Analysis of Applying Knowledge Management in an Information Technology Call Center

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Abstract

The help desk or Call Center provides a single point of contact for customers with the purpose to help their customers to log all problem calls, resolve problems quickly or assign problems to appropriate support agents. This article describes the typical agent-centric call center and a knowledge management system-centric call center. The hypothesis is that the knowledge management system will improve the operational performance. A knowledge management system by gathering organization knowledge would allow each call agent to leverage the organization's knowledge and consequently improve overall service and performance of the call center. The methodology employed to assess the current operations entailed a workflow analysis, identification of actual KPI's (Key Performance Indicators), validity of service level agreements, and respective variance from set goals. Furthermore, a simulation model is proposed to reflect the current operations and the proposed KMS system for critical comparison.

Introduction

The help desk or call center in an organization represents a central contact point where the clients, whether internal customers or external customers, call to receive assistance in many kinds of problems that they encounter while using the organization's products or services. The call center agents attempt to resolve the problems in the shortest time possible in order to reduce the unproductive time faced by the caller. It has been recognized by many that the call center has a great impact on the productivity of the company when serving internal customers or on the value-added service provided to external customers.

Call centers rely heavily on the knowledge, skills, and ability of the call center agents to quickly resolve problems. Much of the knowledge applied is from experiential learning. In today's highly mobile work environments companies face the reality that employees will come and go and often their knowledge goes with them. Organizations have attempted to find ways of separating the knowledge from the employee in a form that can be stored. This knowledge could then be managed and transferred throughout the organization. By doing so, the company is attempting to convert something intangible that leaves the organization when an individual does

into an actual company property that can be inventoried and transferred at will. This is the concept of "knowledge management".

The Call Center is a prime candidate for utilize knowledge management since the purpose of the Call Center is to apply knowledge from domain experts in solving problems. We classify this type of KMS as a problem-solving KMS. The purpose is to capture the intellectual capital of the organization and deploy it in such a way in order to more efficiently solve recurring problems and to attack new problems.

In this article we first present a description of a typical call center. Second, we review knowledge management principles. Then a description of the proposed knowledge management system is provided. A summary of the proposed knowledge management system and expected benefits is provided.

Call Center Operations

When a call is answered by an operator of the Call Center, they check if the problem has been reported before in order to update it and inform the problem reporter about the status of the ticket or generate a new ticket, where the ticket is a mechanism for tracking problems. If the problem has never been reported the operator (1st level) attempts to solve it. If the problem was solve in the first level and there are no other problems the call is finished and the operator completes the ticket form and closes it. If the problem cannot be solve in the first level the operator appends additional information and assign a priority to the problem. The priority is assigned according the following criteria:

Critical Severity- System or a major system component is down or unavailable to a substantial portion of the user community, or the user can not conduct critical business operations that will result in a significant loss of revenue, profit or productivity.

High Severity – High Severity problems occurs when there is a partial or potential system or application outage.

Medium severity – A Medium severity problem is one that must be resolved but does not impact the service level commitments of the Information Technology organization. The problem does not severely impede the user's ability to conduct business and/or it can be circumvented.

Low Severity – A Low Severity problem is a low impact problem that does not require immediately resolution, as it does not directly affect the user's productivity or system or application availability.

Similar prioritization is implemented in most call centers. According to the priority, the problem is assigned to an agent who is responsible for resolving the problem. The agent resolves the problem by accessing many different information and knowledge sources as shown in Figure 1. We call this the *agent-centric* approach since the onus of finding and collecting the requisite information and knowledge to solve a problem is the responsibility of the agent.

Figure 1. Typical Call Center with Agent Centric Collection of Data, Information, and Knowledge
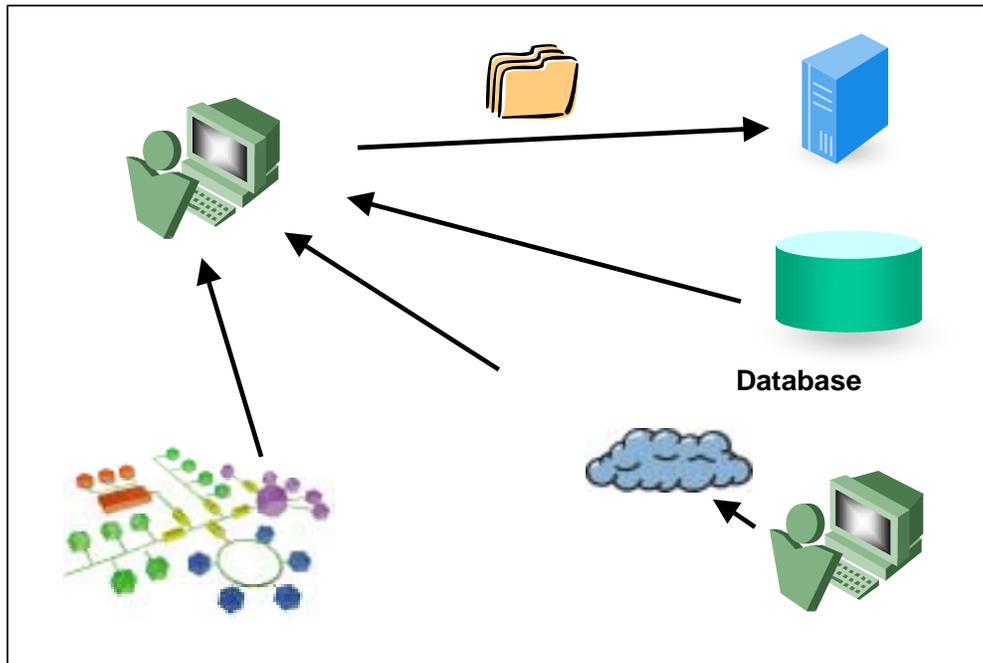
A short-coming of the agent-centric approach is that if one agent solves a problem the knowledge is resident in only that agent. If the problem recurs but is assigned to a different agent, the second agent must learn and solve the problem without the prior knowledge gained by the other agent. Consequently, each individual agent follows their own learning curve and does not benefit from the organizational knowledge gained. This scenario suggests a feature of the KMS would be in sharing organizational knowledge such that once a problem type is solved it becomes available to all agents via the KMS. Thus, the call center moves from agents on individual learning curves to an organization-wide learning curve that allows each individual agent to leverage the organizational knowledge.

Knowledge Management Systems

Data is facts devoid of meaning or context; information is data in context; and knowledge is information with direction or intent and is manifest in business rules. As the economy has transitioned from manufacturing to an information economy companies have increasingly seen the benefits of managing their organization's knowledge. Information technology is being used to build what is called knowledge management systems for handling the organizational knowledge. Knowledge management systems (KMS) are systems that gather, organize, and disseminate an organization's knowledge as opposed to information or data [Alavi and Leidner 1999]. Based on the definition several characteristics can be defined that would make a KMS successful. The KMS must be able to gather knowledge from humans and other sources. The knowledge must be organized so that it can be retrieved and applied.

There are two types of knowledge that have to be identified before the creation of the Knowledge base. Explicit knowledge is a scientific "rule", which may be justify from first principles because its origins and basis are known this type of knowledge is easily transferable. Conversely, tacit knowledge is a heuristic "rule of thumb", derived empirically and held by the organization's

employees or embedded in long-held practices. Tacit knowledge is thus more difficult to challenge, more difficult to transfer and more easily to loss (Beckett, et al., 2000). The best-known model for knowledge creation came from a conversion of these two types of knowledge (Yolles, 2000). In the call center much of the knowledge is tacit knowledge. Tacit knowledge posses challenges in trying to formally capture the knowledge into the KMS.

Part of the call center requirements is to utilize the tacit knowledge of experts; several KMS for finding experts have been developed. Hewlett-Packard (HP) has developed a KMS for finding experts within HP (http://www.carrozza.com/connex). The KMS consists of a central database of user knowledge profiles and utilizes a web interface so that users can search for experts with various knowledge in the organization. The system utilizes a taxonomy with three general classifications of general technical, general non-technical, and specific. The profiles are based on a self assessment, which many consider unreliable and subject to biases. A similar KMS was developed for the Florida State University System and is called SAGE [Becerra-Fernandez, 2000]. This system takes data from the sponsored research departments in each Florida University and migrates it into a database and thus attempts to avoid any inherent problems with self-assessment. This suggests a technique of organizing knowledge according to problems in a similar way SAGE organizes knowledge according to research grants. However, alone this classifications is insufficient. What is required is a knowledge taxonomy that classifies the knowledge based on the domain of interest. For a call center the taxonomy is based on a problem classification.

A Knowledge Management System for a Call Center

The *knowledge-management system centric* approach to a call center is shown in Figure 2. In this approach the KMS serves as an intermediary between the call center agent and all data, information, and knowledge sources. The strength of this approach is twofold; first by becoming the intermediary all knowledge passes through the system and thus should facilitate knowledge gather function. Second, it provides a single uniform interface for the call agent to access various knowledge sources.

Figure 2. Knowledge Management Centric Call Center Operations
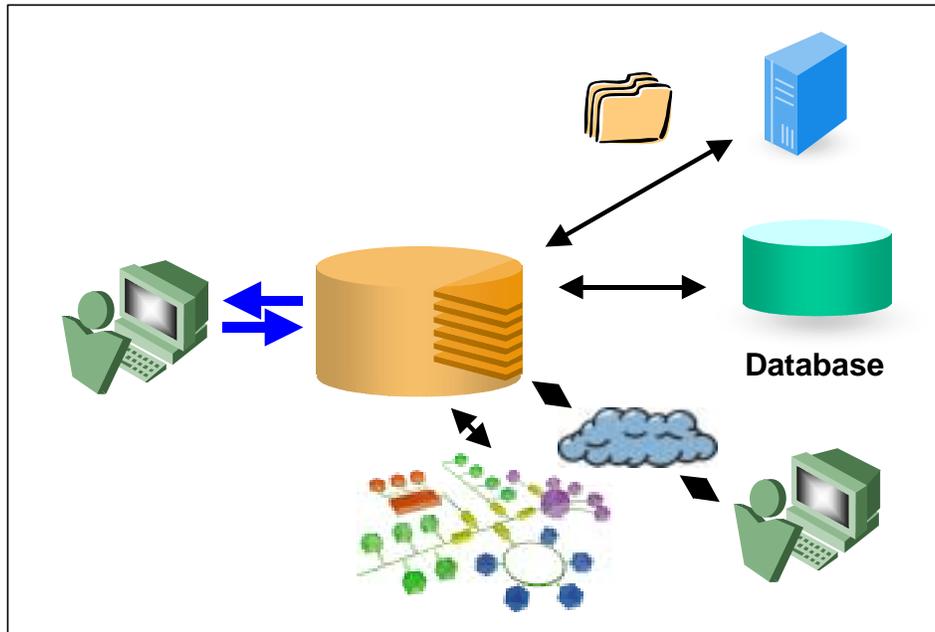
Gathering knowledge is often an obstacle, since busy knowledge-workers may overlook the capturing of knowledge into the system and thus the KMS would stagnate. By designing the KMS so that all knowledge passes through the KMS during problem resolutions we make the capturing of knowledge an intrinsic part of the system.

The KMS is built with the recognition that agents need to access a multitude of knowledge sources. Figure 3 shows how the KMS interacts with various knowledge sources. An important element of the KMS is organizing access to the knowledge such that it can be retrieved as needed. In this approach the knowledge itself is not organized since the knowledge sources are external to the system. Rather the interface for searching for the knowledge is organized.

Figure 3. Data flow diagram showing interaction of KMS with external environment
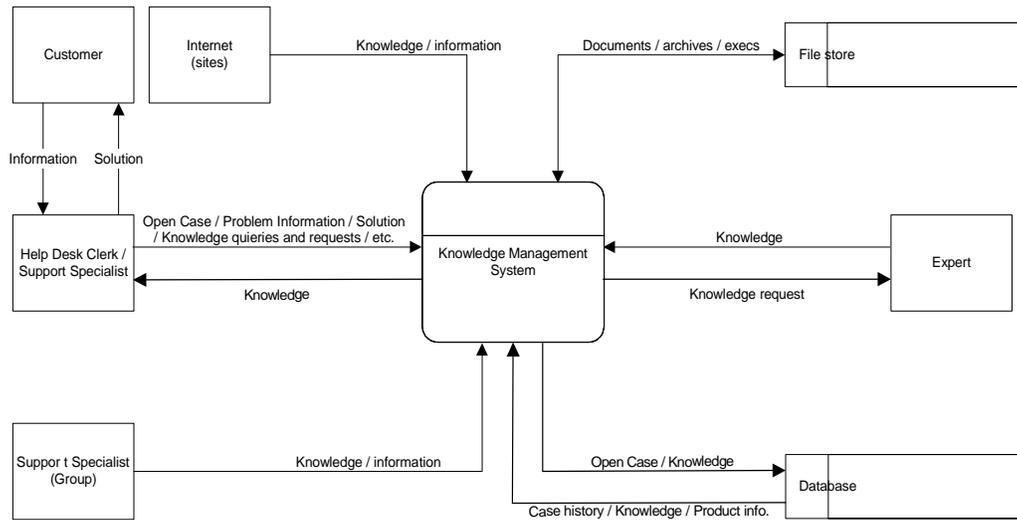
Implementation of the KMS changes the problem resolution process followed by the call center and the new process is shown in Figure 4. A short examination of the process flow shows several potential performance enhancers. First, it is possible that the help desk clerk, usually a lower skill job classification than a support agent, can with the aid of the KMS resolve the problem. Then both the time to resolve a problem will be improved and at a lower wage rate than if utilizing a support agent. The second potential performance improvement is that through the KMS the support agent can leverage the organization's knowledge and solve the problem faster than if working without the KMS.

Figure 4. KMS call center resolution process flow
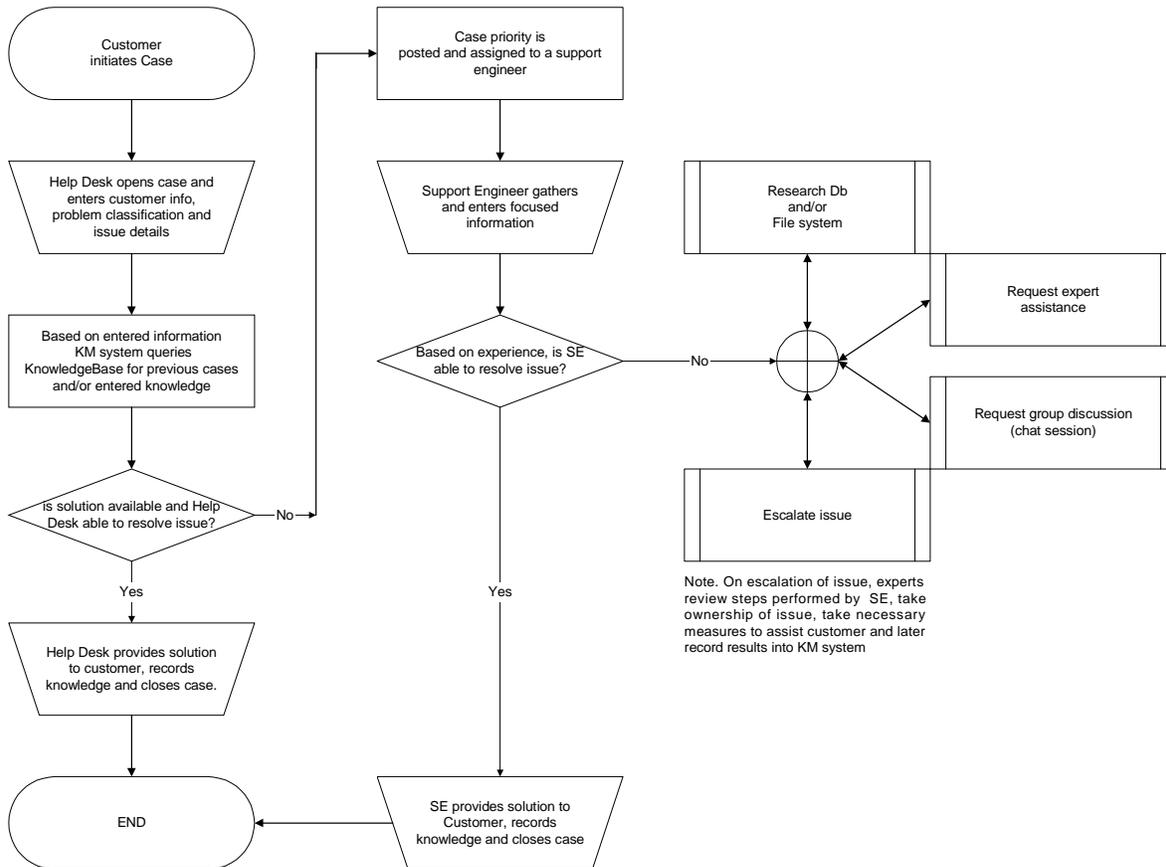
Ongoing Analysis

Our working hypothesis is that the call center performance can be improved by knowledge reuse and knowledge sharing implemented in a knowledge base system. To test the hypothesis a simulation model is being developed that describes the current agent-centric call center and the knowledge management system centric call center. Simulation enables call centers to perform analysis that captures all of the interrelationship between callers, agents, skills, and technology (Pegden, et al., 1995). The simulation model will help to analyze the benefits or advantages that can be obtained with the implementation of the Knowledge Management System. These benefits are measured in terms of the call center management objectives and service level agreements (SLA). SLA are contracts between the call center and the user community based on acceptable levels of service. A typical SLA specifies for a given service what the performance should be. For example, for High Severity Services, the SLA may specify that problem resolution begins within two hours of problem notification 95% of the time. The SLA provides clients with proper expectations for service performance and provides management with a tool for managing the call center's performance. Additionally, the economics feasibility of the KMS will be analyzed. An organization attempting to implement knowledge management need not only be concerned with the cost of classifying, prioritizing, filtering and storing knowledge but also with the cost of retrieving this knowledge when needed. All these "costs" combined, cannot be greater than the actual value of the information to the organization.

Conclusions

The Call Center has great impact on the performance of the company because its activities are focused on answering customer's questions and resolving problems. The success of a call center rests on the call center's ability to apply knowledge in addressing the problems. Knowledge management systems provide an approach and technology that can support organizational learning by collecting all problems and their solutions and then organizing this knowledge so that employees of the organization can retrieve it. The main benefit that Knowledge Management gives is that allow organizations to store, disseminate, exploit and re-use corporate information and experience, with the goal of synthesizing knowledge to improve business operations. In this paper we present a knowledge management system centric architecture for a call center that we believe will provide these benefits.

Acknowledgements

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