

New performance indicators for restaurant revenue management:

ProPASH and ProPASM

1. Introduction

Revenue management (RM) was introduced after the deregulation of the U.S. airline industry and Airline RM soon spread to the hospitality industry. RM is of particularly high relevance in cases where the fixed costs are relatively high compared to the variable costs. Kimes et al. (1998) and Kimes (1999) were among the first to directly address the issue of restaurant revenue management (RRM). Restaurants face capacity utilization issues as they attempt to maximize revenues, because unoccupied restaurant seats represent lost revenue (Heo, 2016). Even though restaurants have a higher variable cost percentage than airlines and hotels, potential revenue gains can be substantial (Kimes & Thompson, 2004). Although several researchers have explored various issues regarding restaurants' RM strategy, there has been little discussion on how to measure the performance of RM strategies as they apply to 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 a restaurant's performance, however, this metric may not provide the whole picture of a restaurant's business performance. In restaurants, the contribution margin of each menu item is different and it should be taken into consideration when evaluating restaurants' performance, because the goal of RRM is to maximize not just revenue but - in the end - profit. Therefore, this study proposes new metrics with which to measure the effectiveness of restaurants' RM strategy.

2. State-of-Art

2.1. 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. Previous research topics on RRM include meal duration control (Bell & Pliner, 2013; Kimes, Wirtz, & Noone, 2002; Kimes & Robson, 2004; Thompson, 2009), table and seating mix (Bertsimas & Shioda, 2003; Kimes & Thompson, 2005), service process (Sill & Decker, 1999; Shields, 2006), and pricing issues (Heo et al., 2013). Recently, a few researchers have started to explore distribution management issues. For example, Kimes (2011) discussed the role of third-party reservation sites as distribution channels for restaurants and Heo (2016) explained how restaurants can utilize group-buying platforms as an RM tool for restaurants.

Thompson (2010), in the restaurant RM literature review, suggested that capacity management and customer experiences were two emergent themes. Shields (2006) found that greater changes in standard operating procedures between high and low demand periods are positively related to revenue generation. 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 policies. 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 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 and 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. Although various topics regarding RRM have been discussed, key performance indicators (KPIs) for RRM have received little scholarly attention.

2.2. Key Performance Indicators for Revenue Management

Performance indicators play 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 of ratios that help calculate the performance and progress of a business in relation 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 is 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 room inventory management. However, these three indicators do not take into account other factors such as cost 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 other areas, excluding rooms, Total Revenue per Available Room (TRevPAR) has been proposed. TRrevPAR sums up all revenue factors generated by a hotel and provides insight into a hotel's profitability. In addition, Profit per Available Room (ProPAR) is a calculation of profit earnings for each room available in the hotel and is based on operating profit, which accounts for movements in both revenues and expenses. Gross Operating Profit per Available Room (GOPPAR) offers greater insight into the actual performance of a hotel than RevPAR and TRevPAR, because it considers all revenue factors generated by a hotel and its related operational costs.

As with other industries, restaurants have their own particular characteristics and, therefore, the measures used to evaluate their performance should reflect the specific issues they face. In the past, many restaurants either defined high table occupancy rates or high average check as their primary business goals to achieve. Kimes et al. (1998) and Kimes (1999) proposed using RevPASH, revenue accrued in a given time interval divided by the number of seats available during that time, in a restaurant setting. RevPASH measures the rate at which capacity

utilization generates revenue. It increases as the number of tables are turned and the duration of a meal decreases. RevPASH offers insight into how many customers arrived and how quickly they are served and helps evaluate the efficiency and effectiveness of service.

However, like RevPAR, using RevPASH alone cannot provide the whole picture of a restaurant’s profitability. In hotels and airlines, the cost per unit sold, except the intermediary commission, is nearly identical, because the production cost is evenly distributed across all sales units (i.e., seats or rooms). However, the production cost for each menu varies in restaurants because of the different ingredients for each dish. Thus, restaurants need to consider the contribution margin of each menu item rather than total revenue. Therefore, this study presents new performance indicators based on the profitability of restaurants.

3. New Performance Indicators for Revenue Management

Scenarios of a hypothetical restaurant have been presented to compare RevPASH and new performance indicator, Profit per Available Seat Hour (ProPASH). Table 1 exhibits the menu items, food cost of each menu item, and the contribution margin of a hypothetical restaurant with 100 seats. Table 2 illustrates the calculation of RevPASH for two days (i.e., Monday and Tuesday) based on seat occupancy and average check size. 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 should not be the only performance index for measuring a restaurant's productivity. Therefore, I propose to apply ProPASH to measure a restaurant’s actual profitability by calculating the total contribution margin of each menu item sold instead of revenue (Note: fixed cost is not considered because it should be distributed evenly.)

Table 1
Menu (100 seats).

Menu Items	MP	FC	CM (\$)	CM (%)
Salad	\$ 15	\$ 3	\$ 12	80%
Soup	\$ 10	\$ 5	\$ 5	50%
Grilled Beef	\$ 35	\$ 15	\$ 20	57%
Chicken Pasta	\$ 25	\$ 8	\$ 17	68%
French Crepe	\$ 10	\$ 3	\$ 7	70%
Ice Cream	\$ 10	\$ 5	\$ 5	50%
Coffee	\$ 5	\$ 1	\$ 4	80%
Average	\$ 15.7	\$ 5.7	\$ 10.0	65%

Note: Menu Price (MP), Food Cost (FC), Contribution Margin (CM).

Table 2
RevPASH.

	Monday			Tuesday			RevPASH
	Total Revenue	Table Occupancy	Average Check	Total Revenue	Table 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	\$ 5200	57.5 %	\$ 22.6	\$ 5200	42.5 %	\$ 30.6	\$ 52

Table 3
Comparison between RevPASH and ProPASH.

05:00–06:00		MP	CM	Sales	Revenue	Total CM	Table Occupancy	Average Check	RevPASH	ProPASH
Monday	Salad	\$ 15	\$ 12	25	\$ 375	\$ 300	30%	\$ 30	\$ 9	\$ 6.8
	Chicken Pasta	\$ 25	\$ 17	10	\$ 250	\$ 170				
	French Crepe	\$ 10	\$ 7	10	\$ 100	\$ 70				
	Coffee	\$ 5	\$ 4	35	\$ 175	\$ 140				
	Total			80	\$ 900	\$ 680				
Tuesday	Soup	\$ 10	\$ 5	28	\$ 280	\$ 140	20%	\$ 45	\$ 9	\$ 5.3
	Salad	\$ 15	\$ 12	10	\$ 150	\$ 120				
	Grilled Beef	\$ 35	\$ 20	12	\$ 420	\$ 240				
	Ice Cream	\$ 10	\$ 5	5	\$ 50	\$ 25				
	Total			55	\$ 900	\$ 525				

Table 3 shows the actual sale of Monday and Tuesday between 5pm and 6pm. Although two periods have identical ProPASH values (\$9), their ProPASH calculations were different (i.e., \$4.95 for Monday and \$3.90 for Tuesday) because customers ordered different menu items. That is, RevPASH increases do not always mean higher profit. Furthermore, a restaurant's service capacity is a function of the surface area of that particular restaurant. Restaurants should maximize the profit of each square meter for each time period during which the space is available. For function spaces, contribution per available space for a given time (ConPAST) was proposed as a performance index by Kimes and McGuire (2001). For restaurants, Profit per Available Square Meter (ProPASM) can be calculated by dividing the total profit of each hour by the total available space in square meters. ProPASM is an indicator of how well the existing restaurant space is managed from a profit perspective.

$$\text{ProPASH (Profit per Available Seat Hour)} = \sum(MP - FC) \div \text{No. of Available Seats}$$

$$\text{ProPASM (Profit per Available Square Meter)} = \sum(MP - FC) \div \text{Available Square Meters}$$

Conclusions

A variety of challenges restaurant owners face such as high labor costs and new competition from indirect and untraditional competitors have forced the restaurant industry to look into creative solutions to handle today's problems and monitor productivity. Many restaurants use a variety of different RM approaches. Some take reservations and offer time-related promotions such as "happy hour" rates and "early bird" specials. However, restaurants' current RM strategies tend to merely focus on discounting prices during low demand periods. Strategies to improve RevPASH include optimizing the table and seat arrangement based on the demand pattern by party size. These two KPIs (i.e., ProPASH & ProPASM) should be used together with RevPASH to monitor a restaurant's RM performance while table set-up and menu design should be adjusted to maximize a restaurant's total profit. Future researchers

could apply two new performance indicators to an empirical study and identify when these measures are likely to deviate most from RevPASH (e.g., restaurant type, location, time). Furthermore, future studies can find how restaurants' optimal revenue management decisions would differ using these new measures as opposed to RevPASH.

The unique business characteristics of restaurants such as fluctuation in food costs require them to develop more sophisticated RM strategies. Heo (2013) highlighted the importance for restaurants to sell the right menu in order to maximize profitability. Restaurant operators will increase their total gross profit and bottom line by selling more profitable menu items during high demand periods. The success of the RRM approach depends on the availability of historical data on demand patterns (customer arrival), sales of specific menu items and price. Therefore, it is important for restaurant operators to have reliable data available to them when they need it so they can analyze these factors correctly. The goal of RRM should be about selling the right menu item to the right customer at the right time (and meal duration, as well) for the right price by using the right table mix in order to maximize profit.

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