A Decision Support System for Sizing the Call Center of an Electrical Power Distributor

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ABSTRACT

Sizing the capacity of a call center is a well known problem. However, in some cases there are regulatory aspects that must be observed that, combined with specificities of the service provided and how it operates, affects the manner of the process for forecasting the inbound call rate and decisions on sizing capacity. This paper presents a real problem relating to several electric power distributors in Brazil regulated by ANEEL (the Brazilian regulatory agency for electric power companies). Amongst the available data, this kind of call center is affected by commercial actions, debt collection actions, billing activities, the health of the state of the distribution network and maintenance activities, which are not integrated and planned together. Considering the dynamics on the company cash flow these factors may change and adversely affect the demands on the call center. Thus in this article, a description is given of how experts’ knowledge has been integrated so as to improve the forecast of incoming calls and the decision process. For this purpose a model to evaluate the sizing of this type of call center is developed in order to comply with regulatory requirements for this service.

Keywords: Call Center Sizing, Electric Power Distribution System, Expert’s Knowledge, Queuing Systems

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1. INTRODUCTION

The call center sector usually accounts for a large portion of business investment. In Brazil, this type of service grew by 15.7% in 2010 (IDC, 2011), and investments in it reached R$ 9.040 billion. Among the costs incurred in the sector, 70% are incurred on the workforce, this being accounted for by the training, hiring and retention of staff (Koole, 2001). This percentage of costs highlights the importance of an efficient operation associated with the quality required to provide this service for the customer.

Depending on the organizational context, the operation of call centers can present complex processes in order to receive different demand profiles. This characteristic leads to management models based on analytical methods for sizing the service capacity of the organization.

This paper describes a real situation and a decision model built to support an electric power distribution company to manage its call center service with a DSS to enable the model to make calculations in a fast and friendly environment to support planning activities for the call center service of a Brazilian power distributor. This problem may differ from that faced by the same type of companies in other countries mainly with respect to the regulation aspects. However, the synergies of the electrical system and interferences with the call center service may be the same.

The contribution of this paper is to present a novel DSS, built to support an organizational decision process for planning the capacity of a call center service. Unlike other approaches to defining the capacity of a call center, this model considers expert’s knowledge in order to incorporate the relationship between amongst the electrical power supply systems and their effects on the inbound call rate. The expert knowledge is incorporated in terms of the parameters of the exponential distribution that represents the inbound call rate. Such knowledge is considered to update the foreseen inbound rate with actions performed by power distributor departments such as their maintenance division, commercial campaigns and others.

The use of a DSS allows the decision maker to perform the required calculations for sizing the call center and to evaluate the performance and risks regarding regulatory aspects. The DSS is essential so as to incorporate the procedure for eliciting expert knowledge in a friendly environment that integrates queuing theory modeling and factors inherent to the electrical distribution system that are interrelated with the inbound call rate.

2. LITERATURE REVIEW

2.1. Sizing Call Centers

In a variety of industries, centralized call centers are hailed as one of the most cost-effective means of responding to customers Meehan (1993). A call center is an important channel of communication and relationship between a supplier and its customers and plays an increasingly important part in today’s business world. Call centers employ millions of agents across the globe and serve as a primary customer-serving channel for firms in many different industries (Franzese et. al, 2009; Aksin et. al, 2007). Thus, correctly sizing the capacity of a call center represents not only optimizing improvements in customer service but also reducing operating costs.

However, while the number of alternatives of communication with the customer is growing, most of them based on automated attendant, due to advances in telecommunication and information technology, a substantial number of transactions are still done through service agents acting at the interface between customers and technology (Aksin & Harker, 1996). The problem is how to specify the capacity of a call center in a way that improves the quality of customer service, mainly by reducing waiting time, and that reduces the operating costs, mainly by reducing the idle time of agents. Moreover, regarding this subject, Kyper et al. (2012) argue that there are three basic value-added strategies call centers adopt: providing high-value added services with the associated higher costs of those services; minimizing...
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