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LEVERAGING CUSTOMER KNOWLEDGE IN ELECTRONIC KNOWLEDGE REPOSITORIES FOR SERVICE EXPERTISE

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Abstract

This study examines how three dimensions of electronic knowledge repositories (EKR), namely customer knowledge level, customer knowledge integration and accessibility of customer knowledge, contribute to increasing customer service representatives (CSRs) service expertise and their customer knowledge utilization and acquisition. Furthermore, the study empirically tests the proposition that service quality is influenced by CSRs service expertise and their customer knowledge utilization and acquisition. To test the proposed model and hypotheses, data were collected on CSRs working for call centers using EKRs such as knowledge management systems. All the hypothesized relationships were found to be significant except that between customer knowledge acquisition and service quality. Service expertise was strongly affected by customer knowledge level. While customer knowledge utilization was strongly increased by the accessibility of customer knowledge, customer knowledge acquisition was strongly increased by customer knowledge integration. This study offers an insight into how EKRs, which will have been accumulated by firms over time, ultimately influence the performance of CSRs.

Keywords: Electronic Knowledge Repository, Customer Knowledge Integration, Accessibility of Customer Knowledge, Knowledge Utilization and Acquisition, Service Expertise, Service Quality, Call Center

1. INTRODUCTION

In call centers, which have been rapidly emerging as the typical customer contact point with firms over the phone, customer service representatives (CSRs) have the responsibility of delivering superior service in response to customers' requests and providing appropriate solutions to customers who are experiencing problems (Gilson and Khandelwal, 2005). Customers' experience of service encounters strongly relies on CSRs (Bitner et al. 1990, 1994). For this reason, most service organizations ask CSRs to comply with a set of established service guidelines for maintaining the organization's standardized quality of service as delivered to customers (Lytle et al., 1998). However, such guidelines may be insufficient to meet the various service needs of customers. Customers are now demanding ever more specialized service from call centers. CSRs are required to have more specialized knowledge and customer service work abilities beyond the basic service skills such as greeting, kindness, attentiveness and so on. As such, CSRs' service expertise should be considered as an important predictor of superior service quality (Brady and Cronin, 2001). However, most research in the service marketing domain has focused on the issue of the service quality offered by CSRs rather than how to help them to become service experts. Considering that superior service comes from superior CSRs, call centers should first enhance their CSRs' service expertise. This study aims to offer insight into the issue of how call centers can improve CSRs' service expertise through introducing concepts from knowledge management studies into the arena of service encounter studies.

Specifically, this study examines the role of electronic knowledge repositories (EKR) such as knowledge management systems (KMS) in enhancing CSRs' service expertise. Using EKR, in which firms will have accumulated customer-related knowledge over time, CSRs can quickly deal with customers' service requests. That is, EKR form a base for offering service to customers in call centers. For example, in a call center for property insurance companies, EKR would contain a much more diverse and sophisticated spectrum of knowledge than is standard, including detailed information and knowledge on numerous insurance products, the cancellation of insurance contracts, loans based on insurance contracts, insurance laws, insurance claims and so on (Choi and Shin, 2012). When a customer requests a CSR to recommend appropriate insurance products, he or she could quickly offer accurate information related to the request using EKR. If the CSR fails to offer proper information to the customer, the firm misses an opportunity to create new sales. Furthermore, the CSR would not receive a favorable evaluation from the customer, who would not obtain satisfactory information despite being treated courteously. Thus, there is a need to understand the effect of EKR on CSRs' service expertise in the context of call centers.

Call centers, which interact with customers consistently throughout the day, can provide firms with significant opportunities to obtain additional knowledge on their customers as well as to confirm the quality of existing customer knowledge. During customer contact, CSRs can grasp and update new knowledge from the EKR following their established categories and structures. This enables firms to keep up with the latest customer knowledge. Although prior research has suggested several dimensions of knowledge management, such as the creation (i.e., acquisition), sharing/distribution and utilization of knowledge (Chou et al., 2007; Mowery et al., 1996; Schulz, 2001; van Wijk et al., 2008), we focus on two of these dimensions: knowledge utilization and acquisition. In the context of call centers, CSRs should utilize the existing knowledge in EKR to deal with customers' requests. Requesting changed knowledge from customers and updating this in their EKR during the contact is a primary part of their work. However, CSRs are not allowed to share or distribute any knowledge in the EKR. Much research has noted that the internally utilized valuable knowledge stored in an organization is more important than knowledge per se in creating competitiveness (Moorman and Miner, 1997; van Wijk et al., 2008; Watson and Hewett, 2006). Although knowledge utilization has been considered as the last step in the knowledge management processes, in the context of call centers, CSRs are simultaneously located in multiple steps of knowledge management as they utilize existing knowledge and acquire new and additional knowledge. Thus, we examine how the EKR that CSRs use influence their knowledge utilization and acquisition.

The principal purpose of this study is to suggest three dimensions of EKR: customer knowledge level, customer knowledge integration and accessibility of customer knowledge. We then examine how these three dimensions are related to CSRs' service expertise and their customer knowledge utilization and acquisition. Additionally, we investigate the effects of CSR's service expertise and customer knowledge utilization and acquisition on service quality.

2. LITERATURE REVIEW

Studies of knowledge management have been conducted from various perspectives. From a broader perspective, researchers have emphasized the whole process of knowledge management including the creation, sharing/distribution and use of knowledge, applying knowledge management theory (e.g., Alavi and Leidner, 2001; Inkpen, 2000; Sambamurthy and

Subramani, 2005) or organizational learning theory (e.g., Moorman and Miner, 1997; Tippins and Sohi, 2003). From a more narrow perspective, researchers have focused on organizational memory (Choi et al., 2010; Moorman and Miner, 1997), EKR (Bock and Sabherwal, 2008; Kankanhalli et al., 2005), knowledge reuse and knowledge codification (Majchrzak et al., 2004; Markus, 2001). Such studies agree that firms' competitiveness depends on their ability to manage knowledge. The current study suggests that a firm's greater ability to manage knowledge leads to employees' ability in the service setting, drawing on studies of organizational memory, EKR and knowledge reuse to form this proposition.

2.1 Organizational Memory

Drawing on the study of organizational memory (Moorman and Miner, 1997), we suggest three main dimensions of EKR in this study: customer knowledge level, customer knowledge integration and accessibility of customer knowledge. EKR is now a typical type of organizational memory containing electronically codified knowledge across the organization. Moorman and Miner (1997) suggested four major dimensions of organizational memory: its level (i.e., amount), dispersion, accessibility and content. They empirically tested the effects of level and dispersion on firm performance (i.e., short-term financial performance and the creativity of new product development). The level of organizational memory here refers to the amount of stored knowledge that an organization has in a certain domain. The dispersion of organizational memory refers to the degree of knowledge sharing across the organization. Accessibility denotes the extent to which is possible to retrieve knowledge for use when needed. Finally, the content of organizational memory refers to what types of knowledge (i.e., procedural and declarative) are stored within it. Organizational memory covers declarative and procedural knowledge (Moorman and Miner, 1997) as well as individual and collective knowledge (Inkpen, 2000). Declarative knowledge in this case comprises facts about business goals, customer needs and preferences, descriptions of goods and services and procedural knowledge such as skills (the ways in which work is conducted), routines, processes and procedures through codification. In this study, instead of dispersion, we use the term customer knowledge integration, which indicates the extent to which a call center integrally manages customer knowledge created across various customer service contact channels including websites, emails, phone, in-store and etc. Finally, we do not consider the content dimension as being an individual dimension of EKR because we can simultaneously measure knowledge content and its level (amount) stored in EKR. In terms of the conceptualization of organizational memory, Moorman and Miner (1997) define this as the degree to which an organization has an amount of stored information and experience related to its business, while Day (1994, p. 44) defines it as "a repository for collective insights contained within policies, procedures, routines, and rules that can be retrieved when needed." Walsh and Ungson (1991) also define organizational memory as stored information created from an organization's history, proposing that it consists of a structure for its maintenance, stored information and the processes of information acquisition and retrieval.

Generally, it has been reported that organizational memory is positively related to organizational performance. Knowledge embedded in organizational memory can affect current decision-making (Walsh and Ungson, 1991). Cross and Baird (2000) asserted that organizations could improve their performance by utilizing stored knowledge in their decision-making and business activities in knowledge-based economies. Walsh and Ungson (1991) argued that organizational memory can reduce transaction costs, contribute to effective decision-making and support collaboration in multiple-task and multiple-use environments (or situations or settings). Hult et al. (2004) contended that organizational memory affects knowledge acquisition activities, finding that firms with greater organizational memory tend to seek more new knowledge than do ones with lower organizational memory.

The role of organizational memory has been divided into two areas: interpretation and action guidance (Moorman and Miner, 1997). Interpretation reflects the way in which organizational memory can offer filtering for categorizing and storing a vast amount of knowledge and experience. In other words, organizational memory provides a certain structure for categorizing different types of knowledge by their similarities (Croasdell, 2001). This structure then helps people to access specific knowledge located in organizational memory when needed. The role of action guidance relates to how organizational memory can offer certain guidelines for how employees should comply with the organizational standards. Thus, organizational memory enables employees to conduct their work effectively and to access and utilize knowledge in EKR.

2.2 Electronic Knowledge Repository

The application of advanced information technology (IT) for building and managing organizational memory has also been an important issue, especially in the field of knowledge management (Alavi and Leidner, 2001; Sambamurthy and Subramani, 2005). Chou (2005) suggested that the role of IT capability is important in implementing knowledge management (KM) activities such as knowledge transfer, storage/retrieval, creation and application. Sambamurthy and Subramani (2005)

asserted that IT plays a key role in managing the knowledge resources of an organization. Stein and Zwass (1995) introduced an organizational memory information system (OMIS) including five mnemonic functions: acquisition, retention, maintenance, search and retrieval of information. Watson and Hewett (2006) argued that knowledge repositories represent one of the major aspects of KM processes. Cheung et al. (2008) noted that an intranet-based knowledge repository is a common type of KMS. Organizational memory is supported by IS and knowledge stored in IS can be instantly modified and shared when needed (Crosasdel, 2001). Likewise, IT enables organizations to realize organizational memory by developing their capabilities of knowledge storage, retrieval and utilization.

An EKR is defined as “an on-line computer-based storehouse of expertise, knowledge, experience, and documentation regarding a particular domain of expertise in which knowledge is collected, summarized, and integrated across sources” (Bock et al., 2010, p. 257). This definition is based on studies in the field of organizational memory. However, it also embraces the role of IT in organizational memory. Similarly, in Bock and Sabherwal (2008), knowledge repository systems were used to explain this phenomenon. Cross and Baird (2000) stated that organizational memory is electronically stored by computers and is also embedded in business processes and products/services. Thus, IT is important for implementing and maintaining EKR, which in turn enhances knowledge management (Alavi and Leidner, 2001).

The ability of an organization to accumulate knowledge from its past experiences and put this into EKR has been emphasized as a core source of competitive advantage and superior organizational performance (Eisenhardt and Martin 2000; Stein and Zwass, 1995; Teece et al. 1997). EKR are embedded in a specific organization so that the knowledge they hold cannot easily be observed and imitated by competitors (Eisenhardt and Martin 2000; Teece et al. 1997). Stein and Zwass (1995) stated that collective knowledge leads to shared interpretations through the processes of creation, transfer and sharing of knowledge. EKR offer common resources that enable employees to solve customers’ problems related to products and services (Gray and Durcikova, 2005-6). Stein and Zwass (1995) suggested that task-specific memory supports the collaboration of a team that is involved in the same project. On the other hand, Cheung et al. (2008) indicated that reusing knowledge in EKR suppresses the creativity of employees. Moorman and Miner (1998) also verified that organizational memory is negatively related to the creativity of employees in new product development. However, Chang and Cho (2008) found that a greater degree of team knowledge memory yields increased efficiency by reducing repetition problems in the process of new product development. Thus, when considering the application of EKR, the characteristics of the organization should also be considered.

There has been little focus on the issue of how EKR are applied in practice, as many researchers have placed emphasis on identifying the determinants of an employee’s knowledge contribution into, and their reuse of, the knowledge in EKR (Bock et al., 2008; Kankanhalli et al., 2005). As predictors of the continuance use intention of EKR, Bock et al. (2010) considered the information overload and contribution overload caused by an organization’s demanding employees to contribute to and reuse the knowledge in EKR, which resulted in a decrease in perceived usefulness and continuance intentions. Kankanhalli et al. (2005) considered the costs and extrinsic and intrinsic benefits as the determinants of EKR usage by knowledge contributors. More studies are needed to explain how employees are utilizing EKR to fulfill their service work.

2.3 Reuse of Knowledge

In the studies of knowledge reuse or the codification of knowledge, there is also emphasis on how to utilize the existing knowledge held by organizations (Markus, 2001; Schulz, 2001). The main assertions in this area are similar to those in the organizational memory and EKR literature. Knowledge reuse is defined as “one individual or group within the firm using knowledge generated by a different individual or group within the same firm in order to be more effective and productive in their work” (Alavi and Leidner, 1999, p. 143). Markus (2001) emphasized that knowledge reuse should be designed so that employees can exploit the knowledge that is suitable for their purposes, which can be facilitated by IT such as organizational memory systems, KMS and repositories.

To share and reuse knowledge across organizations, it is important that the knowledge can be codified by a set of rules and relations (Chou et al., 2007). The codification of knowledge includes the process of converting tacit knowledge into explicit knowledge by using codification strategies so that ambiguous knowledge becomes more specifically articulated (Schulz and Jobe, 2001). Codified knowledge enables the transfer and sharing of knowledge across an organization (Schulz, 2001). A knowledge repository is an important mechanism for knowledge reuse (Markus, 2001). IT-supported knowledge repositories represent a realization of organizational memory (Gray and Durcikova, 2005-2006), including both explicit knowledge and codified tacit knowledge. IT affects the knowledge management of an organization by promoting the integration of explicit knowledge so that it can be codified, transferred and shared, assimilated, stored and retrieved (Grant, 1996; Scott, 2000).

However, the utilization of IT has limitations in encoding tacit knowledge into explicit knowledge, whereas it is ideal for the codification of explicit knowledge (Scott, 2000).

Knowledge reuse has been found to have positive effects on organizations (Schulz, 2001; Watson and Hewett, 2006). Watson and Hewett (2006) identified the determinants of employees’ knowledge reuse frequency, which, in turn, leads to knowledge contribution by employees in an organization. Schulz (2001) asserted that a high level of knowledge codification in a certain domain increases knowledge flows among coworkers from one organization to other organizations (i.e., horizontal knowledge flow), as well as between leaders and members within an organization (i.e., vertical knowledge flow); horizontal flow leads to the increased combination and exploitation of knowledge.

3. RESEARCH MODEL AND HYPOTHESES

3.1 Research Model

Our research model explains how the three dimensions of EKR are related to CSRs’ service expertise in call centers. We propose that EKR help a CSR respond instantly to customers’ service requests and efficiently solve their problems related to products and service. Pavlou and El Sawy (2010) assert that organizational memory contributes to increased firm performance via the enhancement of improvisational capabilities. Accumulated customer knowledge enables CSRs to fulfill their service jobs by offering them accurate and necessary knowledge. Furthermore, the model suggests that the three dimensions of EKR positively influence CSRs’ knowledge utilization and acquisition during contact with customers. Stein and Zwass (1995) contend that organizational memory supports the acquisition, assimilation, transformation, and exploitation of knowledge. Generally, KM researchers have emphasized knowledge creation, knowledge sharing, knowledge transfer and knowledge utilization (Mowery et al., 1996; Schulz, 2001; van Wijk et al., 2008). As noted earlier, however, we focus on CSRs’ knowledge utilization and acquisition considering the specific characteristics of call center service work, where the main purpose is to offer information and knowledge in response to customers’ demands. Thus, it is important that a CSR effectively utilizes the accumulated customer knowledge in EKR to handle customers’ requests and problems. Additionally, customer contact in call centers provides significant opportunities to obtain updated customer knowledge. During contact with customers, CSRs can notice and acquire updated customer knowledge that can be compared with the existing knowledge in EKR. However, the assimilation and transference of knowledge are not part of the service work of CSRs. Finally, we propose that CSRs’ service expertise and the two knowledge activities influence their service quality.

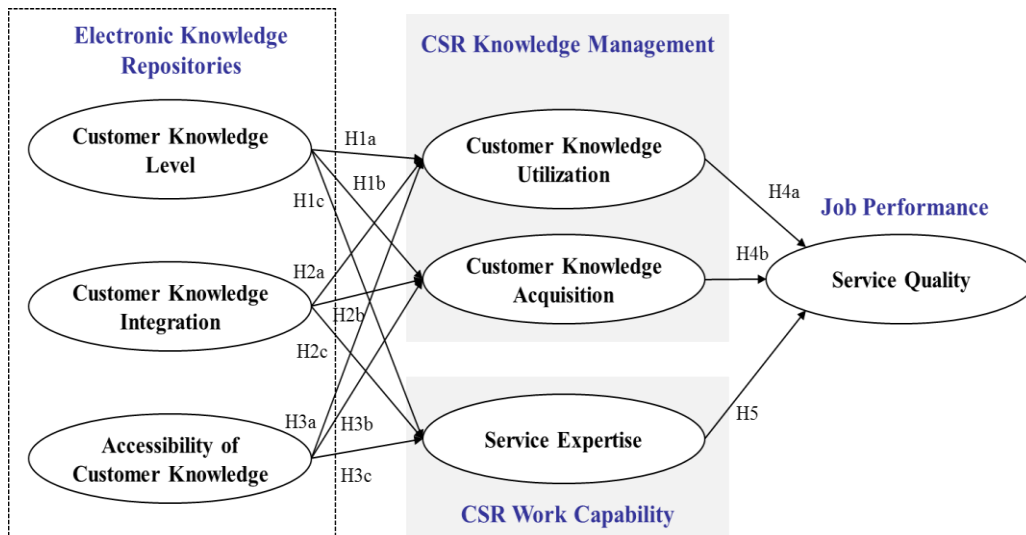


Figure 1. Research Model

3.2 Customer Knowledge Level

The customer knowledge level represents the type and amount of knowledge stored in EKR. Moorman and Miner (1998) state that the content of memory is the “what” of organizational memory (Walsh and Ungson, 1991), whereas the level of memory refers to the amount of stored knowledge and experience. The contents of EKR consist of both declarative, explicit

knowledge (e.g., customer service manuals, past purchase records, customer preferences, descriptions of products and services and business goals) and codified procedural, tacit knowledge (e.g., methods of dealing with customer complaints and ways of understanding customer needs) (Chou, 2005; Moorman and Miner, 1998).

Although EKR is an important aspect of KM (Watson and Hewett, 2006), EKR does not in themselves assure the success of KM (Ofek and Sarvary, 2001). Even if an organization has accumulated a wide range of customer knowledge in EKR, if employees do not utilize this knowledge, they cannot create differential benefits over their firm's competitors. Therefore, it is essential that CSRs exploit the prior knowledge stored in EKR (Ofek and Sarvary, 2001). Furthermore, contact with customers in call centers provides organizations with the chance to update their existing knowledge by facilitating CSRs to recognize changed customer knowledge and input this knowledge into EKR. Thus, utilizing and updating the existing knowledge in EKR is an important part of call center work.

We assume that an increased customer knowledge level will increase CSRs' knowledge utilization and acquisition via EKR. As organizations will have a great deal of knowledge and experiences in a certain domain in EKR, their employees can have more opportunities to utilize this knowledge for their work and create new knowledge and experiences (Moorman and Miner, 1998; Ofek and Sarvary, 2001). Cross and Baird (2000) asserted that IT-supported knowledge repositories could guide employees' decision-making and actions, in turn enhancing their performance. Paul et al. (2004) contended that collective memory affects the speed of group decision-making. Cohen and Levinthal (1990) and Zahra and George (2002) suggested that related prior knowledge and experiences are the determinants of the absorptive capacity of a firm. Likewise, the level of knowledge plays a key role in providing customer service in call centers.

Moreover, customer knowledge level can help CSRs' knowledge acquisition by offering them directions and routines, thus guiding employees to input the knowledge into a knowledge repository (Grant, 1996). As noted previously, Moorman and Miner (1998) suggested that organizational memory plays both an interpretation and action guidance role. This implies that organizational memory can offer employees knowledge that is categorized so as to permit better interpretation, as well as leading employees to act in compliance with the given knowledge. Based on the categories of existing knowledge, CSRs will recognize knowledge that has changed and update this during customer service interactions in call centers.

There has been argument as to the effect of knowledge memory on knowledge acquisition. Chou (2005) emphasized that knowledge repositories have both positive and negative effects on knowledge acquisition and knowledge translation: they offer practicable standards and procedures which enable employees to understand how to exploit knowledge in the repositories for their jobs, but they simultaneously restrict the acquisition of new knowledge. Although employees discover new knowledge during contact with customers, if there is no chance to input this into knowledge repositories, organizations will lose an important chance to acquire new knowledge. However, Hult et al. (2004) found that firms with high levels of knowledge memory tend to more often seek newer knowledge than do those with low levels. Thus, we propose a positive effect of customer knowledge level on CSRs' knowledge acquisition. In call centers, CSRs are required to respond to a customer's requests in a limited time, as dictated by the organization, over the phone according to service manuals. In this limited time, CSRs can acquire certain new knowledge dependent on prior knowledge in EKR. Thus, customer knowledge level will influence CSRs' knowledge acquisition.

The quality of service offered by CSRs will depend on customer knowledge level, which positively influences CSRs' service expertise by enabling them to instantly respond to customers' service requests in a limited time. EKR enable CSRs to offer accurate and instant service to customers by the timely provision of necessary knowledge and solutions during customer service interactions. Gray and Durcikova (2005-6) asserted that EKR offer the common resources that are needed for solving customer problems related to products and services in call centers. In this regard, we set the following hypotheses:

- H1a. Customer knowledge level will positively influence CSRs' knowledge utilization during interaction with customers.
- H1b. Customer knowledge level will positively influence CSRs' knowledge acquisition during interaction with customers.
- H1c. Customer knowledge level will positively influence CSRs' service expertise during interaction with customers.

3.3 Customer Knowledge Integration

It is necessary that organizations integrally manage the customer knowledge that is acquired across various customer contact channels, such as websites, emails, fax and phone, as well as in-store. Integrated customer knowledge enables organizations to offer better customer service by increasing their understanding of customers. During interactions with customers, CSRs may have the chance to obtain customer knowledge that has been omitted in EKR and integrate this new knowledge into the repository. CSRs can then engage in accurate decision-making based on integrated customer knowledge. Despite the importance of customer knowledge integration, this has not received much attention from researchers. In call centers, the integration of customer knowledge can facilitate CSRs' effective communication with customers over the phone at a given

time. For example, a customer may have sent an email to check on the status of his or her order after purchasing an item on the internet; however, the customer has not yet received any reply from the firm. The customer then makes contact with a CSR in the call center of the firm involved. If a customer has to explain the whole story from the beginning, the customer will be irritated with the firm. As another example, a customer updates his or her information on the website; however, what if a CSR keeps asking for the same information during interaction with the customer? The customer would easily become irritated. Call centers may in such cases miss the opportunity to satisfy their customers and obtain important knowledge that they do not yet possess. As such, service organizations can obtain a vast amount of customer knowledge through web applications, which can be useful for the improvement of service quality and customer relationship management (CRM) activities, including customer needs, preferences, purchase motives, repurchase intentions and etc. (Lopez-Nicolas and Molina-Castillo, 2008; Saloman et al., 2005). However, this may also bring about knowledge overlap and overload, meaning that such customer knowledge should be integrally managed for business goals (Lopez-Nicolas and Molina-Castillo, 2008).

Prior studies into KM have emphasized the importance of knowledge integration and its effects on organizational performance, asserting that the core of organizational capability stems from the integration of knowledge that individuals have, rather than the knowledge in itself (Grant, 1996). Rai et al. (2006) showed that knowledge integration in an inter-organizational relationship, which is enabled by IT infrastructure integration, is linked with superior firm performance. Harrigan et al. (2008) argued that the integration of knowledge increases responsiveness. Wang et al. (2006) also verified that IS-enabled virtual integration, meaning the sharing of knowledge related products, markets, production and etc., enhances the responsiveness of suppliers. Padmanabhan et al. (2006) placed emphasis on obtaining complete information about customers when implementing effective CRM rather than obtaining a vast amount of customer knowledge automatically through a web-server. In a call center, integrated customer knowledge can give CSRs more opportunities to apply and capture knowledge during interaction with customers as well as to grasp omitted knowledge. Complete knowledge through integrating customer knowledge across various customer contact channels also enhances the ability of CSRs to deliver good service to customers. Thus, we set the following hypotheses:

- H2a. Customer knowledge integration will positively influence CSRs' knowledge utilization during interaction with customers.
- H2b. Customer knowledge integration will positively influence CSRs' knowledge acquisition during interaction with customers.
- H2c. Customer knowledge integration will positively influence CSRs' service expertise during interaction with customers.

3.4 Accessibility of Customer Knowledge

Accessibility of knowledge is another critical dimension of EKR. Accessibility refers to the extent to which necessary knowledge can be easily retrieved at the right time (Day, 1994; Moorman and Miner, 1997; Walsh and Ungson, 1991). Moorman and Miner (1997) considered accessibility as one of key organizational memory dimensions. Crosasdel (2001) asserted that accessibility is an important predictor for the effective use of knowledge stored in knowledge memory. Stein and Zwass (1995) proposed that IT supported knowledge memory enhances accessibility, which contributes to the facilitation of knowledge distribution across organizations. Accessibility is more important than the knowledge in itself in determining the value of knowledge (Bock and Sabherwal, 2008). That is, the accessibility of knowledge sources is a key determinant of knowledge use (O'Reilly, 1982).

Akin to accessibility, the ease of use in knowledge utilization has also been emphasized (Bock et al., 2010; Savolain, 2007). Ease of use enhances the ability of an employee to create and store knowledge as well as to retrieve and reuse knowledge (Bock et al., 2010; Savolain, 2007). This is in line with the assertions of IS researchers who have emphasized system quality as well as information quality. Thus, EKRs should be designed so that they can offer employees the right knowledge at the right time (Crosasdel, 2001; Pavlou and El Sawy, 2010). If a CSR fails to access the right knowledge during interaction with customers, this will be linked with poor service delivery. Accessibility is needed to usefully utilize the knowledge and experiences accumulated in EKRs (Crosasdel, 2001). Thus, we assume that accessibility enhances CSRs' utilization and acquisition during interaction with customers. Moreover, accessibility will enhance the responsiveness of CSRs during interaction with customers by enabling them to access the right customer knowledge in EKRs at the right time.

- H3a. Accessibility of customer knowledge will positively influence CSRs' knowledge utilization during interaction with customers.
- H3b. Accessibility of customer knowledge will positively influence CSRs' knowledge acquisition during interaction with customers.
- H2c. Accessibility of customer knowledge will positively influence CSRs' service expertise during interaction with customers.

3.5 Customer Knowledge Utilization/Acquisition and Service Quality

Even if service organizations have a good quality of knowledge in EKR, they cannot obtain differential benefits from this if their employees do not utilize the knowledge for their work (Moorman and Miner, 1997; van Wijk et al., 2008; Watson and Hewett, 2006). Pfeffer and Sutton (2000) pointed out that organizations do not always effectively utilize shared knowledge. Knowledge utilization is different from the knowledge creation and knowledge sharing dimensions of KM (Alavi and Tiwana, 2002; Majchrzak et al., 2004). It is noteworthy that knowledge creation and sharing are not always linked to firm performance (Alavi and Leidner 2001; Alavi and Tiwana 2002; Pfeffer and Sutton, 2000). Knowledge sharing and transference in organizations are not on their own enough to solve problems and deliver products and services to customers (Choi et al., 2010; Pfeffer and Sutton, 2000). To improve firm performance, utilizing the knowledge accumulated in knowledge repositories is more important than simply accumulating knowledge in these repositories (Cross and Baird, 2000). Cohen and Levinthal (1990) and Zahra and George (2002) emphasized that organizations need knowledge exploitation to achieve their business goals. Roman et al. (2005) suggested that employees who directly meet customers should utilize customer knowledge to analyze the customers' needs, understand the customers' purchase motives and distinguish between different types of customers. Likewise, knowledge utilization is related to positive outcomes in organizations (Choi et al., 2010; Ko et al., 2009). In this sense, we hypothesize that CSRs' knowledge utilization will positively influence their key job performance indicator, namely their service quality.

Meanwhile, we assume that CSRs' customer knowledge acquisition during interaction with customers is also related to their service quality. Interaction with customers is important not only verifying the usefulness of customer knowledge, but also in updating this knowledge to reflect the current situation. Accordingly, call centers should attempt to not miss opportunities for new knowledge acquisition created by customers' voluntary contact. For instance, based on their firm's manual, CSRs may be able to obtain useful information and comments about their services by asking customers about the service quality delivered as well as any complaints they may have with the service or amendments they would wish to make. Moreover, CSRs can also gain information on customers' preferences towards a firm's new products by providing them with a description of new products and services. During interaction with customers, CSRs should concentrate on and show interest in customers' issues to capture and acquire as much knowledge as they can from the customers, which would in turn facilitate CSRs to deliver better service. Hence, we set the following hypotheses:

H4. CSRs' knowledge utilization will positively influence their service quality during interaction with customers.

H5. CSRs' knowledge acquisition will positively influence their service quality during interaction with customers.

3.6 Service Expertise and Service Quality

CSRs' service expertise is gradually becoming an important issue in call centers. Customers now require CSRs to deliver more specialized services beyond the basic requirements such as displaying courteousness, kindness and articulate pronunciation. Given that call centers seek service differentiation over competitors, it is important that CSRs should have more specialized skills and knowledge of customer service work (Batt and Moynihan, 2002; Mahesh and Kasturi, 2006). In other words, CSRs should be qualified with skills and knowledge in the customer service field in order to deliver differential service to customers (Gilson & Khandelwal, 2005).

The success of a service encounter relies on the service employee involved. In service encounters, CSRs' service abilities are directly linked to customers' perception of service quality (Bitner, 1990; Bitner et al., 1994; Surprenant and Solomon, 1987). A customer evaluates the overall service quality of a company based on interaction with its service employees (Bitner, 1990). That is, the interpersonal interaction between CSRs and customers in a service encounter is a primary predictor of service quality (Bitner et al., 1994; Surprenant and Solomon, 1987). Likewise, service quality in call centers comes from the knowledge, skills and abilities of the CSRs (Burgers et al., 2000). Brady and Cronin (2001) showed that interaction service is directly affected by the attitudes, behaviors and expertise of CSRs. Pontes and Kelly (2000) verified that CSRs' abilities, such as their CRM and communication, lead to greater customer repurchasing in the context of a call center. Roman and Iacobucci (2010) showed that a salesperson's customer-qualification skills, which denote the abilities of the salesperson to identify and analyze customers' needs, to understand their purchase motives and to distinguish between different types of customers, positively influence their adaptive selling behaviors, leading to customer satisfaction. In this regard, we posit that CSRs' service expertise can be a key predictor of service quality.

H6. CSRs' service expertise will positively influence their service quality during interaction with customers.

4. METHODS

4.1 Data Collection and Sample

To empirically test the proposed research model and hypotheses, we conducted a survey on CSRs working for call centers using a self-reported questionnaire method. We distributed a total of 500 questionnaires to five call centers in health/life insurance that provided CSRs with KMSs as EKR. A total of 269 responses were returned, which was a response rate of 53.8%. Excluding eight responses with missing data, we used a total of 261 responses for the analysis.

Female CSRs accounted for 98.5% of the sample, suggesting that an absolute majority of CSRs in call centers were female. In the country in which we collected data, call centers generally employ a majority of female CSRs (c.f., Choi et al. 2012). In terms of age, respondents in their thirties accounted for 59.8% of the sample, and those in their forties were the next largest group at 31.8%. For education level, graduation from high school represented the largest group at 44.1 percent. Graduates from two-year colleges made up 26.1%. These results indicate that the education level of CSRs is relatively low.

4.2 Measures

We adapted measures from prior research and modified these for a call center setting. All items were measured using a seven-point Likert scale ranging from 1 point (very strongly disagree) to 7 points (very strongly agree). The details of measures are presented in Table 1.

Applying the definitions of Hult et al. (2004) and Moorman and Miner (1997), the *customer knowledge level* is defined as the degree to which a CSR perceives that the call center has knowledge and records the success and failure experiences of its customers in EKRs. Generally, call centers provide CSRs with EKRs such as KMS, intranet and customer databases. We define *customer knowledge integration* as the degree to which a CSR perceives that the call center offers assimilated and combined customer knowledge obtained across various customer contact channels into an EKR. This is important because organizations can now obtain customer knowledge through various service channels including their website, email, fax, over the phone, in-store and etc. Thus, the integration of customer knowledge is as important as the creation of this knowledge. It is also important for a call center to keep the consistency of customer knowledge by eliminating overlapping knowledge and updating old knowledge. Drawing on the studies of Moorman and Miner (1997) and O'Reilly (1982), *accessibility of customer knowledge* is defined as the degree to which a CSR can easily search for and retrieve the knowledge they need from EKRs at the right time. Based on the conceptualization of Zahra and George (2002), *customer knowledge utilization* is defined as the degree to which a CSR exploits the customer knowledge in EKRs for conducting customer service work. We adapted measures from Choi et al. (2010). *Customer knowledge acquisition* is defined as the degree to which a CSR grasps new or updated knowledge and inputs this knowledge into EKRs, based on the conceptualization of Zahra and George (2002). We also adapted measures from Hult et al. (2004).

Service expertise is defined as the degree to which a CSR has the knowledge and abilities needed for dealing with customer service work. It is measured using four items, three of which come from Brady and Cronin (2001) to measure knowledge, with an additional item being developed in this study to directly measure customer service work ability. This study measured service expertise from a CSR perspective while Brady and Cronin (2001) measured it from a customer perspective.

We measure *service quality* via CSR's self-rating using three items drawn from Malhotra and Mukherjee (2004). To measure service quality more objectively, customers' direct evaluation would be preferable. However, support for service employees' own evaluation of service quality has also been found (Boshoff and Mels, 1995; Mukherjee and Malhotra, 2006). Service employees can evaluate their service outcomes in that their service quality results from human interaction between employees and customers (Boshoff and Mels, 1995; Sergeant and Frenkel, 2000). It has also been found that there is high correlation between service quality as evaluated by customers and as evaluated by service employees (Schneider and Bowen, 1995). Moreover, in call centers, service quality is one of the key performance indicators used for evaluating CSRs' work performance. Thus, CSRs can identify their level of service quality.

4.3 Assessment of Measurement Model and Common Method Variance

From the analysis results in terms of Cronbach's α , all the constructs used in this study exceeded 0.7, as suggested by Nunnally (1978). This verifies that our constructs have reliability. Our measurement model was then assessed by confirmatory factor analysis (CFA), using LISREL 8.54 as shown in Table 1. According to the recommendations from Joreskog and Sorbom (1993), the goodness-of-fit index of the measurement model was evaluated. All these indices meet the

recommended values, demonstrating that the measurement model is appropriate. The factor loadings of items to their corresponding constructs ranged from 0.71 to 0.98, which were significant at the level of 0.05. The values of average variance extracted (AVE) for constructs were above the recommended value of 0.5 (Fornell and Lacker, 1981). Therefore, it can be said that measurement items used in this study had high representativeness for the constructs. Likewise, the construct reliability for all the constructs also exceeded the recommended value of 0.7 (Hair et al., 1998). Finally, as shown in Table 2, the square root of the AVE was found to be greater than the coefficient (Fornell and Larcker, 1981), which demonstrated discriminant validity between the constructs.

The common method variance (CMV) was confirmed using a CFA because we used data collected via a self-report survey to measure both independent and dependent variables for a respondent. We compared the seven-factor model with a single-factor model (or Harman's one-factor model) in which all indicators loaded on a single factor (Podsakoff et al., 2003). If CMV is substantial, than the single-factor model provides a better fit (Podsakoff et al., 2003). The result showed that the single factor model did not have a good fit ($\chi^2 = 4137.87$, $df = 275$, $GFI = 0.44$, $CFI = 0.80$ and $RMSEA = 0.232$), thus providing evidence that CMV is not an issue for this study.

Constructs	Items	Factor Loadings	Construct Reliability	AVE
Customer Knowledge Level	1. EKR's have customer knowledge useful for customer service.	0.92	0.935	0.783
	2. EKR's have customer knowledge related to prior customer service offered.	0.93		
	3. EKR's have systematic customer knowledge useful for customer service.	0.91		
	4. EKR's have a variety of customer knowledge related to a customer.	0.77		
Customer Knowledge Integration	1. Customer knowledge used for customer service is managed integrally.	0.85	0.836	0.631
	2. Customer knowledge from the call center, web-sites, emails, KMS and etc., is integrated.	0.79		
	3. Customer knowledge is integrated across departments of the organization.	0.74		
Accessibility of Customer Knowledge	1. I easily learn how to use EKR's.	0.87	0.957	0.849
	2. I easily find necessary knowledge stored in EKR's.	0.93		
	3. I can get necessary knowledge from EKR's.	0.95		
	4. The structure and contents are designed to be understood easily.	0.92		
Customer Knowledge Acquisition	1. I identify the knowledge to be changed during contact with a customer.	0.72	0.839	0.567
	2. I ask a customer about complaints and amendment relating to customer service.	0.71		
	3. I try to obtain knowledge from a customer.	0.83		
	4. I try to collect opinions from a customer.	0.75		
Customer Knowledge Utilization	1. I use customer knowledge stored in EKR's to serve a customer.	0.91	0.966	0.904
	2. I use customer knowledge stored in EKR's to solve a customer's problems.	0.98		
	3. I use customer knowledge stored in EKR's to respond to a customer's requirements.	0.97		
Service Expertise	1. I have an ability for customer service work.	0.88	0.923	0.750
	2. I have knowledge for customer service work.	0.89		
	3. I can instantly meet customers' requirements.	0.90		
	4. I have knowledge to deal with difficult service work.	0.79		
Service Quality	1. I solve customers' problems during the first contact.	0.78	0.904	0.759
	2. I solve customers' problems speedily when these problems occur.	0.90		
	3. I instantly respond to the requests of customers.	0.92		

Note. All items were significant at the 0.01 level. Fit index: Chi Square = 273.3, d.f. = 254, p -value = 0.19, $GFI = 0.92$, $RMR = 0.05$, $RMSEA = 0.02$, $\chi^2/df = 1.08$, $AGFI = 0.90$, $PNFI = 0.83$, $NFI = 0.98$, $NNFI = 1.00$ and $CFI = 1.00$.

Table 1. Measurement model

Variables		Mean	SD	A	B	C	D	E	F	G
A	Customer Knowledge Level	4.86	1.24	0.885						
B	Customer Knowledge Integration	4.84	1.17	0.48	0.794					
C	Accessibility of Customer Knowledge	4.67	1.21	0.51	0.36	0.921				

D	Knowledge Acquisition	5.03	1.02	0.56	0.58	0.50	0.753			
E	Knowledge Utilization	5.15	1.20	0.66	0.46	0.70	0.51	0.951		
F	Service Expertise	4.96	0.93	0.53	0.47	0.42	0.41	0.44	0.866	
G	Service Quality	5.94	0.90	0.39	0.32	0.35	0.34	0.43	0.52	0.871

Note. All constructs were significant at the 0.01 level. The value of square root of the AVE is presented in the diagonal colored line.

Table 2. Correlation Matrix

4.4 Assessment of Research Model and Hypotheses

Structural equation modeling was used to validate the research model and the hypotheses. To estimate the parameters of the model, we used the maximum likelihood method and a covariance matrix. The results are presented in Table 3, indicating the good fit of our research model as follows: chi-square = 299.47, $df = 260$, p -value = 0.05, $\chi^2/df = 1.15$, RMR = 0.07, RMSEA = 0.02, GFI = 0.92, AGFI = 0.89, PNFI = 0.85, NFI = 0.98, NNFI = 1.00 and CFI = 1.00. Thus, it can be said that the goodness-of-fit index of the model is acceptable since all the indices were evaluated as being acceptable. Figure 2 provides the values of the standardized path coefficients and the significance of the path. Table 4 shows the results of hypotheses testing (H1-H6). As we expected, all the hypotheses were found to be significant except that predicting relationship between customer knowledge acquisition and service quality. In terms of service expertise, customer knowledge level was shown to be the most significant variable. Customer knowledge utilization was considerably affected by accessibility of customer knowledge while customer knowledge acquisition was considerably affected by customer knowledge integration.

Hypothesis		SPC (t -value)	Result
H1a	Customer Knowledge Level → Customer Knowledge Utilization	0.37(6.55) **	Supported
H1b	Customer Knowledge Level → Customer Knowledge Acquisition	0.27(3.71) **	Supported
H1c	Customer Knowledge Level → Service Expertise	0.33(4.47) **	Supported
H2a	Customer Knowledge Integration → Customer Knowledge Utilization	0.11(2.15) *	Supported
H2b	Customer Knowledge Integration → Customer Knowledge Acquisition	0.37(5.13) **	Supported
H2c	Customer Knowledge Integration → Service Expertise	0.26(3.67) **	Supported
H3a	Accessibility of Customer Knowledge → Customer Knowledge Utilization	0.47(8.58) **	Supported
H3b	Accessibility of Customer Knowledge → Customer Knowledge Acquisition	0.22(3.35) **	Supported
H3c	Accessibility of Customer Knowledge → Service Expertise	0.16(2.37) *	Supported
H4	Customer Knowledge Utilization → Interaction Service Quality	0.22(3.06) **	Supported
H5	Customer Knowledge Acquisition → Interaction Service Quality	0.07(0.96)	Not Supported
H6	Service Expertise → Interaction Service Quality	0.40(5.60) **	Supported

Note. * $p < 0.05$, ** $p < 0.01$. SPC means standardized path coefficient. R-square value: customer knowledge utilization (0.62), customer knowledge acquisition (0.48), service expertise (0.36), service quality (0.32).

Table 3. Summary of Hypothesis Testing

5. DISCUSSION AND IMPLICATION

The results indicate that EKR enhance CSRs' service expertise as well as their knowledge utilization and acquisition, which in turn increases service quality. First, the results demonstrate that CSRs' service expertise depends on the customer knowledge level in EKR, which will have been accumulated by firms over time. A greater degree of customer knowledge accumulated in EKR reinforces CSRs' abilities to handle various customer problems by offering them the necessary knowledge at the right time. Thus, the results suggest that call centers can increase their service quality through the enhancement of CSRs' service expertise, supporting the assertion that service quality is dependent on CSRs. This is because customers continue to demand more specialized services from the CSRs whom they directly meet. In service encounters, CSRs are placed to solve the complaints and discontents of customers and to do so will require professional knowledge and skills beyond the simple basic service skills such as kindness and politeness. However, it is almost impossible for CSRs to

develop a vast range of such knowledge, as was noted in the Introduction section. This study suggests that EKR is a key means of supporting CSRs by providing them with necessary customer knowledge so that service work can be achieved in a timely manner. The results offer implications to managers in call centers by showing that the customer knowledge stored in EKR can be used for the enhancement of CSRs' service expertise. For example, when a customer requests information on suitable insurance goods when making a phone call to an insurance call center, CSRs should present the proper option based on the prior customer knowledge in EKR. In doing so, firms can create new business opportunities.

Second, the results show that the customer knowledge level in EKR enhances CSRs' customer knowledge utilization and acquisition. Generally, EKR offer guidelines for an employee's customer knowledge utilization and facilitate their acquisition of new knowledge based on certain EKR categories and structuring. In call centers, CSRs not only utilize prior customer knowledge in EKR to deal with customer service, but may also have the opportunity to grasp new knowledge during contact with customers. The interaction between CSRs and customers is a golden opportunity to obtain the latest customer knowledge as well as to assure the accuracy of existing customer knowledge. Based on EKR, CSRs can update the customer knowledge which a firm already has. Accordingly, call center managers should promote CSRs' knowledge utilization and acquisition through well-established EKR.

Third, the results demonstrate that customer knowledge integration in EKR increases CSRs' service expertise as well as their knowledge utilization and acquisition. Nowadays, the sources of customer knowledge are diverse, including websites, emails, phone calls and in-store interaction. Thus, it is necessary for a firm to integrate a vast amount of customer knowledge into an EKR. This integrated knowledge enables CSRs to offer better service to customers, to have more opportunities for customer knowledge to be applied, and to focus on the acquisition of knowledge that the organization does not already have, whilst also maintaining the consistency of customer knowledge. Particularly, the results show that customer knowledge integration considerably increases CSRs' customer knowledge acquisition. This indicates that integrated customer knowledge facilitates the acquisition of new knowledge. That is, a call center employee can obtain new knowledge based on integrated knowledge across the organization. Thus, firms should manage all customer knowledge created through various sources to enhance CSRs' knowledge acquisition during contact with customers. Despite the importance of managing a vast amount of customer data from various sources, there is little research on customer knowledge integration. This study has an academic implication by demonstrating the significant effects of integrated customer knowledge on CSRs' service expertise and their knowledge utilization and acquisition.

Fourth, it is found that accessibility of customer knowledge in EKR increases CSRs' service expertise, customer knowledge utilization and customer knowledge acquisition. Accessibility considerably enhanced CSRs' customer knowledge utilization. This finding strongly indicates that although service organizations may have a great stock of knowledge in EKR, their CSRs would fail to utilize this knowledge if they cannot easily access it when necessary. Thus, it is noteworthy that greater accessibility of customer knowledge facilitates the utilization of stored knowledge and also increases service expertise. Moreover, accessibility facilitates CSRs to acquire new customer knowledge by allowing them to retrieve existing knowledge easily and to increase their understanding of the structure and contents of EKR. Prior research has empirically tested the effects of accessibility on users' satisfaction, perceived usefulness and utilization intentions. The results confirm another effect of accessibility by showing that accessibility contributes to increased service expertise, knowledge utilization and knowledge acquisition. This has an academic implication in that it confirms the key role of accessibility in the context of call center work, emphasizing quick responses to customers' requests in a short period of time over the phone.

Finally, the results show that service quality is increased by CSRs' service expertise and customer knowledge utilization. Particularly, the findings show that service quality is considerably increased by service expertise. Thus, it should be noted that service organizations can create superior service by increasing CSRs' service expertise in advance. Although service researchers have emphasized the service quality delivered by CSRs, there have been no studies detailing how to increase CSRs' service expertise, which is considered as a key predictor of service quality (Brady and Cronin, 2001). We suggest that effectively utilizing the customer knowledge that a firm already has is one of the ways to enhance CSRs' service expertise. On the other hand, it was found that the effect of customer knowledge acquisition on service quality was not significant. One possible explanation for this result is that a customer may be reluctant to provide his or her private information to a firm. However, CSRs will ask for some key information from customers so as to confirm their identity, which is a good chance for important knowledge to be updated where necessary. Despite good reasons to do so, customers may well be unwilling to continue providing their recent information to a firm. For CSRs, it is also a major part of their call center work to confirm and update the customer knowledge in EKR. That is, customer knowledge acquisition is an important issue for firms and their CSRs, rather than for customers. This is an issue in need of further research.

6. LIMITATIONS AND FUTURE RESEARCH

There are several limitations to this study. First, although there is considerable guidance as to how to measure interaction service quality by using the self-reported ratings of service employees (Boshoff and Mels, 1995; Mukherjee and Malhotra, 2006; Schneider and Bowen, 1995), it would still be better to use customers' real evaluation. To make up for the weakness, we used anonymous questionnaires and also tested the CMV. Second, this study attempts to measure the customer knowledge integration created through various knowledge sources. It is an important issue for service organizations to have integrated customer knowledge so as to achieve service excellence in service encounters. However, this is an important but preliminary issue, so there could be weakness in supporting the concept and its measurement. Further research is required in this area. Finally, this study focuses on the customer knowledge stored in EKR although service organizations could have numerous and various types of knowledge in the form of documentation and human knowledge sources (i.e., coworkers and managers).

7. CONCLUSION

Given that service excellence is required for service organizations to obtain differential advantages over their competitors, CSRs' service expertise is gradually becoming recognized as important in this area. To deliver better outcomes, service expertise is more important than basic customer service skills. Customers are now demanding ever better service from service organizations. In this context, this study suggests that service organizations should effectively utilize EKRs established in the organizations over time in order to increase the service expertise of CSRs. The findings of this study indicate that CSRs' service expertise is increased by customer knowledge level, customer knowledge integration and accessibility of customer knowledge in EKRs. Moreover, the results of the study suggest that the stored customer knowledge within, and structure of, EKRs can offer CSRs guidelines through utilizing prior knowledge and acquiring new knowledge during contact with customers. It is noteworthy that CSRs are placed in the position of utilizing prior customer knowledge and acquiring new customer knowledge at the same time. Finally, the results demonstrate that EKRs should be designed so that CSRs can easily access the right customer knowledge when necessary.

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