UNDERSTANDING THE TRADE-OFFS IN A CALL CENTER

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ABSTRACT

Determining an adequate workforce size to achieve service level and abandonment rate targets is a complex and important decision for call center managers. Even more complex is to understand the trade-offs among the number of multiple-skill operators and the bi-criteria target; service level and abandonment. A discrete event simulation model was found to be suitable to determine an adequate level of cross-training and illustrate the trade-off effects of a large Chilean call center. From the results, valuable insights about the effects of sacrificing one of the targets can be determined as a way to reduce operational costs in a call center.

1   INTRODUCTION

In general, an important objective in a call center is to minimize the number of operators while achieving targets of service level and abandonment rate. This problem becomes complex since the main objective will compete with the call center targets. Thus, it is critical to understand the trade-offs among the number of cross-trained workers needed, service level and abandonment rate. Based on the relationship found, a future analysis could consider the secondary effects of giving up or relaxing one of the targets.

Most of the operational costs in a call center are due to salary expenses. According to Gans et al. (2003), employee salaries represent about 80% of the total costs in a call center. Therefore, determining an adequate workforce size is highly required to ensure financial success.

Literature offers a wide variety of conceptual and mathematical models to determine an adequate workforce size for call centers. However, simulation has been proved to be very suitable to properly address the challenges behind this problem. Mehrotra and Fama (2003) explain that due to the complexity of the call center operations, it is difficult for decision makers to understand the dynamic of the system without a simulation model. Various trade-offs must be considered in a call center under a competing objective scenario. Thus, understanding their relationship is needed. In this research, we use a discrete event simulation software to determine and understand the complex behavior of a Chilean call center.

2   METHODOLOGY

The operations of a large Chilean call center were used to illustrate the importance of understanding the trade-offs in call centers. Nowadays, the call center is composed by more than 10 platforms and about 600 single-skill agents. For illustrative purposes, just the four most relevant platforms were used.

A simulation model was built in Simio Simulation Software to represent the current operations of the call center. The validation and verification was conducted for the current single-skill configuration by comparing the results obtained versus real data and the Erlang-A model for call centers (4 CallCenters v2.23, Mandelbaum). The accuracy achieved was at least 95% for the four platforms under analysis.

Optquest for Simio was used to determine the number of workers required for each cross-training combination. Then, a Pareto frontier was built for the partial bi-skill configuration. The best results for

different configurations were saved for a range of abandonment rates while achieving service level. Finally, a simple financial evaluation was made to estimate the annual savings of using the bi-skill system when sacrificing the abandonment rate target.

3   RESULTS

Various scenarios were analyzed to determine the impact of different training levels on operational costs. It was found that a bi-skill configuration would need only 259 workers to satisfy the service level and abandonment targets (85% and 5% respectively). This option is more cost-effective than other cross-training configurations, including the current single-skill configuration. It represents yearly savings of approximately US$ 42K for salary and training costs.

In Figure 1, a relationship between the minimum number of operators required for different abandonment rates for an 85% of service level is shown. This type of analysis will also be useful to determine a set of non-dominated scenarios as a way to obtain the Pareto frontier. As stated previously, the maximum abandonment rate allowed in the call center is 5%. However, by relaxing this condition between acceptable bounds, the number of operators required can be decreased without sacrificing the service level.
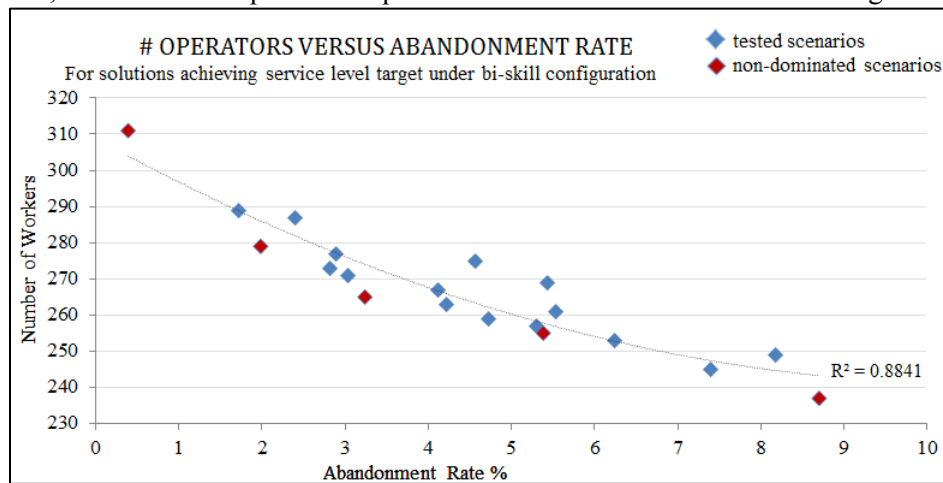

Figure 1: Number of Operators versus Abandonment Rate for an 85% of Service Level

From Figure 1, it can be seen that if the call center manager is willing to sacrifice abandonment and accept a rate of 8% instead of 5%, just 237 workers, including 33 bi-skilled operators would be needed to achieve the service level target. This alternative staff configuration represents operational savings of almost US$ 200K a year if compared with the current scenario.

4   CONCLUSIONS

Discrete event simulation represents a good alternative not only to determine an adequate number of workers required to achieve the targets, but also as a way to visualize the relationship among the objectives and targets. The economic viability of relaxing one or more targets could be easily determined after understanding their trade-offs. However, hidden opportunity costs must be carefully considered.

REFERENCES

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