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# Customer Service Information System for a Call Center

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**Abstract**

As one of the customer relationship management tools, a call center acts as an interface between the customers and the company. The aim of this case study is to design a web based customer service information system to improve service quality and efficiency in a call center. The results are based on a single case studying a certain manufacturer of ceramic sanitary wares and plumbing hardware company in one of the countries it operates. Considering there were several significant issues which directly affect the level of customer satisfaction. The objectives of the system are to manage the technician schedule to do a visit based on the customer preference, to facilitate better escalation of unclosed processed problems after certain duration of time and to generate various types of reports for the use of the management. Furthermore the ability to enable the system to be used by new call center planned to be opened in different location was added. The proposed solution also facilitated mobile usage for more significant process improvements.


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*Keywords:*call center; web; customer relationship management; customer service

## 1. Introduction

Customer Relationship Management (CRM) is abusiness strategy focused on improvement of customer satisfaction and building customer loyalty. Both of the objectives can be achieved by better understanding of customer characteristics and purchase patterns, by adjustment of the offer to customer needs and by efficient service and providing reliable and exhaustive information directly to customer[1].

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A call center is a centralized office meant for the purpose of receiving and transmitting a large volume of information by telephone. Call centers are required for large companies to sell or promote their goods and services as well as for the after sales services and customer queries[2]. A call center is also one of the CRM tools available for companies[3].

Due to the extended ranges of services and channels for customer and organization beyond telephone, the interactions have increased complexity for call center management. These make call centers can be defined as a department in an organization that interacts with customers or prospective customers through any one or multiple communication channels. Call center is confronted with many challenges, including wide range and complex customer enquiries[4].

In this case study the aim of the call center was to improve the customer satisfaction using a new customer service information system since the old information system was considered unable to achieve this. This aim would be achieved through the several key features such as the ability to manage the technician schedule to do a visit based on the customer preference, facilitate better escalation of unclosed processed problems after certain duration of time and to generate various types of reports for the use of the management. Furthermore the ability to enable the system to be used by new call center planned to be opened in different location was added. The proposed solution also facilitated mobile usage for more significant process improvements.

## 2. Materials and Methods

Call center or front offices acts as an interface between the customer and a company where they can call and report problems or ask for information regarding products or services offered. While the back office function is to support the call center staff by solving customer issues which they cannot handle.

For the manufacturer of ceramic sanitary wares and plumbing hardware company focused upon in this paper, several issues were discovered in its call center. The existing system was unable to facilitate a seamless workflow between the call center agents and the back office; the call center agent had to pass the details manually to the relevant back offices, in the form of batches of hardcopy documents. This involves a lot of paperwork and it was time consuming.

The call center agent was also unable to manage the technician schedule to do a visit based on the customer preference. Not to mention at the moment technician visit was the most asked service by the customers with around 40 technician visits requests coming in every day. Letting the technician came up with their own visiting schedule required them to make another call to the customer to make the appointment and allows the technician placed their best interest rather than the customer preference. Since all of this caused the whole process ran slow, the customer had to wait longer to be served. It was hard to fulfill the promised 2 day visit service level agreement. Even more when new spare part order was involved along the way. There was no structured way to track and escalate the process and move it forward to completion.

All of these issues are main concern for the management and there was a need of a system which can relieve those issues. The company also looking to open new call center in different location and hope that the new system can facilitate that. In addition, the ability to use the system mobile was recognized to for more significant process improvements.

The proposed solution of web based customer service information system was then designed based on those needs and simultaneously improve its service quality and efficiency. The web based customer service information system then was built with prototype model approach. This allows a rapid development and testing of working models. During the design phase an interactive, iterative process is used. This also makes the development faster and easier, especially when end user requirements are hard to define and has enlarged the role of business stakeholders[5].

## 3. Results

The proposed web based customer service information system required every user to logon to the system based on their role. These roles would determine the set of menu the user could then access (Fig.1). The roles were call center agents, head of the call center, and technician.

After logon, a dashboard as an easy and powerful way to get the instant overview about the call center operational activities. This includes number of calls, number of work assignment letter for technician visit (SPK), pie chart of the type of interaction, and pie chart of incoming calls based on sector located as seen in Fig.2.

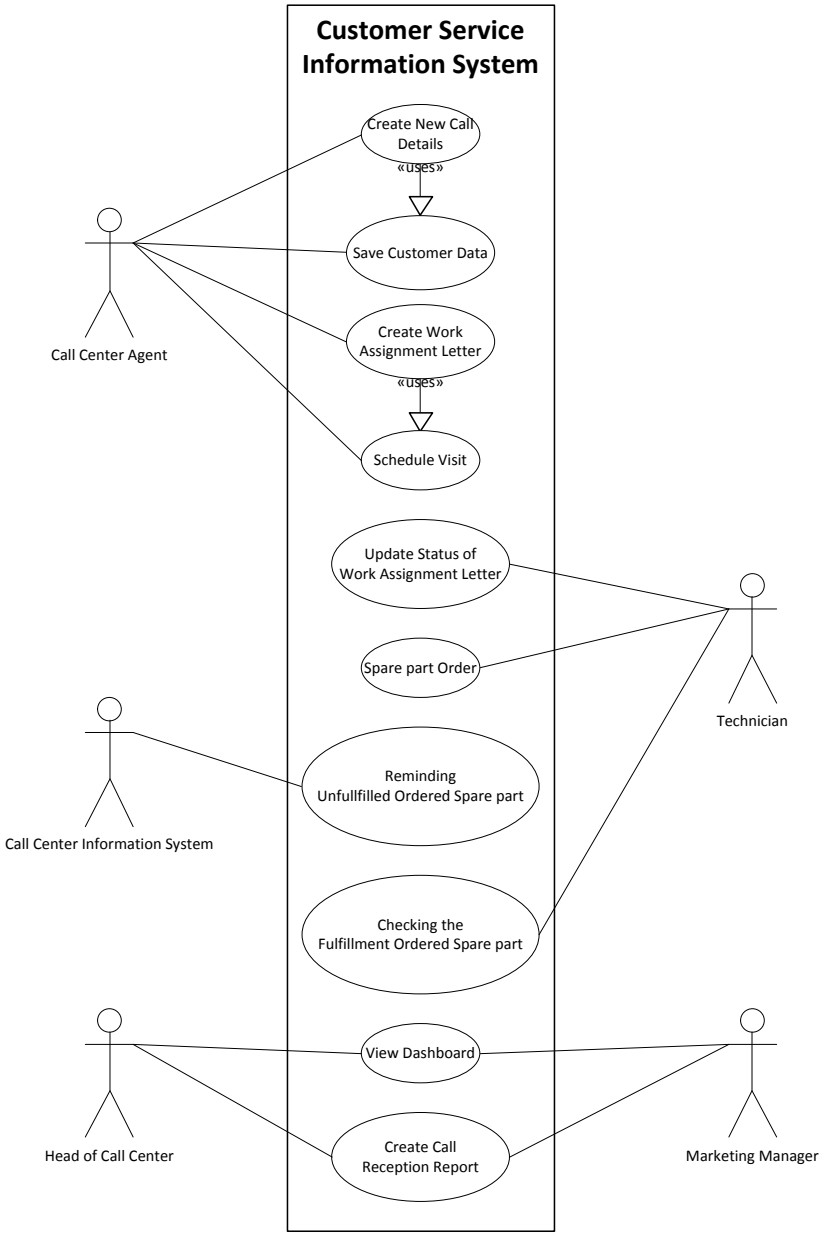


Fig. 1. Use Case Diagram for Customer Service Information System

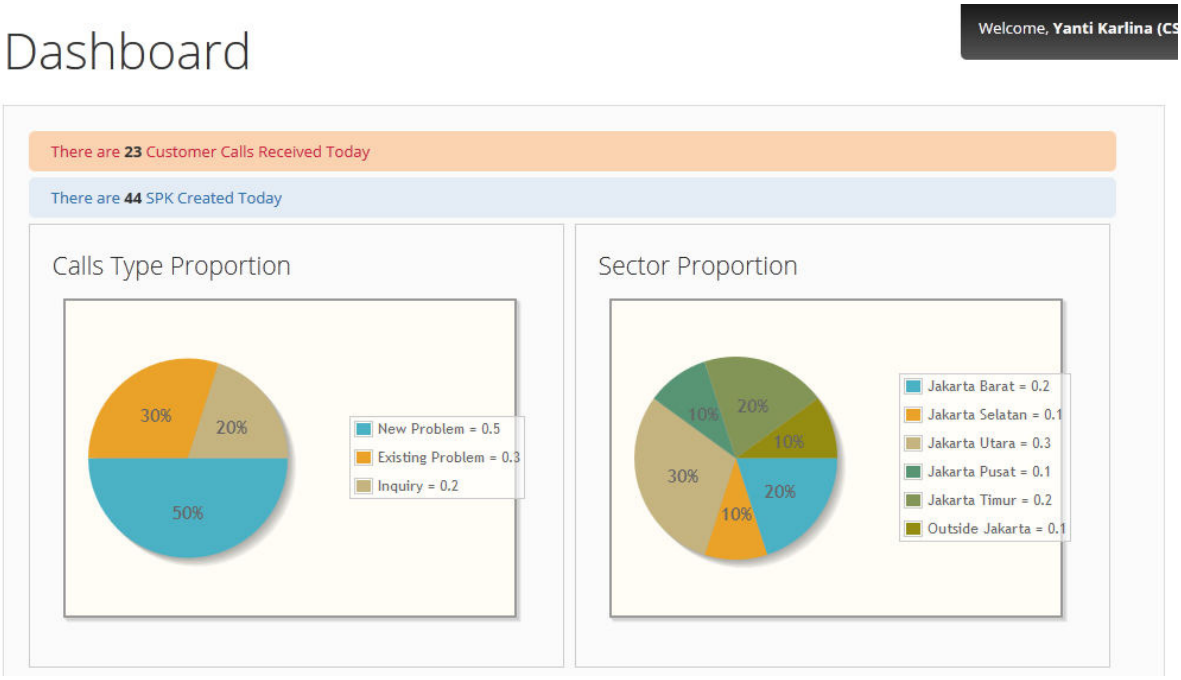


Fig. 2. The Web Based Customer Service Information System Dashboard

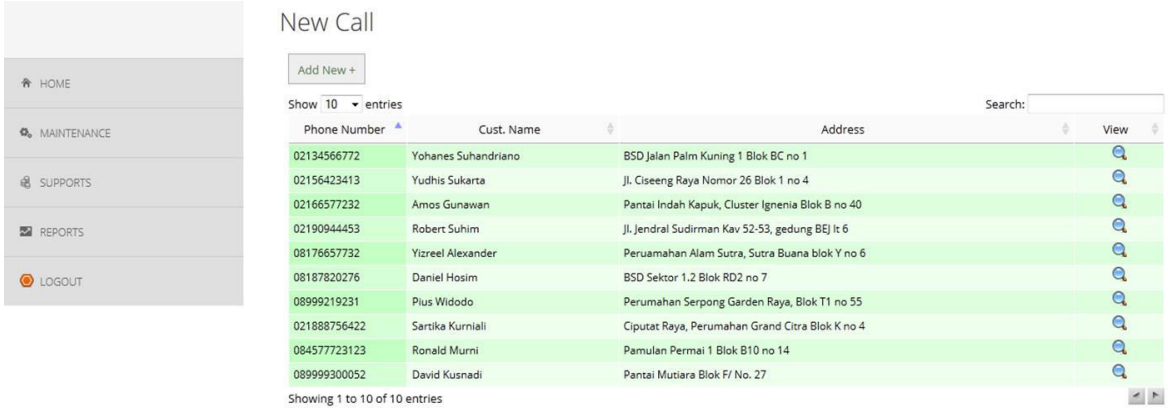


Fig. 3. Agents Creates New Call Details from Customers

Every incoming call could then be entered in the system in details. Existing customers could be identified so there would be no need to save their data inside the system again. On the other hand new customers needed to inform their basic identity information to the agent so they could save it to the database as shown in Fig.3.When the call involved a technician visit, the agent could now create the work assignment letter inside the system and schedule the visit based on the customer preference and schedule availability. This is shown in Fig. 4.

Fig. 5 showed after visiting the customer the technician could update status of the work assignment letter. A finish status concluded the whole process while sometimes another visit is needed. Any new spare part order need was then forwarded to the related back office by the agents. The system also reminded the agent in charge to track and escalate the process if after two weeks passed the spare part still unavailable for another technician visits.

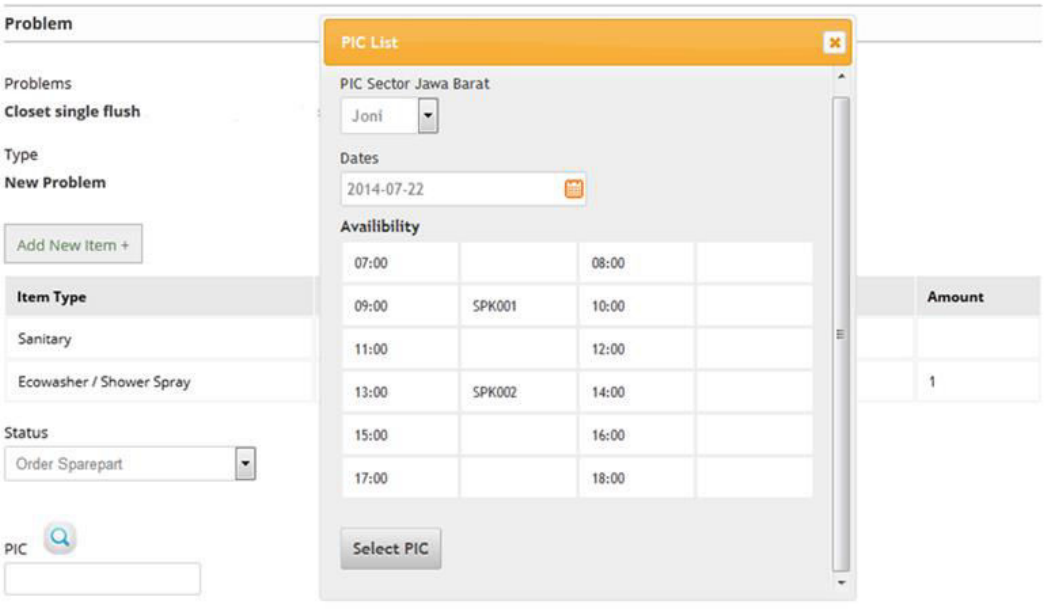


Fig. 4. Agent Schedules Technician Visit based on the Customer Preference

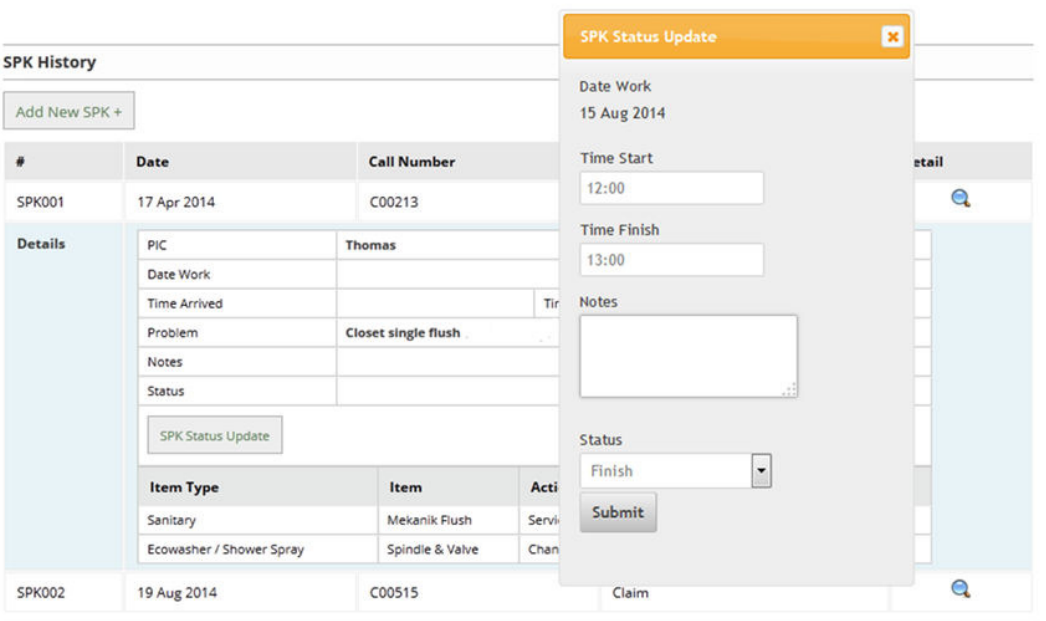


Fig. 5. Technician Updates Progress and Result from the Visit

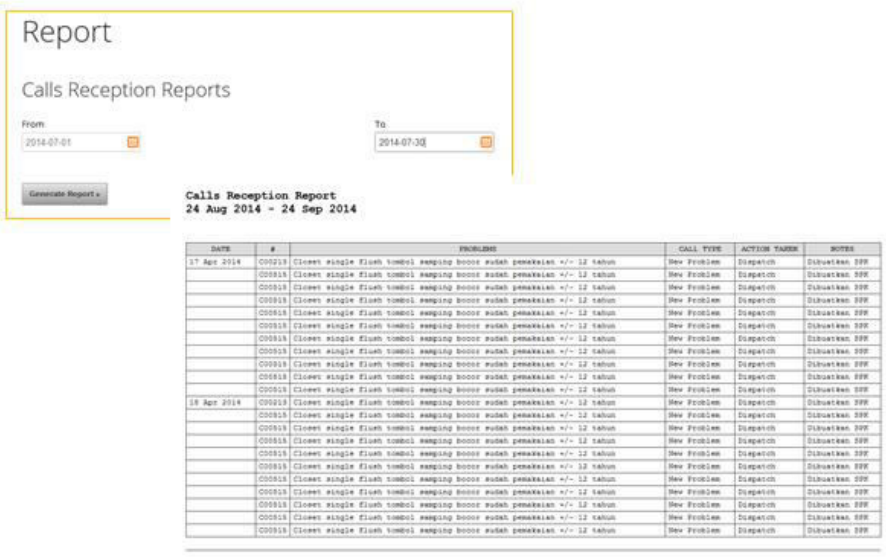


Fig. 6. Monitor and Review the Customer Service Activities

Several reports for the use of the management such as analyzing often broken products, distribution demography of the customers were added. These reports could be generated based by a certain variables set by the users. One of the reports is shown in Fig. 6.

## 4. Discussion

The web based customer service information system designed addressed issues that were discovered as shown in the figures respectively above. However the limitation of the prototype is that it was designed based on a case in a certain company. The system also was still unable to automatically recognize call from previous saved customer due to technical barrier not yet explored with the Cisco telephone system it used.

Overall the new customer information system accommodated a lot of the things that the old system could not achieve to improve business process and the customer satisfaction. A detailed look on the new customer information system compared to the old one can be seen in table 1 below.

Table 1.The customer information system comparison.

| | Old | New |
|---|---|---|
| Platform | Desktop | Web-based |
| User login | No | Yes |
| User management | No | Yes |
| Unclosed problem escalation | No | Yes |
| Scheduling technician visit by the agent based on the customer preference | No | Yes |
| Easy and visualized report monitoring | No | Yes |
| Ability to be used simultaneously in different locations and mobile development | No | Yes |

Furthermore the information systems models to evaluate complex systems as call centers are considered important (6). Two models are mainly adopted that can be used to measure the performance of success and failures

of information systems namely: the Delone and Mclean model first introduced in 1992[7] and the Design Reality Gap model introduced by Heeks in 2002[8].

Since the call center mainly take request by phone call and occasional internal email from corporate customer it was not fully harnessed the whole range of channel for customer interaction with a company. Not only from telephones, but extended to include channels such as email, fax, short message service (SMS), chat, and web forms[9]. Future research on integrating the customer interaction from all of those channels enables provides another opportunity for the company to improve customer satisfaction and building customer loyalty while optimizing the existing web and social media of the company. As multimedia contact volume grows, front-line agents must be prepared to handle transactions in whatever media choice the customer desire[10].

## 5. Conclusion

It was found that there were several issues with the usage of the existing system in the call center. Issues that unfortunately compromised the customer satisfaction because the company was unable to fulfill its service level agreement.

This paper also provides a design in the form of a prototype for the web based customer service information system to address these issues by adding new features to facilitate any changes and process improvement. Compared to the existing system which need to be installed and must be access through a computer, choosing a web based system also provides several advantages. These advantages includes the ability to enable the system to be used by new call center planned to be opened in different location and facilitated mobile usage of the system especially for the mobile technician who frequently visit the customers.

Furthermore, future research should evaluate the effectiveness and the efficiency of this customer service information system, whether it is can be reliable in handling wide range and complex customer enquiries or it is can reduce the stress level of staffs in serving customers. Further research could also elaborate the impact of information, system, and service quality to effectiveness of the customer service information system[11]. Knowledge management (KM) is also could be an enhancement for advance development of customer service information system. KM should be embedded with the system, so it can be used as knowledge warehouse related to cases, lesson learned, and best practices in serving customer, whereas it also can be utilize to reduce customer service staff training time and costs[4].

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