Improving Customer Satisfaction in Multistage Service Delivery Systems: Applying a Modeling Framework to Make Resource Allocation Decisions in a Hotel Setting

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1. INTRODUCTION

A large body of literature exists on drivers and antecedents of non financial measures of performance, such as for example customer satisfaction (CS). Most of these studies have focused on exploring and establishing the importance of CS relative to other measures of interest such as, for example, market share (Harrington, 1980), repurchase intentions (Cronin and Taylor, 1992) and profitability (Jacobson and Aaker, 1987), or shedding light on its drivers and on issues of measurement. There is a dearth, however, of literature that focuses on the application of modeling frameworks that can guide the service manager towards making operational decisions regarding the improvement of CS, while taking into account other issues such as for example the different costs involved.

In this paper, we demonstrate the applicability of one such modeling framework that examines how and where resources should be allocated in a multistage service delivery system, in order to improve overall CS. Soteriou and Hadjinicola (1999) have developed a modeling framework (SH) that focuses on issues of service quality and considers how different factors interact to provide optimal allocation schemes. In this paper, we show a different approach to the SH framework which considers the construct of CS, and as a result makes the use of the SH framework much simpler. We provide an empirical investigation of the SH framework in the multistage setting of a hotel and we discuss managerial implications.

2. BACKGROUND

2.1 Customer Satisfaction (CS)

Most of the work on customer satisfaction in the marketing literature builds on the seminal work of Oliver (1994). Many different approaches on its conceptualization have been presented with the most popular of these, being perhaps the expectancy-

disconfirmation theory, which asserts that customer satisfaction is a function of the disconfirmation which results from the difference between customers' expectations of service and actual perceived service performance (Oliver, 1994). The relationship of CS with other concepts such as satisfaction, customer loyalty, and profitability, has also been extensively studied in the service management and marketing literatures (see, for example, among others Anderson et al., 1994; Soteriou and Zenios, 1999). This relationship has been a central part of many performance frameworks in the above literatures, such as for example, the service profit chain. A common underlying argument is that customer satisfaction influences customer loyalty, which in turn, affects long term profitability.

2.2 The SH resource allocation modeling framework

The SH framework builds on the work of Rust et al. (1994), which considers investment on improving service quality as a resource allocation decision. The SH framework considers a multistage service system, where customers visit a number of different stages before departure, and assumes that customer perceptions change as customers go through the system. The following model captures the interplay between several important factors on the optimal resource allocation aimed to improve overall service quality perceptions in a multistage service system, given some fixed budget D. For each stage, these factors include the current level of service quality perceptions P_i, a parameter h_i reflecting the cost of improving service quality, and finally, the importance w_i placed by customers on this stage.

$$\text{(M1)} \quad \min_{\delta_i, i=1,2,\ldots,n} \sum_{i=1}^{n} \delta_i (M - P_i)\omega_i \qquad (1)$$

$$\text{s.t.} \quad D = \sum_{i=1}^{n} h_i [(1/\delta_i) - 1] \qquad (2)$$

where 1-δ_i, reflects the improvement at each stage i and M the maximum level of the scale used to measure quality perceptions. For further discussion, the solution of the model, and for sensitivity analysis see Soteriou and Hadjinicola (1999). The benefits of the SH model lie in providing a unique optimal solution to the service manager who must

consider trade-offs of the aforementioned factors, while remaining within some pre-specified budget.

3. DEMONSTRATING THE APPLICABILITY OF THE FRAMEWORK

In order to demonstrate the applicability of this framework in a multistage service setting we chose a hotel setting in Europe. Management was eager to apply the framework as part of a broader total quality management initiative undertaken at the hotel. For the purposes of this study, we focused on the different stages that a customer visits before departure. After checking out, customers provide feedback regarding their experience at the hotel, which can be used as an input to the model.

Capturing customers perceptions regarding their experience at each stage is a difficult task. Soteriou and Hadjinicola (1999) discuss some of the challenges involved in directly applying the SH framework, the most important of which includes the collection of service quality related perceived data. They discuss how service quality information for each stage can be extremely difficult to obtain. If one used, for example, a SERVQUAL-based instrument in a 5-stage setting, the resulting number of questionnaire items would exceed 200, making it difficult to use.

In this paper we use a cognitively-based satisfaction instrument based on an axiological value realm model suggested by Hartman (1967), as discussed by Danaher and Mattsson (1994). The instrument can be used to collect quality factor data along three generic value dimensions: emotional (E), practical (P), and logical (L). These three dimensions were shown to explain a large part of the variation of customer's satisfaction at each stage. The simplicity of their instrument makes it particularly attractive for the case of multistage service systems with a large number of stages.

Upon check out, customers were requested to complete a questionnaire that was found on-line at a check out booth next to the reception area. Customers dragged and dropped the mouse, using a novel computer application on a continuous scale (1-100) depending on their levels of satisfaction for each of Hartman's dimensions for each stage and for their overall satisfaction. The stages included check in and check out, room, restaurant and breakfast. A total of 556 responses, during a week period, from randomly selected hotel guests were used for the study.

Other inputs to the model include the cost for improving each stage and the importance the customers place on each stage. These are often not easy to determine. The parameter h_i in (2) reflects the investment required to half the perceived loss M-P_i, at each stage. Properly specifying this parameter is not an easy task. In this paper we discuss how a framework proposed by Chase and Stewart (1994) known as 3Ts, consisting of three dimensions ---task, treatment and tangibles-- can guide the identification of relevant cost drivers at each stage. We further discuss how cost data were properly discounted for, to reflect yearly investments, so that they can provide meaningful input to the modeling framework.

The following table presents mean values of the major model parameters along with the model's solution.

Stage i	P_i	W_i	h_i (000s)	δ_i
Check in/out	88.4	26.4	151	0.48
Room	82.3	33.4	849	0.96
Restaurant	84.5	25.3	621	0.93
Breakfast	86.7	22.2	83	0.44

Table 1. Mean values of model parameters and solution.

After applying the framework we can make a number of recommendations to the service manager. The data suggest that satisfaction with the room, which is also the most important stage for customers, is lower than that observed in other stages. The model acknowledges this and given the manager's fixed budget and that the cost to improve perceptions in the rooms is much higher than that of the remaining stages, it suggests that in order to improve overall perceptions, more resources should be placed in the remaining stages. The greatest improvement (small values of δ) can be observed in the breakfast area, which although not the most important area to the customers, major improvements can be observed in an inexpensive way.

Since the robustness of the results depend on the reliability of the model's parameters, we conducted sensitivity analysis. Sensitivity analysis can provide useful information to the service manager, in light of the fact that systematic biases may exist in the way some of the models' parameters were determined.

4. CONCLUDING REMARKS

In this paper demonstrate the applicability of the SH modeling framework in practice. We discuss some of the practical difficulties associated with its implementation along with some novel ways to overcome them. We further discuss different issues which result from applying the SH in order to provide the service manager with optimal allocation decisions in multi-stage service delivery systems.

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