

Customer Knowledge in Knowledge Management Systems: The Source of Superior Customer Service

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Although most firms have accumulated customer knowledge in knowledge management systems (KMSs) over time at the organizational level, there is a lack of understanding of its role in creating their own idiosyncratic capabilities and superior performance. Under the circumstances, this study argues that three dimensions of customer knowledge in KMSs namely, customer knowledge level, customer knowledge integration, and accessibility of customer knowledge influence customer service representatives (CSRs)' knowledge utilization and acquisition, thereby increasing service performance. The results provide empirical support for the assertion. This study offers an insight into how customer knowledge in KMSs ultimately influences service performance.

JEL Codes: M15, M31 and M39

1. Introduction

In call centers, which have been rapidly emerging as a firm's typical service encounter, customer service representatives (CSRs) have the responsibility of conveying superior service in response to customers' requests and providing appropriate solutions to customers who are experiencing problems. Customers' overall experience of service encounters strongly relies on CSRs (Bitner, Booms & Mohr 1994). Recognizing this, most call centers establish service guidelines (or manuals) and demand CSRs to provide customer service according to them (Lytle, Hom & Mokwa 1998). Service manuals contain basic service skills such as greeting, kindness, attentiveness and others. Although such guidelines are effective in creating standardized customer service, it is difficult to meet customers' various service needs. Nowadays, customers expect more specialized service beyond such basic service from call centers. However, most research in the service marketing domain has focused on the service quality offered by CSRs rather than how to help them to become service experts (Brady & Cronin 2001). Considering that specialized service comes from CSRs (Bitner, Booms & Mohr 1994; Brady & Cronin 2001), it is important to understand how to enhance CSRs' capability and service performance.

Under the circumstances, this study explores the role of customer knowledge stored in knowledge management systems (KMSs) in enhancing CSRs' capability and service performance. In call centers, CSRs use customer knowledge in KMSs that a firm has

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accumulated over time so that they are able to deal with customers' service requests instantly over the phone in a very limited time. When a CSR receives an incoming call from a customer, a pop-up screen in the CSR's computer monitor appears with the basic information of the customer. Then, the CSR handles the customer's service requests by searching and using necessary knowledge in KMSs.

Another example, in the case of call centers for property insurance companies, KMSs cover a much more diverse and complicated spectrum of knowledge, such as detailed information and knowledge on numerous insurance products, the application and termination of insurance contracts, loans under insurance contracts, the insurance policy and laws, insurance claims and others (Choi & Shin 2012). When a customer requests a CSR to recommend insurance products suitable to him or her, the CSR could promptly suggest proper insurance by using organizational knowledge in KMSs. If the CSR fails to offer proper information to the customer, the firm could miss a golden opportunity to create new sales. Moreover, the CSR would not receive a favourable evaluation from the customer who does not obtain satisfactory information, in spite of being treated courteously. Likewise, in a call center, KMSs serve a fundamental knowledge base for customer service. Therefore, this study explores the relationship of customer knowledge in KMSs and CSRs' capability, which has remained unexplored.

Furthermore, this study considers two types of knowledge management (KM) capabilities that CSR are required during the interaction with customers: knowledge utilization and knowledge acquisition. More specifically, this study proposes that customer knowledge in KMSs influences CSRs' KM capabilities and thereby affecting service performance. CSRs interact with customers constantly throughout the day, which creates important opportunities not only to update extant customer knowledge, but also to gain additional knowledge on their customers. That is, CSRs are able to grasp and update new knowledge based on the established categories and structures of KMSs. This is a way of enabling firms to keep up with the latest customer knowledge in KMSs.

Although prior research has suggested several processes of knowledge management such as the creation (i.e., acquisition), sharing/distribution, and utilization of knowledge (Chou et al. 2007; van Wijk, Jansen & Lyles 2008), this study focuses on two of them: knowledge utilization and acquisition. Given that CSRs use existing customer knowledge in KMSs to handle customers' requests immediately, knowledge utilization is an important part. Another primary part of CSRs' work is to check the latest information to customers regarding key customer information and update it into KMSs during the contact. This activity refers to knowledge acquisition. Meanwhile, CSRs are not allowed to share and distribute any knowledge in KMSs. With regard to knowledge utilization, much research has noted that the use of valuable organizational knowledge is more essential than the creation or accumulation of the knowledge in creating the organization's competitiveness (Moorman & Miner 1997; van Wijk, Jansen & Lyles 2008; Watson & Hewett 2006). Although knowledge utilization has been considered as the last stage of KM process, CSRs are located in multiple steps of them in that they use prior knowledge and acquire new and additional knowledge simultaneously in the context of call centers. Therefore, in this study, knowledge utilization and knowledge acquisition are considered as KM capabilities that are necessary for CSRs. However, the issue of knowledge acquisition in the context of call centers has not been explored yet.

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The principal purpose of this study is to offer an insight into the issue of how call centers can enhance CSRs' service performance, by verifying the role of customer knowledge in KMSs. Furthermore, this study is to provide empirical evidence on the relationship of customer knowledge in KMSs, CSRs' capabilities, and service performance.

The remainder of the paper is organized as follows. The next section provides theoretical backgrounds on organization memory, KMSs as a reservoir of customer knowledge, and CSRs' knowledge management capability. Then, this study's overall research framework, research model, and hypotheses are presented, followed by its methods and the results of statistical analysis. Finally, we provide the discussion and implications of our findings.

2. Literature Review

2.1 Organizational Memory

Accumulated organizational knowledge is a key source of creating a firm's capabilities and superior performance (Choi, Lee & Yoo 2010; Grant 1996; Moorman and Miner 1997, 1998). Accordingly, organizations have attempted over time to accumulate common knowledge at the organizational level created from such various sources as individuals/groups and inside/outside, with the help of KMSs. Indeed, KMSs are nowadays an important means of containing and maintaining such organizational knowledge (Gray & Durcikova 2005-6; Markus 2001; Watson & Hewett, 2006). Moreover, researchers emphasize the use of organizational knowledge in creating and improving the business capabilities and performance of a firm (Choi, Lee & Yoo 2010; Moorman & Miner 1997). Knowledge utilization is a noteworthy issue in that, without using the created and shared knowledge, knowledge creation and knowledge sharing do not ensure superior firm performance.

To capture accumulated customer knowledge in KMSs, this study introduces the concept of organizational memory (OM), which refers to the amount of stored knowledge, experience, and familiarity with a certain domain (Hult, Ketchen & Slater 2004; Moorman & Miner 1997, 1998). More widely, OM is conceptualized as including stored knowledge and knowledge structure to organize it (Walsh & Ungson 1991). Besides, OM exists in the invisible form of organizational values, norms, and culture as well as physical artifacts (Moorman & Miner 1997).

Furthermore, Moorman and Miner (1997) suggested four major dimensions of OM: its level (i.e., amount), dispersion, accessibility and content. OM level refers to the amount of stored knowledge that an organization has in a certain domain. Generally, OM level is regarded as the representative dimension of OM. Many studies conceptualize OM as OM level *in itself* (e.g., Chang & Cho 2008; Moorman & Miner 1998). OM dispersion is referred to as the degree of knowledge sharing across the organization. OM accessibility denotes the extent to which knowledge is easily retrieved for use when needed. Finally, OM content denotes the meaning of collective knowledge stored in the organization that consists of two types of knowledge: procedural and declarative knowledge. That is, OM covers declarative and procedural knowledge (Moorman & Miner 1997) as well as individual and collective knowledge (Inkpen 2000). Declarative knowledge means facts about business goals, customer needs and preferences, descriptions of goods and services while procedural knowledge means skills (the ways in which work is conducted), routines, processes, and procedures. Thus, OM content can be embedded within the organization, in the invisible form of organizational structure and

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organizational culture (Alavi & Leidner 2001; Moorman & Miner 1997). Moorman and Miner (1997) empirically tested the effects of OM level and dispersion on firm performance (i.e., short-term financial performance and the creativity of new product development) while the other two, accessibility and content, remain untested.

Applying Moorman and Miner (1997)'s conceptualization of OM, this study identifies main dimensions of customer knowledge in KMSs that a firm has accumulated on customers over time: customer knowledge level, customer service integration and accessibility of customer knowledge. This study limits OM pertaining to customer knowledge in KMSs that CSRs use for customer service work in a call center. Although OM is also embedded in business processes, products/services, organizational structure, and organization culture in invisible forms (Croasdell 2001; Cross & Baird 2000), this study focuses on OM which is electronically built in KMSs so that CSRs can use it instantly when needed. Accordingly, this study uses the term customer knowledge level, customer knowledge integration and accessibility of customer knowledge. However, this study excludes OM content, considering that customer knowledge in KMSs is electronically stored through the process of knowledge codification, regardless of procedural or declarative knowledge (i.e., knowledge content). Besides, we use the term customer knowledge *integration* instead of using the term *dispersion*, emphasizing that call centers integrally manage customer knowledge created across a firm's various customer contact channels, such as phones, websites, emails, and in-stores.

2.2 KMSs as a Reservoir of Customer Knowledge

KMSs are a typical means of containing and maintaining OM (Alavi & Leidner 2001; Bock, Mahmood & Sharma 2010). Particularly, KMSs serve as a great reservoir of organizational knowledge which contains electronically codified knowledge across the organization (Bock, Mahmood & Sharma 2010; Gray & Durcikova 2005-6; Watson & Hewett 2006). In a call center, customer knowledge in KMSs is used to deal with customers' various and complicated service requirements over the phone in a very limited time (Choi & Shin 2012). For instance, KMSs of S 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 others (Choi & Shin 2012). The KMSs 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 KMSs increases as it is difficult for CSRs to learn about everything on a firm's products and customer service policies. Therefore, this study explores the role of KMSs in enhancing CSRs' capability and thereby leading to superior service performance.

2.3 CSRs' Knowledge Management Capability

This study focuses on knowledge utilization and acquisition, although prior research has suggested several dimensions of knowledge management, such as the creation (i.e., acquisition), sharing/distribution and utilization of knowledge (Alavi & Leidner 2001; Chou et al. 2007; van Wijk, Jansen & Lyles 2008). In the context of call centers, CSRs involve knowledge utilization and acquisition. Above all, CSRs use extant customer knowledge in KMSs in order to respond to customers' various service requests. Besides, during the contact, CSRs engage in the knowledge acquisition process by requesting the latest information to customers and

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updating it into KMSs. This is a primary part of CSRs' work. On the other hand, the sharing and distribution of knowledge are not required to CSRs. Rather, it is not allowed to share customer-related knowledge. Thus, this study excludes knowledge sharing/distribution in call center settings. Much research has noted that using valuable prior knowledge that a firm has is more important than the knowledge *in itself* in creating a firm's capabilities and superior performance (Moorman and Miner 1997; van Wijk, Jansen & Lyles 2008; Watson & Hewett 2006). Generally, knowledge utilization is considered as the final stage of KM process. However, in the context of call centers, CSRs are located in multiple steps of KM process in that they use existing knowledge and also obtain newly updated knowledge.

CSRs' knowledge utilization and acquisition capabilities are the challenging issues in the context of call centers. Given that CSRs' main work is to offer accurate knowledge in response to customers' service requests, it is important for CSRs to effectively use customer knowledge in KMSs. Moreover, CSRs are required to handle various customers' service requests and problems. Under the circumstance, KMSs serve as a knowledge base by conveying necessary knowledge to CSRs so that they are able to cope with customers' service requests and problems in a very limited time over the phone. In this sense, CSRs' ability to use knowledge in KMSs would be an important issue in creating superior service performance. In other words, CSRs' service performance will be dependent on the ability of knowledge utilization.

Particularly, the issues of knowledge creation and sharing have received a considerable amount of attention, while there is a lack of understanding about how stocked knowledge in KMSs can be applied to achieve a firm's business purposes and goals. Obviously, some researchers emphasize more the use of valuable existing knowledge (i.e., knowledge utilization), based on the assertion that accumulating knowledge is different from using it appropriately in practice (Moorman & Miner 1997; Pfeffer & Sutton 2000; Watson & Hewett 2006). Much research has noted that utilizing valuable knowledge stored in the organization is more important than knowledge *per se* in creating a firm's competitiveness (Moorman & Miner 1997; van Wijk, Jansen & Lyles 2008; Watson & Hewett 2000). Nevertheless, this study argues that more studies are needed to understand how accumulated knowledge leads to organization performance in various ways, beyond simply verifying the direct relationship of knowledge use and organizational performance. This is because stored organizational knowledge can be utilized for achieving individuals or organizations' various purposes, such as the development of organizational improvisational capability (Moorman & Miner 1998; Pavlou & El Sawy 2010), the creation of creativity (Cheung, Chau & Au 2008; Moorman & Miner 1997), and the enhancement of organizational knowledge processing capability (Hult, Ketchen & Slater 2004). In this regard, this study proposes that accumulated knowledge first contributes to the enhancement of employee work capability and then leads to better performance in the context of call centers.

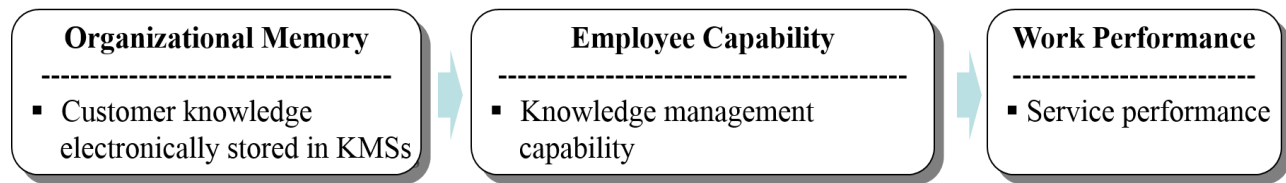
Regarding CSRs' knowledge acquisition capability, they have significant opportunities to detect new knowledge and update existing obsolete knowledge during the customer contact, following knowledge categories and structures designed in KMSs. This is an important way of enabling firms to keep up with the latest customer knowledge. Recognizing this, call centers attempt to not miss opportunities for acquiring new knowledge generated by customers' voluntary contact. For instance, according to a firm's manual, CSRs may be able to obtain useful information and comments about its service by asking customers about the quality of service delivered as well as to attain any complaints that they may have with the service or any

amendments that they would wish to make. Moreover, CSRs can gain information on customers' preferences towards a firm's new products by providing them with a description of new products and services. During the interaction with customers, CSRs are demanded to concentrate on and show interest in customers' issues to capture and acquire as much knowledge as they can from the customers. However, this issue has not yet been examined.

3. Research Framework

3.1 OM, Employee Capability, and Job Performance

Figure 1: Research Framework: OM as a Knowledge Base for Enhancing Employee Capability and Performance



Previous research of OM' various roles within the organization provides the research framework as depicted in Figure 1. First of all, OM is regarded as a reservoir of collective knowledge created by individuals or groups and leads to the organization's knowledge processing activities (Cross & Baird 2000). Furthermore, OM refers to not only the storage of organizational knowledge but also the organization and retrieval of it (Walsh & Ungson 1991). In other words, OM performs two types of roles: interpretation and action guidance (Moorman & Miner 1997). Interpretation reflects the way in which OM can offer filtering for categorizing and storing a vast amount of knowledge by providing a certain structure for categorizing different types of knowledge by their similarities (Croasdell 2001). This structure then helps people access specific knowledge in OM when needed. Thus, OM supports the acquisition, assimilation/transformation, and utilization of knowledge. The role of action guidance relates to the ways that OM can offer certain guidelines for how employees should comply with the organizational standards. Thus, OM enables employees to conduct their work effectively in the direction that their organization pursue.

OM provides a baseline for managing organizational knowledge (Alavi & Leidner 2001). OM is often conceptualized as one of the key dimensions consisting of organizational learning (Chou et al. 2007). Applying organizational learning, Chou et al. (2007) proposed information processing capability consisting of information acquisition, dissemination, integration, and OM and found that OM increases information dissemination and integration. Hult, Ketchen and Slater (2004) contended that OM facilitates information processing capability, such as knowledge acquisition, knowledge distribution, and the development of shared meaning in supply chains. Thus, this study draws the potential relationship of OM and CSRs' KM capabilities namely, knowledge utilization and knowledge acquisition.

Secondly, OM plays a key role in enhancing the organization's various business capabilities. Moorman and Miner (1997) asserted that OM level and OM dispersion are directly associated with new product creativity as well as new product short-term financial performance. Pavlou and El Sawy (2010) mentioned the positive relationship of OM and improvisational capability in

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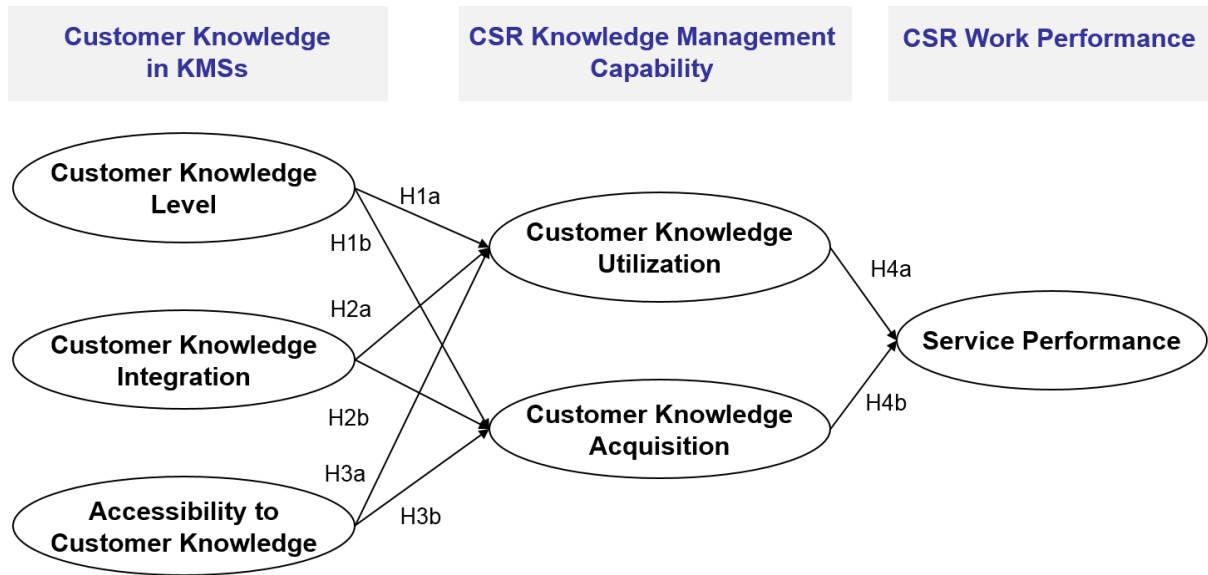
new product development, recognizing that OM provides useful knowledge on past effective improvisational actions, but found no significant statistical outcome. On the other hand, researchers have also argued that OM has negative effects on the enhancement of capability and performance of individuals and organizations by promoting the maintenance of the status quo seeking stable, consistent organizational cultures (Alavi & Leidner 2001; Moorman & Miner 1998). Moorman and Miner (1998) contended that greater OM level negatively influences the development of organizational improvisation capability required for developing new products by providing only well-established knowledge obtained from the organization history that restricts radical changes. Cheung, Chau and Au (2008) indicated that knowledge reuse via KMSs suppresses employees' creativity. Thus, this study assumes the potential relationships of OM and CSRs' various work capability.

Finally, OM is directly and/or indirectly related to individual and organizational performance. Walsh and Ungson (1991) argued that OM can reduce transaction costs, effective decision-making and facilitate collaboration in multiple-task and multiple-use environments. Cross and Baird (2000) asserted that organizations could improve their performance by utilizing their stored knowledge in their decision-making and business activities in knowledge-based economies. 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. On the other hand, researchers have asserted indirect effect of OM on organizational performance via mediators (e.g., organizational capability). That is, OM first contributes to the enhancement of organizational capability and thereby increasing its performance. Moorman and Miner (1998) argued that OM level influences organizational improvisation capability which then leads to new products and process outcomes. Pavlou and El Sawy (2010) contended that OM contributes to improvisational capabilities and thus increases operational performance. Following this idea, this proposes that OM is positively associated with CSRs' KM capabilities, which leads to their increased performance.

3.2 Research Model

Based on the above discussion, this study proposes the research model and hypotheses, as shown in Figure 2. The model suggests that three dimensions of KMSs are positively associated with CSRs' KM capabilities (i.e., knowledge utilization and knowledge acquisition). Moreover, the model explains that CSRs' KM capabilities affect service performance.

Figure 2: Research Model and Hypotheses



4. Hypotheses

4.1 Customer Knowledge Level

Customer knowledge level namely, the degree of accumulated customer knowledge in KMSs would increase CSRs' KM capabilities: knowledge utilization and acquisition. As we discussed earlier, OM is closely related to the organization's knowledge processing capability since OM provides not only stored organizational knowledge but also the way of organizing and retrieving the knowledge (Walsh & Ungson 1991). As organizations have a great deal of organizational knowledge and experiences in KMSs, their employees can have more opportunities to apply them for their work and create new knowledge and experiences (Moorman & Miner 1998). Researchers have contended that absorptive capacity referring to the organization's ability to acquire, assimilate, transform and utilize knowledge depends on prior knowledge and experience (Cohen & Levinthal 1990; Zahra & George 2002). Thus, CSRs' KM capabilities are influenced by accumulated organizational knowledge.

Customer knowledge level can also facilitate CSRs' knowledge acquisition by offering directions and routines, thus guiding employees to input the knowledge into KMSs (Grant 1996). Voluntary customer contact creates the golden time to keep up with the latest customer knowledge by comparing the existing knowledge with new knowledge offered by the customer. During the customer contact, CSRs attempt to detect obsolete customer knowledge and update the knowledge into KMSs. One of roles of OM is to provide the employees with certain structure that is needed to categorize and store captured new knowledge (Moorman & Miner 1998). Based on the categories of existing knowledge, CSRs should detect updated knowledge during customer service interactions over the phone within a very limited time according to job manuals, as specified by the call center. Under the situation, existing knowledge serves as a baseline for acquiring new knowledge. On the other hand, the negative effect of OM on acquisition has been also reported. Chou (2005) argued that knowledge repositories have both positive and negative effects on knowledge acquisition and knowledge

translation. That is, knowledge repositories offer practicable standards and procedures which enable employees to understand how to utilize knowledge stored in repositories for work, but they simultaneously restrict the acquisition of new knowledge. For example, although employees discover new knowledge during the customer contact, if there is no category in KMSs to input the knowledge into, organizations would lose an important chance to acquire new knowledge. However, Hult, Ketchen and Slater (2004) found that firms with high levels of OM are more likely to seek newer knowledge than those with low levels. Based on the above discussion, we propose that customer knowledge level positively influences CSRs' knowledge acquisition.

***H1a:** Customer knowledge level will be positively associated with CSRs' knowledge utilization.*

***H1b:** Customer knowledge level will be positively associated with CSRs' knowledge acquisition.*

4.2 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. In call centers, the integration of customer knowledge helps 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 performance and customer relationship management (CRM) activities, including customer needs, preferences, purchase motives, repurchase intentions and others (Lopez-Nicolas and Molina-Castillo 2008). Thus, integrated customer knowledge would be related to CSRs' KM capabilities.

Prior studies of KM have also emphasized the importance of knowledge integration. Grant (1996) argued that organizational capability stems from the integration of knowledge, rather than the knowledge itself. Rai, Patnayakuni and Seth (2006) showed that knowledge integration in inter-organizational relationships leads to superior firm performance. Padmanabhan, Zheng and Kimbrough (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 detect omitted knowledge. Thus, this study proposes the following hypotheses:

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H2a: Customer knowledge integration will be positively associated with CSRs' knowledge utilization.

H2b: Customer knowledge integration will be positively associated with CSRs' knowledge acquisition.

4.3 Accessibility of Customer Knowledge

Accumulated customer knowledge in KMSs should be easily retrieved for use at the right time (Moorman & Miner 1997). Firms continue to expand an amount of customer knowledge in KMSs to provide CSRs with complete knowledge for accurate and professional customer service. For instance, The KMS of insurance call centers has more than 500 categories to organize a vast range of knowledge. Under the circumstance, it is essential that CSRs instantly extract accurate knowledge needed to solve customer service requirements in KMSs in a very limited time. Thus, accessibility is more important than knowledge *per se* in determining the value of knowledge. By enabling employees to have greater accessibility, firms can enhance their capabilities (Croasdell 2001; Pavlou & El Sawy 2010). Likewise, if a CSR fails to access the right knowledge during interaction with customers, it would lead to poor service delivery.

Accessibility to knowledge sources is a key determinant of knowledge utilization (Croasdell 2001; O'Reilly 1982). Croasdell (2001) asserted that accessibility is an important predictor for the effective use of knowledge stored in OM. Akin to accessibility, ease of use has also been emphasized in the studies of knowledge utilization (Bock, Mahmood & Sharma 2010). This is because ease of use enhances the ability of an employee to create and store knowledge as well as to retrieve and reuse knowledge (Bock, Mahmood & Sharma 2010). Similarly, IS researchers have emphasized system quality as well as information quality. Thus, KMSs that are easily designed enable employees to use the right knowledge at the right time (Croasdell 2001; Pavlou & El Sawy 2010).

Besides, KMSs as knowledge containers can provide not only stored knowledge, but also knowledge structures to save new knowledge (Walsh & Ungson 1991). That is, accessibility enhances CSRs' knowledge acquisition by allowing them to retrieve existing knowledge easily and to increase their understanding of the structure and contents of KMSs. When CSRs have greater accessibility to knowledge in KMSs, they can have more opportunities to use and store customer knowledge during customer contact. Thus, this study assumes that accessibility enhances CSRs' KM capabilities.

H3a: Accessibility of customer knowledge will be positively associated with CSRs' knowledge utilization.

H3b: Accessibility of customer knowledge will be positively associated with CSRs' knowledge acquisition.

4.4 KM Capabilities and Service Performance

Researchers have verified various positive outcomes of KM capabilities in the organization. Greater knowledge processing capability leads to positive outcomes (Hult, Ketchen & Slater 2004). Research of organizational learning provides the evidence that the organization's information processing capability enhances firm performance (Tippins & Sohi 2003).

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Particularly, knowledge utilization has received much attention in that it is different from the dimensions of knowledge creation and knowledge sharing of KM (Alavi & Tiwana 2002). Even though organizations have good knowledge in KMSs, they could not attain differential benefits if their employees do not utilize the knowledge for their work (Moorman & Miner 1997; van Wijk, Jansen & Lyles 2008; Watson & Hewett 2006). Pfeffer and Sutton (2000) pointed out that organizations do not utilize shared knowledge always effectively. To improve firm performance, utilizing knowledge accumulated in knowledge repositories is more important than simply accumulating knowledge in the repositories (Cross & Baird 2000). In this regard, the issue of knowledge reuse has been received considerable attention.

It is noteworthy that knowledge creation and sharing are not always linked to firm performance (Alavi & Leidner 2001; Alavi & Tiwana 2002; Pfeffer & Sutton 2000). Knowledge sharing and transference in organizations are not on their own enough to solve problems and produce products and services (Choi, Lee & Yoo 2010; Pfeffer & Sutton 2000). Cohen and Levinthal (1990) and Zahra and George (2002) emphasized that organizations need the process of knowledge exploitation to achieve their business goals. Roman and Iacobucci (2010) 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, Lee & Yoo 2010). In this sense, this study hypothesizes that CSRs' knowledge utilization will positively influence their service performance.

Moreover, this study postulates that during the customer contact, CSRs' knowledge acquisition is positively related to their service performance. Hult, Ketchen and Slater (2004) argued that greater knowledge acquisition activities lead to greater firm performance in the context of supply chains but the argument was found to be insignificant. From the perspective of call centers, customers' voluntary contact offers good opportunities for acquiring new knowledge. Accordingly, acquiring knowledge during the customer contact becomes a central part of CSRs' work. CSRs attempt to obtain useful information and comments about their services by asking customers about the service quality they delivered as well as any complaints that customers may have with the service or amendments that they would wish to make. CSRs can also obtain information on customers' preferences towards a firm's new products by providing them with a description of new products and services. During the 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, this study establishes the following hypotheses:

H4a: CSRs' knowledge utilization will be positively associated with service performance.

H4b: CSRs' knowledge acquisition will be positively associated with service performance.

5. Methods

5.1 Sample and Non-Response Bias

To empirically test the proposed research model and hypotheses, this study conducted a survey on CSRs working for call centers using a self-reported questionnaire method. A total of 500 questionnaires were distributed to five call centers in health/life insurance that provided CSRs with KMSs. We requested call center managers, who are in the graduate course of call

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center, to encourage their CSRs' survey participation. The survey was conducted during March 2012. 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. Non-response bias was tested by verifying that there is no difference between early respondents and late respondents in terms of all the variables. The results of t-tests between the means of the two groups demonstrated no significant difference at the 0.05 level, suggesting that non-response bias is not a problem in this study.

Demographics are summarized in Table 1. 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 (Choi, Cheong & Feinberg 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, high school graduation represented the largest group at 44.1 percent, indicating that the education level of CSRs is relatively low. Concerning the number of calls handled per day, 40.6% of respondents handle 70 calls to less than 100 calls. The average number of calls that CSRs handle per day was 77 calls (S.D. = 29).

Table 1: Demographics

Category		Frequency	Percentage
Gender	Male	4	1.5
	Female	257	98.5
Age	Twenties	19	7.3
	Thirties	156	59.8
	Forties	83	31.8
	Over Fifties	3	1.1
	Education	High school	115
	Junior college	68	26.1
	Undergraduate	14	5.4
	Four-year college	64	24.5
Number of calls handled per day	Fewer than 50 calls (< 50)	51	19.5
	50 calls to less than 70 calls (51-70)	74	28.4
	70 calls to less than 100 calls (71-100)	106	40.6
	More than 100 calls (> 100)	30	11.5

5.2 Measures

This study 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 2. Based on the studies of Hult, Ketchen and Slater (2004) and Moorman and Miner (1997), *customer knowledge level* is defined as the degree to which a CSR perceives that KMSs have a great deal of knowledge and experience needed for customer service, and is measured with four items. Besides, *customer knowledge integration* is defined as the degree to which a CSR perceives that KMSs offer unified customer knowledge across various customer contact channels, including a firm's website, email, fax, call center, in-store and so on. This dimension is particularly important in that a call center can keep the latest and consistent customer knowledge by eliminating overlapped knowledge and updating obsolete knowledge. This study

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developed three items to measure this dimension in the context of call center. *Accessibility of customer knowledge* is defined as the degree to which a CSR can easily search for and retrieve the knowledge they need from KMSs at the right time (1997) and is measured with four items: two of them were drawn from O'Reilly (1982) and the other two were additionally developed in this study.

Customer knowledge utilization is defined as the degree to which a CSR exploits the customer knowledge in KMSs for conducting customer service work and is measured with three items drawn from Choi, Lee and Yoo (2010). *Customer knowledge acquisition* is defined as the degree to which a CSR grasps new or updated knowledge and inputs the knowledge into KMSs and is measured with four items: three of them were drawn from Tippins and Sohi (2003) and one is additionally developed in this study. *Service performance* is measured with a CSR's self-rating (Setia, Venkatesh & Joglekar 2013), using three items drawn from Choi and Ryu (2015) and Setia, Venkatesh and Joglekar (2013).

6. Results

6.1 Measurement Model Assessment 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 2. Following 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 & Larcker 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. Finally, as shown in Table 2, the square root of the AVE was found to be greater than the coefficient (Fornell & Larcker 1981), which demonstrated discriminant validity between the constructs. We also tested the possibility of multicollinearity by using the variance inflation factor (VIF) which is a widely used method due to strong correlation between accessibility of customer knowledge and knowledge utilization (value = 0.70) as shown in Table 2. The results supports that multicollinearity is not an issue in this study, indicating that the VIF of all constructs were below a threshold value of 10.

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. The result showed that the single factor model did not have a good fit ($\chi^2 = 2975.44$, $df = 189$, p -value = 0.000, GFI = 0.48, CFI = 0.79, and RMSEA = 0.238), thus providing evidence that CMV is not an issue.

Table 2: Measurement Model

Constructs	Items	Factor Loadings	Construct Reliability	AVE	VIF
Customer Knowledge Level	1. KMSs have lots of customer knowledge useful for customer service.	0.92	0.935	0.783	2.031
	2. KMSs have customer knowledge related to prior customer service offered.	0.93			
	3. KMSs have systematic customer knowledge useful for customer service.	0.91			
	4. KMSs have a variety of customer knowledge related to a customer.	0.77			
Customer Knowledge Integration	1. Customer knowledge used for customer service is integrally managed.*	0.85	0.836	0.631	1.383
	2. Customer knowledge created from call center, websites, emails, and in-store, is integrally managed.*	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 KMSs.*	0.87	0.957	0.847	1.940
	2. I easily find necessary knowledge stored in KMSs.	0.93			
	3. I can get necessary knowledge from KMSs.	0.96			
	4. The structure and contents in KMSs are designed to be understood easily.*	0.92			
Customer Knowledge Acquisition	1. I identify the knowledge to be changed during contact with a customer.*	0.73	0.801	0.502	1.771
	2. I ask a customer about complaints and amendment relating to customer service.	0.73			
	3. I try to obtain knowledge from a customer.	0.66			
	4. I try to collect opinions from a customer.	0.71			
Customer Knowledge Utilization	1. I use customer knowledge stored in KMSs to serve a customer.	0.91	0.966	0.904	2.520
	2. I use customer knowledge stored in KMSs to solve a customer's problems.	0.98			
	3. I use customer knowledge stored in KMSs to respond to a customer's service requests.	0.97			
Service Performance	1. I solve customers' problems during the first contact.	0.78	0.904	0.759	NA
	2. I solve customers' problems speedily when these problems occur.	0.90			
	3. I instantly respond to customers' service requests.	0.92			

Note. * New items are developed in this study. NA: Not applicable.

All items were significant at the 0.01 level. Fit index: Chi Square = 179.07, $df = 174$, p -value = 0.38, GFI = 0.94, RMR = 0.050, RMSEA = 0.011, $\chi^2/df = 1.03$, AGFI = 0.92, NFI = 0.98, and CFI = 1.00.

Table 3: Correlation Matrix

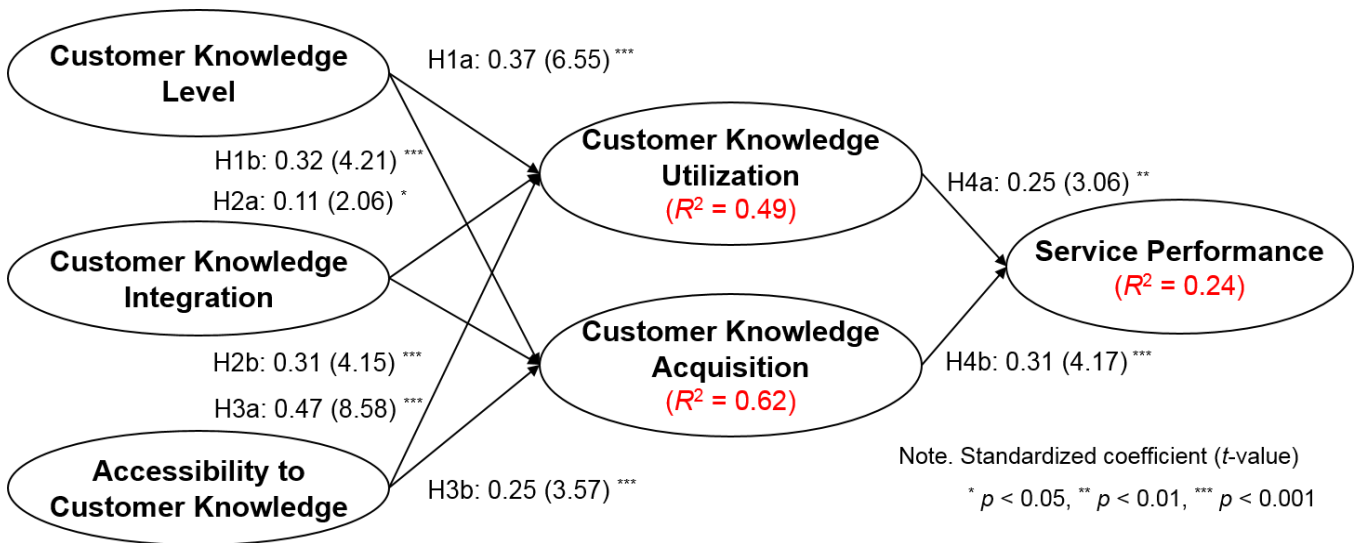
Variables	Mean	SD	A	B	C	D	E	F
A Customer Knowledge Level	4.86	1.24	0.885					
B Customer Knowledge Integration	4.84	1.17	0.48	0.794				
C Accessibility of Customer Knowledge	4.67	1.21	0.51	0.36	0.921			
D Knowledge Acquisition	5.03	1.02	0.59	0.54	0.53	0.708		
E Knowledge Utilization	5.15	1.20	0.66	0.45	0.70	0.51	0.951	
F Service Performance	5.94	0.90	0.43	0.33	0.30	0.40	0.44	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.

6.2 Research Model Assessment and Hypothesis Testing

Structural equation modeling was employed to validate the research model and the hypotheses. To estimate the parameters of the model, this study used the maximum likelihood method and a covariance matrix. The results are presented in Figure 3, indicating the good fit of our research model as follows: chi-square = 185.88, $df = 178$, p -value = 0.327, $\chi^2/df = 1.04$, RMR = 0.055, RMSEA = 0.013, GFI = 0.94, AGFI = 0.92, NFI = 0.98, 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 3 provides the values of the standardized path coefficients and their significance and the results of testing hypotheses (H1a-H4b). As we expected, all the hypotheses were found to be significant. Customer knowledge utilization was considerably affected by accessibility of customer knowledge while customer knowledge acquisition was considerably affected by customer knowledge level and customer knowledge integration.

Figure 3: Results of Structure Model Assessment and Hypothesis Testing



7. Conclusions

7.1 Discussion and Implications

Although most firms have accumulated OM related to customer knowledge over time at the organizational level by using KMSs, there is a lack of understanding about how they can create their own idiosyncratic capabilities and superior performance based on OM in KMSs. Building OM in KMSs is a different matter from using OM for a firm's business purposes. From the latter perspective, this study attempts to demonstrate how firms can apply OM for achieving their business goals in the context of call centers. The results support the argument that customer knowledge in KMSs is positively associated with CSRs' KM capabilities, which in turn leads to increased service performance. The details of the results are presented as below.

First of all, customer knowledge level enhances CSRs' KM capabilities namely, knowledge utilization and knowledge acquisition. In call centers, CSRs not only utilize prior customer

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knowledge in KMSs to deal with customer service requests, but may also have the opportunity to grasp new knowledge during the contact with customers. The findings suggest that customer knowledge level promotes CSRs' knowledge utilization during the customer contact. In a service encounter, CSRs take responsibility for solving customers' various complaints and service requests so that they are required to have much professional knowledge and abilities, beyond simple basic service abilities, such as kindness and politeness. However, it is difficult for CSRs to learn a vast range of knowledge needed for customer service work. The current study suggests that accumulated customer knowledge in KMSs is a key means of supporting CSRs by providing necessary knowledge for customer service in a timely manner. For example, when a customer requests information on suitable insurance goods suitable for himself or herself during the contact with a CSR, the CSR is able to present the proper solution using the prior customer knowledge in KMSs. Likewise, call center managers enhance CSRs' knowledge utilization by providing customer knowledge via KMSs.

Moreover, the findings indicate that the interaction between CSRs and customers creates a golden opportunity to obtain the latest customer knowledge as well as to assure the accuracy of existing customer knowledge. The results show that customer knowledge level in KMSs promote CSRs' knowledge acquisition by allowing them to capture new knowledge during the customer contact based on extant customer knowledge that a firm possess. That is, the finding implies that customer knowledge level in KMSs functions a baseline for CSRs to acquire new knowledge according to certain knowledge categories and structure. The results provide an important practical implication to call center managers by verifying that CSRs' knowledge utilization and acquisition are enhanced through well-established KMSs.

Second, customer knowledge integration in KMSs increases CSRs' knowledge utilization and acquisition. As customer contact channels are diverse such as websites, emails, phone calls, and in-stores, it is essential for a firm to manage customer knowledge integrally created across these channels. Integrated knowledge enables CSRs to convey accurate customer service, to have more opportunities for customer knowledge to be applied, and to detect the obsolete knowledge. Managing customer knowledge integrally is a way of keeping customer knowledge up-to-date. The findings offer a practical implication to call centers, verifying that integrated customer knowledge across customer contact channels ensure its effective use and update. Despite the importance of managing a vast amount of customer information created from various sources, there is a lack of empirical research on customer knowledge integration. This study provides impetus for further discussion on customer knowledge integration across various customer contact channels where customer knowledge is produced.

Third, the accessibility of customer knowledge in KMSs increases CSRs' knowledge utilization and acquisition. The findings strongly support the argument that CSRs would fail to utilize customer knowledge if they cannot easily access it when necessary despite the fact that organizations have a great stock of knowledge in KMSs. Thus, it is noteworthy that greater accessibility of customer knowledge ensures the utilization of stored knowledge. 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 KMSs. The results confirm another effect of accessibility by showing that accessibility contributes to increased 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 that emphasizes quick responses to customers' requests over the phone within a short period

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of time. Overall, the results provide an academic contribution by considering and testing the various aspects of customer knowledge in KMSs simultaneously. Besides, the results support the assertion that organizational knowledge plays a key role in developing a firm's business capabilities.

Finally, with regard to the relationship of CSRs' KM capabilities and performance, the results show that CSRs' service performance is affected by their knowledge utilization and acquisition. Particularly, the findings show that service performance is considerably increased by knowledge utilization. Therefore, it should be noted that service organizations can create superior customer service by increasing CSRs' ability to use organizational knowledge. Service researchers have emphasized service quality *per se* delivered by CSRs rather than the way of helping them during the customer contact. Accordingly, there have been no studies detailing how to support CSRs' service work, which is considered as a key predictor of service quality (Brady & Cronin 2001). The current study offers an insight into the issue of how call centers can enhance CSRs' service performance by combining studies of KM with those of customer service. That is, the findings support that customer knowledge in KMSs serve as a knowledge base for enhancing CSRs' KM capabilities and thereby increasing service performance.

Meanwhile, customer knowledge acquisition is also positively associated with service performance. As a core part of call center work, CSRs request some key information to customers so as to confirm their identity, which is a good chance for key knowledge to be updated. Despite good reasons to do so, customers may well be unwilling to continue providing their recent information to a firm. However, knowledge acquisition during the customer contact is one of the criteria that evaluates CSRs' work performance. Therefore, CSRs could recognize that they increase their performance by identifying and updating outdated customer knowledge in KMSs. The results imply that firms can obtain new knowledge effectively during the customer contact.

7.2 Limitations and Future Research

There are several limitations to this study. First, although there is theoretical support as to the measure of service performance by using the self-reported ratings of service employees (Setia, Venkatesh & Joglekar 2013), it would be still better to use supervisors' real evaluation. To make up for the weakness, we used anonymous questionnaires and also tested the CMV. Second, this study attempts to measure 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 KMSs 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).

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