Chapter 2
A Bertrand Game-Based Approach to Hotel Yield Management Strategies

Junzo Watada
Universiti Teknologi PETRONAS, Malaysia

Koki Yoshimura
Waseda University, Japan

Pandian Vasant
Universiti Teknologi PETRONAS, Malaysia

ABSTRACT

This chapter examines hotel yield management from a game perspective using a duopoly situation of two hotels. The hotel yield management determines strategies by considering the number of available rooms in the Bertrand situation. Each hotel does not know the strategies adopted by a competitive hotel. We derive the strategy that realizes a maximum profit under a given situation and constraints. Furthermore, we validate the game-based strategy developed for hotel yield management. In the real world, a business manager adopts an optimum strategy of yield management to gain profits in the current conditions; after the initial strategy is chosen, however, managers continuously weigh new strategies and investments. Therefore, we import the method of real option. Such maneuvers and investments are required to build new strategies amidst competition in the industry.

1. INTRODUCTION

Business circumstances today are becoming increasingly competitive, particularly in the hotel industry, where demand has been shrinking during the recession. Furthermore, as Figures 1 and 2 show, the supply of hotel rooms in Japan, most notably in Tokyo, has been increasing because of the development of numerous foreign-affiliated hotels. Under these circumstances, each hotel must adopt useful measures to remain competitive. The majority of hotels select yield management as one of these strategies, aiming to develop effective strategies to obtain optimal profits in today's competitive environment.

DOI: 10.4018/978-1-5225-2594-3.ch002

In this chapter, we propose the game-based development of strategies in yield management, that is, we model a competitive business circumstance to develop an optimal strategy using game theory under a duopolistic state. First, the duopoly state of two hotels is analyzed in a single year using game theory. The Bertrand model is employed in this case. Bertrand model provides a simple equation in this work. The model uses the given number of rooms to obtain the maximum profit within the price. As we can see, each hotel in a certain area competes for how many guests choose to stay at the hotel each night, for the price of the room, and for overall demand from visitors in the area.

This research on hotel management focuses primarily on yield management. To obtain optimum solutions, we must consider not only room rates but also yield management strategies. Hotel yield management strategies decide that an early hotel booking generally warrants a higher discount on the room rate.

The theoretical result is compared with the one obtained by Monte Carlo simulation. To achieve these phases, we created and tested simple models using reference books, including the model described in Section 6. The hotel business environment is challenging, requiring exact strategies and uncertain future risks. If neither the demand nor the outside environment changes, hotels do not need to alter their initial strategies. However, by examining game theory, we suggest that when one hotel tends to improve, its competitors also must continuously change their strategies in response. After further testing, we introduce the "real option technique" such that the optimal strategy can be adopted. The novelty of this model is found in the game perspective treatment of yield management (Suzuki, K., 1999;Shigeo M., 2001;Watanabe, T., 2008).

The remaining of the chapter consists of the following structure. Section 2 provides literature review of game theory and real option theory. Section 3 explains the basic concept of yield management. Section 4 illustrates a game theoretical approach. Sections 5 and 6 provide the research result. Finally, in Section 7, we consider the strategy of continuous time length instead of a single term by employing real option model to decide strategies in hotel yield management. Then Section 8 summarizes this chapter.

Figure 1. Volume of hotel industries