of call centers which have become a typical service encounter of the firm.

At a call center, customer service representatives (CSRs) generally use customer knowledge accumulated in EKRs in order to deal with customers’ various and complicated service requirements over the phone in a very limited time (Choi and Shin, 2012). When a CSR receives an incoming call from a customer, a pop-up including the basic information of the customer appears in the CSR’s computer monitor. Then, the CSR can instantly respond to the customer’s service requests by searching and using the necessary knowledge in EKRs. Thus, customer knowledge in EKRs can influence a CSR’s service expertise and service quality. For instance, EKRs at the Samsung insurance call center contain a great deal of knowledge and information on the descriptions of numerous insurance products, the comprehensive coverage of insurance contracts, the cancellation of an insurance contract, loans secured on the insurance contracts, insurance laws, insurance claims, and so on (Choi and Shin, 2012). The EKRs have more than 500 categories to organize such knowledge systematically. In a very limited time, CSRs should immediately extract the accurate knowledge needed to solve customer service requirements in EKR. The importance of EKRs increases as it is difficult for CSRs to learn about everything on a firm’s products and customer service policies. Hence, we propose that EKRs serve as an important digital knowledge source of enhancing CSRs’ service expertise and performance i.e., service quality.

To measure the amount of customer knowledge stored in EKRs, we introduce the construct of organizational memory which means the amount of knowledge, experience and familiarity regarding the organization’s business domain (Hult et al., 2004; Moorman and Miner, 1997, 1998). That is, we limit our focus on organizational memory related to customer knowledge in EKRs, instead of including the entire knowledge of the organization. As customer knowledge in EKRs is explicit knowledge, it can be easily shared and exploited when needed (Croasdell, 2001). Thus, EKRs are regarded as a core means of exploiting accumulated organizational knowledge (Cheung et al., 2008). Researchers have suggested that organizational memory is positively related firm performance (Cheung et al., 2008; Choi and Ko, 2012; Moorman and Miner, 1997). Others have attempted to uncover the determinants of EKR’s use (Bock and Sabherwal, 2008; Kankanhalli et al., 2005). However, there is a lack of empirical studies looking at the roles of organizational memory stored in EKRs in developing or enhancing the organization’s core business capabilities and performance.

In addition to a digital knowledge source, we consider expert location as a human knowledge source for CSRs at call centers. Expert location denotes the degree to which employees understand who experts are in the organization (i.e., who knows what) (Reychav and Weissberg, 2009; Su and Contractor, 2010). While EKRs involve the use of codified knowledge, expert location involves the use of un-codified tacit knowledge that experts have (Su and Contractor, 2010). CSRs can obtain knowledge from experts needed to solve unexpected customer requests, when they fail to acquire knowledge in EKRs. As customers’ service requests continue to increase and become diverse, it is difficult for firms to anticipate and prepare all knowledge in EKRs. Therefore, complimentary to EKRs, firms deploy experts in various fields and ensure CSRs to get appropriate assistance from the experts when needed. In this sense, we suggest that it is important not only to use customer knowledge in EKRs as a digital knowledge source, but also to utilize experts as a human knowledge source in enhancing CSRs’ service expertise and service quality. Furthermore, we empirically test the individual effects of the two knowledge sources on CSRs’ service expertise and service quality.

Finally, this study examines the role of technological IT resources (TIR) in enhancing CSRs’ service expertise and service quality. A call center is a typical service encounter enabled by cutting-edge IT, such as computer telephony integration (CTI), integrated and dedicated applications for customer service work which is connected with knowledge repositories (i.e., KMSs), customer relationship management systems (Choi and Ryu, 2013; Choi and Shin, 2012). Such systems allow CSRs to deliver prompt and accurate customized service by offering integrated information on each customer. In particular, a call center has
been transforming into an integrated service center of a firm by connecting other service channels, such as websites, emails and faxes in real time, and offline customer service centers. In this regard, IT resources will considerably influence CSRs’ service expertise and service quality at the call centers. Hence, it is necessary to understand the role of IT in the context of call centers.

2. LITERATURE REVIEW

2.1 Organizational memory in EKRs as a digital knowledge source

Organizational memory refers to the amount of stored knowledge and experience related to the organization’s business domain (Hult et al., 2004; Moorman and Miner, 1997). Further, OM is the collective knowledge across specific individuals or groups, which represents lessons learned from past experiences and evolves over time (Cross and Baird, 2000). Organizational memory is “a repository for collective insights contained within policies, procedures, routines, and rules that can be retrieved when needed” (Day, 1994, p. 44). Organizational memory is stored not only in EKRs through the process of electronic codification, but also in business processes and goods/services of the organization (Cross and Baird, 2000).

Studies of organizational memory have suggested that although many firms primarily place their emphasis on the activities of creating and acquiring new knowledge, it is equally important to store and distribute the knowledge throughout the organization (Moorman and Miner, 1997). Alavi and Leidner (2001) asserted that a firm’s competitiveness depends on its ability to create and transfer, to assimilate and integrate, and to utilize knowledge when needed. EKRs are a key means of realizing organizational memory using IT (Alavi and Leidner, 2001; Cross and Baird, 2000) as well as supporting such knowledge management abilities (Gray and Durcikova, 2005-6). EKRs are defined as information systems storing knowledge, expertise, and experience on the business domain of the organization (Bock et al., 2010; Gray and Durcikova, 2005-6). Stein and Zwass (1995) used the term organizational memory information systems (OMIS) and Cheung et al. (2008) used the term intranet-based knowledge repositories as a typical type of KMSs. IT facilitates the storage and sharing of digitalized explicit knowledge so that employees can easily use the knowledge when necessary (Crosasdell, 2001). Thus, this study focuses on OM related to customer knowledge stored in EKRs so that CSRs can timely use the knowledge for customer interactions in call center settings.

Prior studies of EKRs have attempted to verify the key determinants of user satisfaction or the use of EKRs (Bock and Sabherwal, 2008; Kankanhilli et al., 2005) or to examine the effects of EKRs on work performance (Cheung et al., 2008). Bock and Sabherwal (2008) found some key determinants of user satisfaction of EKRs, including intrinsic and extrinsic rewards, organizational trust, perceived output quality of EKRs, perceived searchability of EKRs and perceived usefulness. Kankanhilli et al. (2005) uncovered various antecedents of EKR usage based on three dimensions such as costs (e.g., codification effort * generalized trust), intrinsic benefits (e.g., knowledge self-efficacy) and extrinsic benefits (e.g., organizational reward). Cheung et al. (2008) examined that intranet-based repositories led to individuals’ creative work performance. However, little has been known about how knowledge in EKRs influences the development of a firm’s capabilities and performance. Accordingly, this study attempts to demonstrate a mechanism demonstrating that EKRs can contribute to the development of a firm’s business capabilities and performance. This study is consistent with the assertion that a firm’s ability to use valuable existing knowledge for achieving its business goals is more important than the abilities to create and share the knowledge (Moorman and Miner, 1997; Watson and Hewett, 2006).

2.2 Expert location as a human knowledge source

While EKRs involve the use of explicit knowledge stored in the repositories, expert location involves that of tacit knowledge that experts have inside (Su and Contractor, 2010). That is, EKRs refer to the use of encoded knowledge and expert location refers to that of human knowledge source (i.e., who knows what) (Reychav and Weisberg, 2009; Su and Contractor, 2010). Prior studies of KM have suggested different ways of using tacit knowledge of individuals or groups that is difficult to codify (Kanawattanachai and Yoo, 2007). One of the ways is to build a map of experts by identifying experts with certain knowledge in certain areas. Based on the assertion that team performance is increased when employees understand who the experts are in certain areas, Kanawattanachai and Yoo (2007) suggested that as team members understand who knows what (i.e., they know the expert location), they can ultimately obtain superior work performance in the long run by facilitating task-knowledge coordination activities. Su and Contractor (2010) asserted that knowledge workers can obtain knowledge from EKRs or human experts; further, the choice of a knowledge source is dependent on the complexity of knowledge and
the codifiability of knowledge. They also asserted that a human knowledge source is preferred when team members need a high level of knowledge, whereas an EKR is preferred when an amount of general knowledge is needed. That is, knowledge workers do not prefer to obtain knowledge from EKRs when the necessary knowledge is complex. Reychav and Weisberg (2009) suggested that one of the ways of measuring the sharing of tacit knowledge is to identify the degree to which employees know who has certain knowledge in certain area, which increases their customer-oriented attitudes. That is, expert location increases the ability to grasp, analyze, understand and respond to customer needs. Therefore, as CSRs understand who has knowledge and skills in certain areas, they can seek and receive appropriate help from experts when necessary.

2.3 Physical IT Resources

Prior research has emphasized the role of IT resources in creating and maintaining a firm’s comparative advantage based on a resource-based view (RBV), as suggested by Barney (1991) (Bharadwaj, 2000; Christiaanse, E. and Venkatraman, 2002). Barney (1991) asserted that IT resources should be valuable, rare, imperfectly imitable and substitutable to create a firm’s sustained competitive advantage. Further, Grant (1996) pointed out that researchers applying the RBV have a tendency to define resources with a wide concept, including assets, knowledge, capabilities, organization processes, etc., and contended that there is a need to distinguish the concept of a resource and that of a capability. That is, a resource is defined as a concept including tangible (e.g., facilities, raw materials), intangible (e.g., reputation, brand) and human-based resources (e.g., technical know-how, employee training). On the other hand, a capability refers to the abilities of a firm to combine, integrate, and arrange such resources and it is directly related to the firm’s comparative advantage (Grant, 1996). That is, capability implies a firm’s ability to exploit various resources for its business purposes; it is generally embedded in its business processes so that it is difficult to be imitated by competitors (Prahalad and Hamel, 1990). Thus, a capability based on resources can be a source of creating a firm’s competitiveness over competitors.

Given that most firms have similar IT resources, it is more important to understand what capabilities a firm creates based on the IT resources (Pavlou and El Sawy, 2010). Wade and Hulland (2004) emphasized that a firm’s performance created by IT resources is temporal; thus, the firm should attempt to continuously develop its business capabilities in order to obtain sustainable performance over time. In line with the assertion, many researchers have introduced a firm’s capabilities that is developed or enhanced by IT resources (Bharadwaj, 2000; Pavlou and El Sawy, 2010; Rai et al., 2006; Wade and Hulland, 2004). They agree that IT resources first contribute to developing or enhancing a firm’s business capabilities and then such capabilities ultimately lead to increased firm performance. Examples of such capabilities include the business process capability (Bharadwaj, 2000; Melville et al., 2004), supply chain process integration capability (Rai et al., 2006), the KMS-based expertise exploitation capability (Christiaanse and Venkatraman, 2002), and the improvisational capability (Pavlou and El Sawy, 2010). In line with these studies, the current study examines whether TIR of a call center plays a key role in enhancing CSRs’ service expertise and service quality.

3. RESEARCH MODEL AND HYPOTHESES

3.1 Research model

Given that most firms have accumulated their own knowledge through EKRs (e.g., KMSs), it is important that employees use the knowledge in EKRs for their work when needed (Su and Contractor, 2010). Based on the studies of Gray and Durcikova (2005-6) and Su and Contractor (2010), this study considers two types of knowledge resources in our model that CSRs can use to deal with customer service requests: EKRs as a digital knowledge source and expert location as a human knowledge source. By doing so, this study examines the individual effects of the two knowledge sources on CSRs’ service expertise and service quality. Furthermore, our model includes TIR as another factor influencing CSRs’ service expertise and service quality, based on the argument that TIR can be a source of developing or enhancing a firm’s business capabilities and performance (Bharadwaj, 2000; Christiaanse and Venkatraman, 2002; Melville et al., 2004; Pavlou and El Sawy, 2010; Rai et al., 2006; Wade and Hulland, 2004). Finally, our model explains that CSRs’ service expertise determines service quality. The hypothesized relationships in this study are depicted in Figure 1.
3.2 The impacts of organizational memory

In the context of call center service settings, the importance of EKRs as a digital knowledge source for CSRs is greatly increasing. To solve customer service requests, CSRs first access EKRs in order to promptly acquire the necessary knowledge and skills (Gray and Durcikova, 2005-6). That is, EKRs help CSRs by providing accurate, timely knowledge needed for customer service work. Thus, customer knowledge in EKRs will influence CSRs’ service expertise and service quality.

CSRs’ service expertise is particularly an important issue, given that customers are ever demanding to receive higher levels of service and the expectation to solve more complicated problems through call centers. However, it is impossible for CSRs to learn all the knowledge and skills needed to respond to customers’ complicated service requests. For example, when a customer contacts a CSR in a call center to obtain relevant information on insurance products suitable for his or her situation, if the CSR fails to recommend the proper insurance products, a customer would provide feedback that he or she did not receive superior service from the CSR. Further, the company would lose an opportunity to create new sales. Thus, it is imperative that call centers timely provide CSRs with the relevant and abundant knowledge for customer service work through EKRs (Choi and Shin, 2012). Prior studies have demonstrated that customer knowledge influences customers’ perceived service quality and increases customer loyalty and retention (Salomann et al., 2005). Reychav and Weisberg (2009) argued that shared explicit knowledge increases salespeople’s customer orientation, which is one of the key determinants of superior service quality. Hence, this study assumes that accumulated customer knowledge in EKRs influences CSRs’ ability to deal with customers’ various service requests (namely, service expertise) and further contribute to increased service quality, particularly in the context of call centers with a time constraint.

H1a. Organizational memory in EKRs has a positive effect on CSRs’ service expertise.

H1b. Organizational memory in EKRs has a positive effect on CSRs’ service quality.

3.3 The impacts of expert location

As call centers should offer immediate service to customers over the phone, it should be designed that CSRs receive appropriate assistance from experts, such as supervisors, team leaders and other skillful CSRs, when they fail to obtain the necessary knowledge and skills through EKRs in order to handle customer service requests (Gray and Durcikova, 2005-6). Although call centers establish a wide range of knowledge for customer service work via EKRs, it is difficult to anticipate and prepare all of the customers’ requests. CSRs frequently meet customers’ unexpected service requests which do not deal with the knowledge in EKRs. In the case of this, call centers ensure that CSRs attain the relevant knowledge from experts in
certain areas. Gray and Durcikova (2005-6) stressed that in call centers without face-to-face interactions, CSRs should first use EKRs to obtain the necessary knowledge needed to solve customer service requests and then get assistance from other knowledge sources, such as coworkers and experts, when they fail to obtain the necessary knowledge in EKRs. Faraj and Sproull (2000) asserted that it is important to establish the expert location that employees can use when needed. Likewise, expert location can be another important knowledge source for CSRs at call centers.

Expert location is related to the issue of tacit knowledge sharing, which leads to positive work performance (Faraj and Sproull 2000; Kanawattanachai and Yoo, 2007; Reychav and Weisberg, 2009). Reychav and Weisberg (2009) measured tacit knowledge sharing as a concept consisting of three sub-constructs, such as experience, know who/where and expert; they discovered that the sub-constructs help increase salespeople’s customer orientation, enabling them to access un-coded knowledge located in social networks so that they can have an opportunity to learn the new solutions. Organizations can increase the understanding of customer needs by facilitating tacit knowledge sharing (e.g., knowledge on best practices) among employees (McLean, 2005). Thus, when employees obtain the necessary knowledge from experts, they could improve the abilities to grasp customer needs by asking the right questions to customers and to deal with customers’ unexpected service requests (Reychav and Weisberg, 2009). Employees who can acquire the relevant knowledge from experts can increase the adaptability to customer needs and offer tailored service satisfying customers (Chebat and Kollias, 2000). Based on the above discussion, we establish the following hypotheses:

H2a. Expert location has a positive effect on CSRs’ service expertise.
H2b. Expert location has a positive effect on CSRs’ service quality.

3.4 The impacts of IT resources

Delivering superior service to customers gradually relies on a firm’s IT resources (Rust et al., 2000). IT resources enhance employees’ ability to customize their service according to customers’ situations (Bitner et al., 2000). That is, IT resources enable CSRs to convey tailored service to customers by analyzing customers’ fast purchasing patterns (Bitner et al., 2000). In the situation of call centers, various IT resources are being widely used to support CSRs in dealing with customers’ problems and service requests over the phone in a very limited time. When call centers provide CSRs with superior IT resources for customer service work, CSRs’ service expertise and service quality is enhanced. In this regard, we suggest the following hypotheses:

H3a. Technological IT resources have a positive effect on CSRs’ service expertise.
H3b. Technological IT resources have a positive effect on CSRs’ service quality.

3.5 Service expertise and service quality

In service encounters, superior service quality depends on CSRs’ service expertise (Brady and Cronin, 2001). Brady and Cronin (2001) asserted that CSRs’ expertise as well as their attitudes and behaviors directly influence service quality. Romn and Iacobucci (2010) contended that salespeople’s adaptive selling behavior closely related to customer satisfaction is increased when they have the abilities to grasp customer needs, understand the buying motive and distinguish different types of customers. Arnold et al. (2009) found that employees’ high levels of job efficacy has a positive, strong effect on the overall service quality that they conveyed to customers. Employees with high levels of expertise have greater possibilities to fulfill their tasks successfully (Parasuraman et al., 1988).

CSRs’ service expertise is a challenging issue for call centers to enhance service quality. Call centers have attempted to regulate CSRs’ service attitude and behaviors by establishing their own standardized service guidelines (Lytle et al., 1998). Although such effort contributes to producing standardized services, there is a limitation to create differentiated superior customer service. Customers become very familiar with a friendly greeting, a high tone of voice and courteous attitudes, and they feel that such kind service is fundamental. Customers are now demanding more specialized services beyond such basic service. If a customer fails to obtain the desired outcomes from a CSR, he or she would not provide a good evaluation on the CSR’s service. Thus, CSRs’ service expertise is a key determinant of service quality (Gilson and Khandelwal, 2005). In this sense, we establish the following hypothesis:
H4. CSRs’ service expertise increases their service quality.

4. METHODS

4.1 Data collection and sample

The subjects of this study are CSRs working for call centers, which have grown as a typical service encounter of firms offering service to customers over the phone without face-to-face interactions based on cutting-edge IT. The reason as to why we select CSRs is as follows. First, as CSRs are widely using various IT resources for customer service work, they are the appropriate subjects for this study in order to measure the effect of IT resources on their service expertise and work performance (Choi and Shin, 2012). Second, CSRs provide customers with service by using customer knowledge in EKRs, such as KMSs or Internet-based customer databases; hence, they are useful subjects in studying the utilization of organizational knowledge (Choi and Shin, 2012). Finally, the service competitiveness of call centers relies on their CSRs (Bitner et al., 1990). Likewise, CSRs can be a major source of creating a firm’s service excellence by meeting customer service requests and by offering superior service to customers over their competitors (Batt and Moynihan, 2002).

We distributed a total of 500 questionnaires to CSRs at five insurance call centers; 300 responses were returned giving us a response rate of 60%. Eliminating 8 responses with missing data, a total of 292 responses were used for the analysis. Among the 292 respondents, 288 (98.6%) were female. This represents the fact that Korean call centers mostly consist of female CSRs (Choi et al., 2012). In addition, 133 (45.6%) and 77 (26.4%) were high school and junior college graduates, respectively, accounting for approximately 72% of the sample. In terms of the age of the respondents, 176 (60.3%) and 93 (31.8%) were in their thirties and forties, respectively, accounting for a majority of the sample (92.1%). Their average tenure was approximately 5 years (S.D. = 3.05). For most of the respondents (92.8%), the primary responsibility was dealing with incoming calls from customers. In addition, the average number of calls handled per day was 76 calls (S.D. = 28).

4.2 Measures

We measured all items on a seven-point Likert-type scale ranging from “very strongly disagree” (1) to “very strongly agree” (7). Organizational memory is defined as the degree to which a CSR perceives the amount of stored knowledge and experience related to customer service work in EKRs (Hult et al., 2004; Moorman and Miner, 1997). Four items were used in the studies of Choi and Ko (2012), Moorman and Miner (1997), and Hult et al. (2004): OM1. EKRs have a great deal of customer knowledge useful for customer service; OM2. EKRs have a great deal of customer knowledge related to prior customer service offered (from past experience on customer service); OM3. EKRs have systematic customer knowledge useful for customer service; OM4. EKRs have a variety of customer knowledge related to the customer.

We define expert location as the extent to which a CSR is aware of who knows what at a call center (Kanawattanachai and Yoo, 2007; Reychav and Weisberg, 2009). Accordingly, a CSR understands experts in certain areas so that he or she can obtain appropriate assistance from them when he or she is met with the customers’ unexpected or unsolved problems or service requests. Three items from Kanawattanachai and Yoo (2007) are used to measure expert location: exp1. The call center offers the location map of each other’s knowledge and skills; exp2. I know who possess which task-related skills and knowledge; exp3. I know who in the call center has specialized skills and knowledge that is relevant to their work.

Based on Melville et al. (2004), we define technological IT resources (TIR) as the degree to which a CSR perceives that the call center has tangible, technical IT infrastructures and business applications for customer service work; TIR was measured using three items: it1. The call center provides a CSR with information systems for customer service work; it2. The call center creates data standardized for sharing information related to customer service work across the organization; it3. The call center offers integrated applications for customer service work.

We define service expertise as the degree to which a CSR perceives that he or she has the knowledge and skills which are essential in dealing with customer service work; this factor was measured with three items drawn from Brady and Cronin (2001) and Choi and Ryu (2013): ser1. I have an ability for customer service work); ser2. I have knowledge for customer service work; ser3. I can instantly deal with customers’ requirements.

We measure service quality as a CSR’s self-reported rating on his or her service delivered to customers with three items drawn from Choi and Ryu (2013) and Malhotra and Mukherjee (2004). Service quality is a result of human interaction
between a CSR and a customer; thus, the CSR can evaluate his or her performance of service quality (Malhotra and Mukherjee, 2004; Mukherjee and Malhotra, 2006). Service quality is one of the key performance indicators used to evaluate CSRs’ work performance (Choi et al., 2012). Items of service quality are as follows: sq1. I solve customers’ problems during the first contact; sq2. I attempt to promptly solve customers’ problems when I meet the problems; sq3. I provide customers with instant service according to their requests.

5. RESULTS

5.1 Measurement model assessment and common method variance

As shown in Table 1, Cronbach’s a for all constructs was 0.8 or higher, representing a satisfactory reliability for all constructs (Nunnally, 1978). Moreover, the composite reliability of all constructs quite exceeded the 0.70 threshold for acceptable reliability, and the AVE (average variance extracted) value exceeded the recommended threshold of 0.5 (Hair et al., 2010; Fornell and Lacker, 1981). We evaluated construct validity via the confirmatory factor analysis (CFA) by including all constructs and using LISREL 8.54. As a result of the CFA, we obtained the following fit indices for the measurement model and assessed them according to the recommended threshold by Jöreskog and Sörbom (1993): chi-square = 125.89, degrees of freedom (df) = 94, p-value = 0.02, the goodness-of-fit index (GFI) = 0.95, the root mean square residual (RMR) = 0.05, the root mean square error of approximation (RMSEA) = 0.03, chi-square/df = 1.34, the adjusted GFI (AGFI) = 0.93, the normed fit index (NFI) = 0.98, the non-normed fit index (NNFI) = 0.99, the parsimony normed fit index (PNFI) = 0.77, and comparative fit index (CFI) = 0.99. All indices met the recommended threshold, supporting that the model had a good fit to the data. Finally, we confirmed the discriminant validity of all constructs by comparing the square root of the AVE (\(\sqrt{AVE}\)) of all constructs with all the correlations (Fornell and Larcker, 1981). As indicated in Table 2, the result shows sufficient discriminant validity between the constructs.

We assessed the common method variance (CMV) by conducting a CFA because we measured both the independent and dependent variables of a respondent via a self-reported survey. We compared our five-factor model with a single-factor model (or Harman’s one-factor model) in which all indicators were loaded on a single factor (Podsakoff et al., 2003). Podsakoff et al. (2003) suggested that if CMV is substantial, than the single-factor model would provide a better fit. Our result conveyed that the single factor model did not provide a good fit (Chi-square = 3189.68, df = 104, GFI = 0.42, CFI = 0.62, and RMSEA= 0.319), suggesting that CMV is not a serious issue in this study.

<table>
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<th>Items</th>
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<th>t-values</th>
<th>Construct reliability</th>
<th>Cronbach's a</th>
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<td>20.13</td>
<td></td>
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<tr>
<td></td>
<td>infra3</td>
<td>0.81</td>
<td>16.52</td>
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</tr>
<tr>
<td>Service Expertise</td>
<td>eff1</td>
<td>0.85</td>
<td>17.59</td>
<td>0.916</td>
<td>0.921</td>
<td>0.784</td>
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<tr>
<td></td>
<td>eff2</td>
<td>0.93</td>
<td>20.17</td>
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<tr>
<td></td>
<td>eff3</td>
<td>0.88</td>
<td>18.47</td>
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<tr>
<td>Service Quality</td>
<td>sq1</td>
<td>0.77</td>
<td>15.21</td>
<td>0.901</td>
<td>0.897</td>
<td>0.753</td>
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<tr>
<td></td>
<td>sq2</td>
<td>0.89</td>
<td>18.83</td>
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<tr>
<td></td>
<td>sq3</td>
<td>0.93</td>
<td>19.91</td>
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</table>

*Table 1. Results of the confirmatory factor analysis*
<table>
<thead>
<tr>
<th>Constructs</th>
<th>Mean</th>
<th>S.D.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Organizational Memory</td>
<td>5.01</td>
<td>1.343</td>
<td></td>
<td></td>
<td></td>
<td>0.906</td>
<td></td>
</tr>
<tr>
<td>B Expert Location</td>
<td>4.94</td>
<td>1.271</td>
<td>0.29**</td>
<td>0.883</td>
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<td></td>
<td></td>
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<tr>
<td>C TIR</td>
<td>4.72</td>
<td>1.456</td>
<td>0.33**</td>
<td>0.43**</td>
<td>0.879</td>
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<td></td>
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<tr>
<td>D Service Expertise</td>
<td>5.09</td>
<td>1.055</td>
<td>0.34**</td>
<td>0.50**</td>
<td>0.43**</td>
<td>0.886</td>
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<tr>
<td>E Service Quality</td>
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<td>0.957</td>
<td>0.42**</td>
<td>0.37**</td>
<td>0.24**</td>
<td>0.47**</td>
<td>0.867</td>
</tr>
</tbody>
</table>

*Note:* **p < 0.01. Figures along the diagonal denote the square root of the AVE.

Table 2. Means, standard deviations and correlations between constructs

5.2 Hypothesis testing

The structural equation modeling method was employed to test the proposed model and hypotheses, using LISREL 8.54. The model provided a good fit of the data: Chi-square = 125.89 (p-value = 0.02), df = 94, GFI = 0.95, RMR= 0.05, RMSEA= 0.03, AGFI = 0.93, PNFI = 0.77, NFI = 0.98, NNFI = 0.99, and CFI = 0.99. Fig. 2 illustrates the results of the path analysis of the proposed research model and Table 3 summarizes the results of the hypothesis testing. Except for H3b (the relationship between TIR and service quality), the other six hypotheses were supported.

![Figure 2. Results for the structural model](image)

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>SPC</th>
<th>t-value</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a Organizational Memory in EKRs → Service Expertise</td>
<td>0.17**</td>
<td>3.00</td>
<td>Supported</td>
</tr>
<tr>
<td>H1b Organizational Memory in EKRs → Service Quality</td>
<td>0.29**</td>
<td>4.79</td>
<td>Supported</td>
</tr>
<tr>
<td>H2a Exert Location → Service Expertise</td>
<td>0.35**</td>
<td>5.11</td>
<td>Supported</td>
</tr>
<tr>
<td>H2b Exert Location → Service Quality</td>
<td>0.17**</td>
<td>2.32</td>
<td>Supported</td>
</tr>
<tr>
<td>H3a Technological IT Resources → Service Expertise</td>
<td>0.19**</td>
<td>2.85</td>
<td>Supported</td>
</tr>
<tr>
<td>H3b Technological IT Resources → Service Quality</td>
<td>-0.08</td>
<td>-1.22</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H4a Service Expertise → Service Quality</td>
<td>0.33**</td>
<td>4.72</td>
<td>Supported</td>
</tr>
</tbody>
</table>

*Note:* *p < 0.05; **p < 0.01; SPC denotes standardized path coefficients.

Table 3. Summary of hypothesis testing
6. DISCUSSION AND IMPLICATIONS

The results of this study support the argument that customer knowledge in EKRs considerably enhances CSRs’ service expertise and service quality in the context of call centers. That is, EKRs as a digital knowledge source are very useful tools of supplementing CSRs’ knowledge and skills needed in order to resolve customer service requests. The results contribute to KM research by demonstrating a way of using accumulated customer knowledge in EKRs for increasing a firm’s service competitiveness. Firms could collect a wide range of customer data via web applications on the Internet and have already accumulated a great deal of customer knowledge in EKRs (e.g., KMS) (Watson and Hewett, 2006). Although customer knowledge has been considered as one of the most strategic knowledge resources for a firm (Tanriverdi, 2005), little has been known about how the knowledge can be used for certain areas. Moreover, although firms possess a wide range of customer knowledge in EKRs, if they do not use the knowledge for business purposes, the performance created by the knowledge would be limited. Thus, it is important to understand how and for what firms can use the accumulated customer knowledge. Our study can offer an insight to the question by verifying that CSRs can enhance their service expertise and service quality by using customer knowledge in EKRs during the interaction with customers within limited time.

Our results also show that expert location, considered as a human knowledge source, increases both CSRs’ service expertise and service quality. In particular, it is found that expert location greatly increases CSRs’ service expertise. When CSRs face customers’ unexpected service requests or unsolved problems, and if they obtain appropriate assistance from experts in certain areas, they could complement their abilities for customer service work and receive a better evaluation from the customers. The results imply that call centers should ensure CSRs to become aware of who the experts are in the call centers, who are needed to solve the unexpected problems of customers. Understanding and using experts in call centers is a useful way of supplementing individual CSRs’ service knowledge and skills. In the situation that customers ever demand instant and more specialized customer service, experts can be a key source of offering un-codified tacit knowledge to CSRs, complementary to codified knowledge in EKRs. Thus, call centers can enhance their service competitiveness by deploying experts so that CSRs can receive appropriate help from the experts when needed. The results have an academic implication by integrating the studies of service encounters with that of KM. That is, the results can provide new insight into the studies of service quality by demonstrating the following method: service organizations can enhance CSRs’ service expertise and service quality by using experts’ un-codified tacit knowledge as well as by using accumulated knowledge in EKRs. Moreover, the results can explain how accumulated knowledge influences a firm’s service competitiveness, which contributes to the studies of the utilization of knowledge.

Concerning TIR, the results indicate that it increases CSRs’ service expertise; yet, it has no effect on service quality. That is, TIR contributes to enhancing CSRs’ ability to deal with customer service work, but TIR in itself is not related to the increase of service quality. Nevertheless, the results suggest that TIR should be still considered as an important tool for enhancing CSRs’ service expertise, which ultimately influences service quality. The result is consistent with the assertion that IT resources first enhance a firm’s business capabilities and then ultimately contribute to increased firm performance (Bharadwaj, 2000; Pavlou and El Sawy, 2010; Rai et al., 2006; Wade and Hulland, 2004). The results have an implication by extending the studies of the strategic role of IT resources in the studies of service research. Although prior studies of customer service have considered the importance of IT in service settings with a focus on self-service technologies (SST) (Bitner et al., 2000), a more strategic role of IT has not been considered. Under the situation, this study suggests a way of utilizing IT in creating superior customer service.

Finally, the result shows that CSRs’ service expertise considerably increases service quality. The results can offer a practical implication for call centers seeking to increase CSRs’ service expertise for enhancing service competitiveness. The most challenging issue of call centers is to deliver superior customer service, which largely depends on CSRs (Mukherjee and Malhotra, 2006). Although CSRs provide customers with a friendly greeting, a high tone of voice and courteous attitudes, if the CSRs fail to solve customers’ problems or deal with their service requests, customers usually do not provide a positive feedback on the superior service. Customers consider such attitudes as very basic and natural service attitudes; further, they demand more specialized services from CSRs at call centers. Under the situation, the results suggest that to create specialized customer service, call centers should retain specialized CSRs in advance. Moreover, the results demonstrate that call centers can enhance CSRs’ service expertise by promptly offering customer knowledge in EKRs, by deploying experts able to support CSRs, and by implementing advanced IT resources. Although prior studies of service quality have emphasized the importance of service quality leading to increased customer satisfaction and further increased customer loyalty (Bitner et al., 1990), little has been known about how firms can support CSRs to develop service expertise and service quality. Researchers of internal marketing have suggested that firms should view CSRs as internal customers and satisfy the CSRs in advance in order to create superior service quality, leading to increased customer satisfaction (Bitner et al., 1990; George, 1977). By
combining the studies of KM, IT resources and service quality, the current study can offer another explanation for the contemporary issue. That is, CSRs’ service expertise and quality can be influenced by a firm’s ability to possess appropriate customer knowledge and IT resources able to support its CSRs during customer interaction. On the other hand, although a firm has superior resources, if the CSRs are not using the resources for customer service effectively, the firm would be limited to create service excellence. Thus, firms should promote CSRs to use customer knowledge through EKRs and appropriate IT resources for their work.

7. LIMITATIONS AND FUTURE RESEARCH

This first limitation of this study is that about 99 percent of our sample consists of female CSRs. Although our results can well represent female-dominated call centers, this issue should deserve researchers’ and practitioners’ attention when applying our results. In the country that we collected data, it is a common phenomenon that more than 90 percent of CSRs at call centers are female (Choi et al., 2012). Future research could seek the generalization of the research by including data collected on male CSRs. Next, we used a self-reported method to measure service quality. Although there have been theoretical and empirical supports for the method (Mukherjee and Malhotra, 2006) and we confirmed the CMV issue, there could be a gap between the self-evaluation of CSRs and the evaluation of customers. In this regard, future research needs to fill this gap.

8. CONCLUSION

By combining the studies of KM, IT resources and service quality, the current study suggest that customer knowledge accumulated in EKRs, expert location and TIR are positively associated with CSRs’ service expertise in the context of call centers. Particularly, it is notable that CSRs’ service expertise is considerably influenced by digital and human knowledge sources offered by call centers. Moreover, customer knowledge in EKRs and expert location contribute to increasing service quality; however, TIR has no direct effect on service quality. Finally, service expertise is a key determinant of service quality.

REFERENCES


