Is RevPASH the best performance indicator for restaurant revenue management?

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Introduction

Revenue management (RM) was introduced after the deregulation of the U.S. airline industry in the 1970s in order to maximize yield per available seat by allocating seats at different rate. Airline RM soon spread as to the hospitality industry, which experiences similar operational issues such as fixed service capacity, perishable inventory, customers booking in advance, lower cost competition and high demand fluctuation. Furthermore, scholars began to explore the application of RM approaches to various service sectors such as restaurants (e.g., Kimes et al., 1998; Susskind, Reynolds, & Tsuchiya., 2004; Johns & Rassing, 2004), cruise lines (e.g., Hoseanson, 2000), resorts (e.g., Kasikci, 2006; Pinchuk, 2006), casinos (e.g., Norman & Mayer, 1997; Hendler & Hendler, 2004), hospitals and healthcare facilities (e.g., Lieberman, 2004), and theme parks (Heo & Lee, 2009). RM is of particularly high relevance in cases where the fixed costs are relatively high compared to the variable costs. RM is now regarded as a critical strategic tool for many service businesses. Practitioners of RM use tools such as market segmentation, demand forecasting, and variable pricing to ensure sale of the service firm's limited capacity at the highest possible price in each given situation (Ng, 2007). Most researchers have traditionally focused on the strategic problems facing airlines and hotels, but several researchers started to explore various RM issues from a restaurant perspective among other industries. Restaurants have a similar business characteristic to hotels and airlines. They face capacity utilization issues as they attempt to maximize revenues, because unoccupied restaurant seats represent lost revenue (Heo, 2016). Although several researchers have explored various issues regarding restaurant's RM strategy, there has been little discussion on how to measure the performance of RM strategies for restaurants, except Revenue per Available Seat Hour (RevPASH). Measuring business performance is the first step of the improvement process but without knowledge there can be no purposeful action. RevPASH is an effective and reliable indicator of restaurant's performance, however, this metric is not the best metrics for restaurant revenue management (RRM). Contribution margin of each menu item is different and it should be considered when evaluating restaurant's performance, because the goal of RRM is to maximize not just revenue but profit in the end. Therefore this study tried to show the disadvantages of using RevPASH as a key performance indicator (KPI) and propose new metrics to measure the results of the restaurant's RM strategy.

Literature Review

Restaurant Revenue Management

Kimes (1999) argued that the principles of RM can apply to restaurants given that the unit of sale in restaurants is the time required for service, rather than just the meal itself. Even though restaurants have a higher variable cost percentage than traditional RM industries such as airlines and hotels, potential revenue gains can be substantial (Kimes & Thompson, 2004). Previous research topics on RRM include meal duration management (Kimes & Robson, 2004; Bell & Pliner, 2003, Thompson, 2009), table and seating mix management (Bertsimas & Shioda, 2003; Hwang, 2008; Kimes & Thompson, 2005), menu redesign (Sill, 1991; Kimes et al., 1998; Sill and Decker, 1999), and pricing issues (Heo et al., 2013). Noone and Maier (2014) incorporated various facets of RRM into a decision-making framework that encompasses both a short-term focus on revenue generation and a strategic focus on profit maximization. Recently, a few researchers started to explore distribution management issues as they apply to restaurants. For example, Kimes (2011) discussed the role of the third-party reservation sites as distribution channels for restaurants and urged future researchers to explore the challenges of managing the emerging distribution and RM issues in the restaurant

industry. Furthermore, Heo (2016) explained how restaurants can utilize group-buying platforms as an RM tool and identified the key features of restaurant deals that can help generate sales and revenues on these platforms.

Thompson (2010), in the restaurant RM literature review, suggested that capacity management and customer experiences were two emergent themes. Capacity management is related to restaurant's internal approaches such as service process management, seating and table management, and meal duration control. Shields (2006) found that greater changes in standard operating procedures between high and low demand periods are positively related to revenue generation with a survey of 85 restaurants. Guerriero et al. (2014) proposed new formulations of table mix problems by considering the expected meal duration, the room share, and tables combinability and the performances of the different booking control polies are evaluated in a simulated study. Bell and Pliner (2013) found the positive relationship between meal duration and group size and the interaction between group size and eating setting indicates that the magnitude of the group size effect on meal duration differed depending on the situation. Thompson (2015) assessed the use of early-bird and night-owl specials in restaurants as a tool for service capacity-demand management using back-of-the-envelope calculations and the cannibalization-based value estimation.

On the other hand, customer experiences concern how restaurant guests react to various pricing policies and different reservation policies, and how customer seating affects average check size. Kimes and Witz (2003) examined how customers respond to restaurants' variable pricing policies (i.e., lunch/dinner period, weekday/weekend period, time of the day, table location, and two-for-one coupons). They found that restaurant RM pricing in the form of coupons, time of day pricing and lunch/dinner pricing are considered to be fairer compared to the other practices. Heo et al. (2013) examined the effects of perceived scarcity of capacity in a restaurant as well as price differences on the perceived value of a restaurant's offerings in addition to the fairness perceptions of a restaurant's RM practices. However, many questions remain unanswered. For example, questions regarding cultural differences have not been investigated. Kimes et al. (2002) found that Europeans prefer a significantly longer dining time compared to North Americans and Asians by using time sensitivity measurement. Beldona and Kwansa (2008) identified that cultural orientation influences perceived fairness of RM pricing; vertical individualism has a significantly positive association with perceived price fairness. Although various topics regarding RRM have been discussed, KPIs for RRM have received little scholarly attention.

Key Performance Indicators for Revenue Management

Performance indicators have a critical role in evaluating past performance and planning future decisions. When reviewing performance evaluation systems, it is important to identify the fundamental orientation and industry context of an organization (Fitzgerald et al., 1991; Harris, 1999; Harris & Mongiello, 2001). KPIs refer to a set or ratios which help calculate and indicate the performance and progress of a business accordingly to their strategic plans.

The three major KPIs used to measure the economic success of a hotel include occupancy rate, Average Daily Rate (ADR) and Revenue per Available Room (RevPASH). The simplest measure of performance for hotels is the occupancy rate, which is measured as the percentage of available rooms occupied over a specific period of time. ADR, measured as the average price paid per room on a specific day and RevPAR measures hotel utilization or the average daily room revenue generated per available room. RevPAR is commonly used to evaluate financial performance in the hospitality industry and to monitor the success of the hotel's rooms inventory management. Hoteliers aim to maximize RevPAR by means of an occupancy

and average rate trade off. However, these three indicators do not take into account things like costs per occupied room or additional revenue per room for each individual room that is sold. In order to capture the mostly untapped revenue and profit potential associated with the non-room revenue-generating centers of the hotel, Total Revenue per Available Room (TRevPAR) has been proposed. TRrevPAR sums up all revenue factors generated by a hotel taking a meaningful look into hotel's profitability. Unfortunately, TRevPAR does not consider cost factors and does not take into account the occupancy rate, where these numbers are required to fully understand the hotel's efficiency. In addition, Profit per Available Room (ProPAR) is a calculation of profit earnings for each room available in the hotel and it is based on operating profit, which accounts for movements in both revenues and expenses. Gross Operating Profit per Available Room (GOPPAR) offers greater insight in the actual performance of a hotel than RevPAR and TRevPAR, because it considers both all revenue factors generated by a hotel and factors in operational costs related with such revenues.

As with other industries, restaurants have its own particular characteristics and, therefore, the measures used to evaluate restaurant's performance should reflect the specific issues. In the past, many restaurants either defined high table occupancy rates or high average check as their primary business goal to achieve. Kimes et al. (1998) and Kimes (1999) were among the first to directly address the issue of RRM. They developed a strategic framework for applying RM to restaurants to increase revenue by effective meal duration management and demand-based pricing and proposed using the Revenue per Available Seat Hour (RevPASH: revenue accrued in a given time interval divided by the number of seats available during that time). RevPASH indicates the rate at which capacity utilization generates revenue, and RevPASH increases as the number of table turns increases and the length of a meal's seating duration decreases. RevPASH offers an insight into monitoring revenues into a unit based on the revenues generated, the number of customers seated per hour and the duration of customer. However, like RevPAR, using RevPASH alone cannot provide the whole picture of restaurant's business performance. In hotels and airlines, the cost per unit sold, except intermediary commission, is nearly identical, because the production cost is evenly distributed to all sales unit (i.e., seats or rooms). However, the production cost for each menu varies in restaurants because of the different ingredients for each menu. Thus, restaurants need to consider the contribution margin of each menu item rather than total revenue. Therefore, this study attempted to illustrate the limitations of using RevPASH as KPI for RRM and aimed to present new performance indicators for restaurants.

Study Design

Scenarios of a hypothetical restaurant have been presented to show the limitation of RevPASH. Table 1 exhibits the menu items, food cost of each menu item, and contribution margin of a hypothetical restaurant with100 seats. Table 2 illustrates calculation of RevPASH for two days (i.e., Monday and Tuesday) based on seat occupancy and average check. Although the restaurant's seat occupancy and average check for Monday and Tuesday are different, their RevPASH are identical. RevPASH does not reflect the profitability of the restaurant and thus, it is not the perfect index for measuring a restaurant's actual productivity. Therefore, I propose to apply ProPASH (Profit per available seat hour) to measure a restaurant's actual profitability by calculating the total of contribution margin of each menu item sold instead of revenue. Table 3 shows the actual sale of Monday and Tuesday between 5pm and 6pm. Although two periods have ProPASH ($9), their ProPASH were different (i.e., $6.4 for Monday $5.3 for Tuesday) because of different menu items ordered. That is, RevPASH

increase does not always mean profit increase. Further, Profit per available square meter (ProPASM) can be calculated by dividing the total profit of each hour by the total available space in square meter. ProPASM is an indicator on how well the existing restaurant space is managed from a profit perspective. Strategies to improve RevPASH include optimizing the table and seat arrangement based on demand pattern by party size. These two KPIs (i.e., ProPASH & ProPASM) should be used to monitor the restaurant's RM performance and table setting and menu design should be adjusted to maximize them.

Table 1) Restaurant's menu (100 seats)

Menu Items	Menu Price	Food Cost	Contribution Margin ($)	Contribution Margin (%)
Salad	$ 10	$ 3	$ 7	70 %
Soup	$ 10	$ 5	$ 5	50 %
Grilled Beef	$ 35	$ 15	$ 20	57 %
Chicken Pasta	$ 25	$10	$ 15	60 %
French Crepe	$ 10	$ 3	$ 7	70 %
Coffee	$ 5	$ 1	$ 4	80 %
Average	**$ 15.83**	**$ 6.17**	**$ 9.67**	**61 %**

Table 2) RevPASH (Revenue

 per available seat hour)

	Monday			**Tuesday**			**RevPASH**
	Total Revenue	Seat Occupancy	Average Check	Total Revenue	Seat Occupancy	Average Check	
05:00~06:00	900	30%	$ 30	900	20%	$ 45	$ 9
06:00~07:00	1500	60%	$ 25	1500	30%	$ 50	$ 15
07:00~08:00	1800	90%	$ 20	1800	100%	$ 18	$ 18
08:00~09:00	1000	50%	$ 20	1000	20%	$ 50	$ 10
Total / Average	$ 5,200	57.5 %	$ 20	$ 5,200	42.5 %	$ 30.6	

Table 3) Comparison between RevPASH and ProPASH (Profit per available seat hour)

05:00 ~ 06:00	Sales	Total Revenue	Total Profit	Seat Occupancy	Average Check	RevPASH	ProPASH
Monday	Salad ($20) - 20 Soup ($10) - 10 Grilled Beef ($35) - 10 Coffee ($25) - 50	$ 900	$680	30%	$ 30	$ 9	$6.4
Tuesday	Soup ($30) - 30 Chicken Pasta ($50) - 20 20 Coffee ($10) - 20	$ 900	$530	20%	$ 45	$ 9	$5.3

Discussion

Several restaurants adopt various RM approaches. Restaurants take reservations and offer time related promotions such as "happy hour" rates and "early bird" specials. However, the RM strategies that are currently implemented by restaurants merely focus on discounting prices during low demand periods. The unique business characteristics of restaurants such as the varied food cost require restaurants to develop more sophisticated RM strategy. Heo (2013) pointed out the importance of selling the right menu for restaurant revenue management and Chattejee (2005) addressed the needs of new metrics for RRM. Restaurant operators should increase the total gross profit and the bottom line profitability of the restaurant by selling more profitable menu items during high demand periods. RRM be about selling the right Menu item to the right Customer at the right Time (& meal duration) for the right Price by using right Table mix in order to maximize ProPASH and ProPASM (Profit per available square meter). In addition, the success of RRM approach depends on the availability of historical data on demand pattern (customer arrival), sales of menu item, price. Therefore, it is important for restaurant operators to have timely availability of reliable data to analyze and understand them correctly.

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$$GOPPAR = (\overset{\text{GPPOR}}{\underbrace{\sum m_n \cdot ADS_n}}) \cdot Occ - \sum FCPAR_m$$

GPPAR