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RESTAURANT REVENUE MANAGEMENT: AN INVESTIGATION INTO CHANGING STANDARD OPERATING PROCEDURES TO MAXIMIZE REVENUE

Jeff Shields
University of Southern Maine
jshields@usm.maine.edu

ABSTRACT

Changing the standard operating procedures that are used for serving customers during periods of high versus low demand is a method of revenue management employed in restaurants. This study examined the extent to which this practice is used in restaurants that are primarily small businesses and examined its effects on revenue generation. The results of a survey of 85 restaurants provide the first known evidence that changing standard operating procedures is common among these small businesses. Findings support the hypothesis that greater changes in standard operating procedures between periods of high and low demand are significantly and positively associated with revenue generation.

Seven of every ten restaurants are small businesses (National Restaurant Association, 2005). An important segment of the economy, these eating establishments generate sales approaching $150 billion annually (U.S. Census, 2002).

Revenue management is a practice employed in restaurants that involves the management of demand and price in order to maximize sales revenues from capacity (Kimes & Chase, 1998). Within the context of revenue management, a variety of methods that restaurants can use to manage customer demand and price have been proposed (Kimes, Chase, Choi, Lee, & Ngonzi, 1998). A field study of a single restaurant led to some specific guidelines that may be employed to increase the rate at which revenue is generated from a restaurant's capacity (Kimes, Barrash, & Alexander, 1999). These recommendations include a call for restaurants to change the standard operating procedure (SOP) used for serving customers during periods of high demand from the SOPs normally in use during periods of low demand.

The extent to which restaurants that are primarily small businesses engage in the recommended revenue management practice of switching SOPs for serving customers between periods of high and low demand is currently unknown. The results of a large sample investigation would offer empirical evidence on the prevalence of the practice and, more importantly, its effects on restaurant revenue generation. Large sample empirical support for the Kimes, Barrash, & Alexander (1999) recommendation would extend the literature on revenue management practices in restaurants and would provide important tested guidance to restaurant owners and managers seeking to improve their business practices.

To address this need, the purpose of this research was to investigate the use and

results of the practice of switching SOPs for serving customers between periods of high and low demand in small business restaurants. The study examines the research question: To what extent is the revenue management method of changing SOPs between periods of high and low demand used? The research then tests the hypothesis that restaurants with higher levels of changes in SOPs will have higher rates of revenue generation.

In the following section, the literature on restaurant revenue management is reviewed, followed by the hypothesis that guided the study. After presentation of the methods employed, the results from the survey of 85 restaurant decision-makers are presented. Finally, the implications of this research are discussed.

LITERATURE REVIEW

Revenue management is defined as "selling the right product to the right customer at the right time for the right price" (Smith, Leimkuhler, & Darrow, 1992, p.8). It developed in the airline industry and is employed a range of industries including communications, hotels, and shipping (McGill & Van Ryzin, 1999; Secomandi, Abbott, Atan, & Boyd, 2002)

The central objective of revenue management is maximizing the revenue generated from capacity (McGill & Van Ryzin, 1999). There are two important conditions for its practice. The first is that a business's output must be perishable (Weigand, 1999). For example, an airline has a perishable product (i.e., a flight on a given date and time to a given destination flies only once). The second condition for the practice of revenue management is that a business should have a relatively fixed capacity (Weatherford & Bodily, 1992). Continuing with the previous example, an airline has a fixed capacity in its investment in a fleet of airplanes. Revenue management holds that given fixed capacity, a business can increase its profitability by maximizing the revenue generated from that fixed capacity.

Restaurants have a perishable product and have relatively fixed capacity. Revenue management for restaurants has also been defined as "selling the right seat to the right customer at the right price and for the right duration" (Kimes, 1999, p.17). Kimes et al. (1998) developed a framework for the application of revenue management in restaurants that involves managing demand in order to maximize the revenue that is generated from a restaurant's capacity.

The framework for the application of revenue management in restaurants suggests that restaurants can manage demand by managing meal duration. Meal duration is the length of time that a customer occupies a seat in a restaurant (Kimes et al., 1998). Meal duration is central to restaurant revenue management because it governs the availability of seats (i.e., seating capacity) (Kimes, 1999). During periods of high demand, a shorter meal duration facilitates serving more customers. Reducing variation in meal duration increases its predictability. With more predictable duration, restaurant management can make more effective reservation and seating decisions (e.g., which reservations to book in terms of the time and the number in the party, when to seat waiting customers) (Kimes, 1999; Kimes, et al., 1999; Kimes & Chase, 1998; Kimes et al., 1998). During periods of high demand, effective reservation and seating decisions can reduce the amount of time that seats are empty, better utilizing capacity.

Standard Operating Procedures

In a field study of restaurant revenue management, Kimes et al. (1999) developed recommendations for the application of restaurant revenue management concepts in practice. These recommendations include changing the SOP regarding how customers are served during periods of high versus low

demand to make meal duration more predictable. During periods of low demand, the objective is to increase customers' average check and thus increase revenue. During periods of high demand, the objective is to increase the number of customers served and, thus, increase revenue. The changes in SOPs that Kimes et al. (1999) recommend include the range of the duties of the host(ess), menu variety, prices and promotions, suggestive selling, and presetting tables with snacks. Each of these is discussed below.

The SOP of using of a host(ess) with reduced duties during periods of high demand facilitates the more effective management of operations. During a period of high demand, a host(ess) with reduced duties will be more effective in managing those aspects of operations that affect both the length of and the variation in meal duration (e.g., greeting customers, managing the waiting list, and tracking table progress). A host(ess) with additional duties during a period of high demand (e.g., answering the telephone, filling take out orders) will be less effective in managing those areas of operations that affect revenue generation.

Another aspect of SOP that can be changed between periods of high versus low demand is the menu. A streamlined menu will reduce the time required to fill orders and thus allow more customers to be served during periods of high demand (Kimes et al., 1999). This reduces the variation in and length of meal duration. Restaurants can also change their menu during high demand periods and feature a menu with higher prices. Conversely, promotions in the form of discounts should only be used during periods of low demand to increase revenue by switching price sensitive customers from using the restaurant's capacity during periods of high demand to using it during periods of low demand (Kimes et al., 1999).

Suggestive selling is another SOP that can be changed between periods of high and low demand to increase revenue generation. Suggestive selling (e.g., suggesting appetizers, dessert) will increase meal duration. During periods of low demand, suggestive selling will increase the rate of revenue generation by increasing the average check. In contrast, during periods of high demand, suggestive selling through increased meal duration will reduce the number of customers who can be served and, thus, the rate of revenue generation.

The SOP of presetting the table with snack items can be changed between periods of high versus low demand. Customers who order appetizers and/or dessert will have a longer meal duration than customers who do not order appetizers or dessert. During periods of low demand, snacks should only be served after customers have placed their order so snacks do not reduce the demand for appetizers and, hence, revenue. During periods of high demand, snacks should be preset to reduce the demand for appetizers. This should reduce meal duration and increase the rate of revenue generation by increasing the number of customers who can be served during periods of high demand.

Based on the review of the literature, this study first examines the research question: To what extent is the revenue management method of changing SOPs between periods of high and low demand used? The field case evidence and recommendations for the revenue management practice of changing SOPs in restaurants that were presented by Kimes et al. (1999) then suggest the following hypothesis that was used to further guide the research.

Hypothesis: Restaurants with higher levels of changes in SOPs between periods of high and low demand will have significantly higher rates of revenue generation.

METHODOLOGY

The sample of restaurants was generated from a list of full service restaurants provided by a New England state chapter of

the National Restaurant Association. Each restaurant was given a number and a sample of 589 restaurants was then drawn through the use of a table of random numbers. The data were collected by the use of a semi-structured questionnaire. The questionnaire mailing methods are based on Dillman (2000) Total Design Method procedures with four timed, hand-signed mailings. Five hundred and eighty-nine questionnaires were mailed to restaurant owners and managers. A total of 254 replies were received for an overall response rate of 43 percent. Of the 254 responses, 85 were usable responses from full service restaurants that use hosts(esses). Because the independent variable, differences in SOPS, are predicated on the presence of a host(ess), the sample was limited to these restaurants. No evidence was found that there were any significant differences between early and late responders.

Measures

The full service status of a restaurant was measured through a question that asked respondents if their restaurant was a full service restaurant. The question used the definition of a full service restaurant from the U.S. Economic Census (U.S. Census Bureau, 1997).

The independent variable was differences in SOPS. Measures of the SOPS used during periods of high and low demand were developed from Kimes et al. (1999). These eleven items included: "Servers do suggestive selling," "We decline reservations," "A host(ess) greets customers," "A host(ess) tracks the flow of tables," "A host(ess) answers the telephone," "A host(ess) fills take out orders," "A host(ess) seats customers," "We offer a streamlined menu"; "We charge higher than normal prices," "We offer promotions," and "We preset tables with snacks."

Respondents were asked to respond to single-item, seven-point Likert-type scales, with response categories for items ranging from "Never" to "Always." Two identical sets of questions with respect to each of the eleven SOPs were given to respondents. The first set of questions asked respondents to respond to the extent to which a given SOP was used in their restaurant during busy periods. The second set of questions asked respondents to respond to the extent to which the same SOP was used in their restaurant during slow periods. Difference scores for each SOP were then computed by subtracting the response for the slow period from the response for the busy period. These difference scores for each SOP were then summed to get a total difference score, SOPDIFF. SOPs that are done more in periods of high (low) demand than in periods of low (high) demand will have a positive (negative) value.

For purposes of this study, restaurant revenue generation was operationally defined as meal duration and the number of table turns, consistent with Kimes (1999). Meal duration was measured according to the responses to the open-ended question: "During a typical weekend dinner period, how many minutes do you consider to be: a) a short meal duration, b) an average meal duration, and c) a long meal duration." A measure of the range of meal duration was defined as the difference between responses for long and short meal duration. This measure of the range of meal duration was used as a surrogate measure for the variation in meal duration. The number of table turns was measured as the response to an open-ended question asking, "How many times do you turn over your tables during a typical weekend dinner period?"

ANALYSIS AND RESULTS

Descriptive statistics for the dependent and independent variables are shown in Table 1. Sixty-one percent of the sample was male and 39% was female. The average age of the sample restaurants ranged from 11 to 15 years, with average sales revenues in 2002

ranging from $600,000 to $799,000. The Average number of seats in the sample of restaurants was 141, serving an average of 202 dinners with the average number of paid employees ranging from 16 to 30. Seventy percent of the respondents reported that their restaurants take reservations.

Table 1 – Descriptive Statistics (n = 85)

Variable	Theoretical Range	Actual Range	Mean	Median	Standard Deviation
Average Meal Duration	NA	35.00 – 150.00	72.70	60.00	28.94
Number of Table Turns	NA	0.50 – 6.00	2.86	3.00	1.15
Range of Meal Duration	NA	20.00 – 190.00	64.63	60.00	31.85
SOPDIFF	-66 – 66	-6.00 – 26.00	3.44	2.00	6.18

The research question addressed by this research was, to what extent is the revenue management method of changing SOPs between periods of high and low demand used? Two-tailed t-tests were used to assess the significance of mean differences in the extent to which individual SOPs are used between periods of high and low demand. A test value of zero was used to represent *no difference* in the extent to which SOPs are used between periods of high and low demand. An SOP that was more extensively used during periods of high rather than low demand would have a positive difference score.

As shown in Table 2, the mean differences between busy and slow period SOPs were significantly different from zero ($p<.05$) for the following SOPs: Decline Reservations, Host(ess) Answers Phone, Host(ess) Greets Customers, Host(ess) Seats Customers, Host(ess) Tracks Tables, Offer Promotions, and Suggestive Selling. In addition, the mean differences for the SOPs Preset Table with Snacks and Streamlined Menu were marginally significant ($p<.10$). All of the significant SOP differences were positive except Offer Promotions and Suggestive Selling, which were negative.

The hypothesis was tested using three simple regression analyses with the variable SOPDIFF as the independent variable and the measures of the rate of revenue generation as the respective dependent variables (i.e., average meal duration, range of meal duration and table turns). SOPDIFF was not significantly associated with average meal duration ($F = 0.10$, $p = .75$), see Table 3 panel A. However, SOPDIFF was a significant predictor of the range of meal duration ($F = 4.03$, $p=.05$) with an adjusted $R^2 = .04$, see Table 3 panel B. The regression coefficient was significant and negative ($F = -0.24$, $p=.05$). SOPDIFF also was a significant predictor of table turns ($F = 6.42$, $p = .01$) with an adjusted $R^2 = .07$, see Table 3 panel C. The regression coefficient for SOPDIFF was significant and positive ($F= 0.29$, $p = .01$).

DISCUSSION

The results of this study provide large sample empirical evidence that predominantly small business restaurants do practice

Table 2 - SOP Differences Between Periods of High and Low Demand (n = 85, Test Value = 0)

Variable	Mean	*t*	p
Charge higher prices	0.08	1.06	.29
Decline reservations	1.79	7.71	.00
Host(ess) answers phone	0.29	2.12	.04
Host(ess) fills takeout orders	-0.10	-0.66	.51
Host(ess) greets customers	0.57	3.79	.00
Host(ess) seats customers	0.63	4.02	.00
Host(ess) tracks tables	0.50	2.78	.01
Offer promotions	-0.29	-2.14	.04
Preset tables with snacks	0.20	1.77	.08
Streamlined menu	0.18	1.80	.08
Suggestive Selling	-0.44	-3.19	.00

Table 3 – Regression Analysis (n = 85)

Panel A: Dependent Variable Average Meal Duration				
Independent Variable	**Regression Coefficient**	***T* for Variable**	***F* for equation**	**Adj. R^2**
SOPDIFF	-.04	-0.38	0.15	.01
Panel B: Dependent Variable Range of Meal Duration				
Independent Variable	**Regression Coefficient**	***T* for Variable**	***F* for Equation**	**Adj. R^2**
SOPDIFF	-0.24	-2.15**	4.64**	.04
Panel C: Dependent Variable Table Turns				
Independent Variable	**Regression Coefficient**	**T for Variable**	**F for Equation**	**Adj. R**
SOPDIFF	0.29	2.69***	7.2***	.07
Level of significance * = ≤ .01; ** = ≤ .05; and * = ≤ .10**				

so during periods of high demand than in periods of low demand, restaurants are declining reservations and the host(ess) is greeting customers, seating customers, and tracking the occupancy of tables. These changes in SOPs allow the host(ess) to better manage the flow of customers. In contrast, during periods of low demand, restaurantsare offering promotions and engaging in suggestive selling. The use of these revenue

management strategies during periods of high and low demand is consistent with the recommendations of Kimes et al. (1999).

The hypothesis that higher levels of change in SOPs between periods of high and low demand will be associated with higher rates of revenue generation was supported. There is a significant relationship between changes in SOPs and both the range of meal duration and the number of table turns even though average meal duration does not vary significantly. As expected, changes in SOPs are inversely related to the range of meal duration. Moreover, changes in SOPs are positively associated with the number of table turns. The narrower range of meal duration and higher levels of table turns are indicators of the effective management of capacity among the sample restaurants.

These results suggest specific actions that restaurant owners and managers can take. First, in order to change SOPs in response to demand, they must first track demand so that they have a systematic forecast by time of day and day of the week to guide their adjustments. Tracking demand also entails tracking their reservations, both the accepted and declined reservations as well as the "no shows." In addition, they should track their walk-in customers, including walk-in customers who leave before being seated. With these measures of demand, restaurant operations can be planned to adjust to changes in that demand (Sill, 1991).

Second, restaurant owners and managers can gain additional benefits by performing analysis of their existing operations with an eye to changing them to make them more efficient. This analysis would involve measuring the times required to perform the basic service processes that comprise meal duration (e.g., time to greet, seat, service drinks, serve entrée, bring and settle the check, and bus and reset the table). With information on the mean and variance, the management can focus on reducing the length and variation in the time to perform those processes, especially those with high variance relative to the mean (Kimes, 2004).

Lastly, in order to get the most out of managing existing capacity, owners and managers can analyze their operations to insure that they maintain a balanced line during periods of high demand (Sill, 1991; Sill and Decker, 1999). If the rate of seating customers exceeds the rate at which the wait staff and the kitchen can serve them, then bottlenecks will form and stay throughout tperiods of high demand. This may decrease the rate of revenue generation. Further, it is important to manage the transition from periods of low demand to periods of high demand and then back to avoid having underutilized capacity. Using flexible hours and staggered shifts for employees may assist this effort (Sill and Decker, 1999).

The three actions suggested here (i.e., tracking demand, analyzing service processes, and maintaining a balanced line) can help restaurant decision makers more effectively manage capacity to avoid the financial difficulties that can result from its underutilization (Muller, 1999).

This research has several limitations which should be noted. The research was conducted in a single geographic location (i.e., region) and should be replicated to enhance the generalizability of its findings. In addition, this study employed a sample of full-service small business restaurants and the implications of the results are, therefore, limited to these restaurants. Different results might be found in large chains, fast food, or limited service settings.

Future research should investigate other aspects of restaurant revenue management in small business restaurants. For example, restaurant revenue management may require staff training in order to be successfully implemented. Future research may investigate levels of training and turnover and what effects they have on the rate of revenue generation. Further, revenue

management is managing capacity in response to changes in levels of demand. Future research might investigate if and how capacity utilization is analyzed in restaurants. Do restaurant owners and managers analyze their processes? If so, what methods do they use and how do they employ information they gain from the analysis? Do they try to ensure that their seating rates match the rates at which their wait staff and kitchen can serve customers in order to maintain a balanced line? Finally, making adjustments to changes in demand also occurs in relation to seasonal swings in the restaurant business. What changes in capacity do restaurants make in adjusting to swings in demand associated with seasonality and how similar or different are these strategies to those of restaurant revenue management as currently formulated in the revenue management literature?

The results of this research extend prior research by providing large sample empirical evidence on the practice and effects of restaurant revenue management. This evidence is consistent with the framework and recommendations of Kimes et al. (1998) and Kimes et al. (1999) and demonstrates its application in restaurants that have a small business rather than a corporate or large chain orientation. The revenue management methods examined in this study and restaurant revenue management in general provide small business restaurant owners and managers with a means to avoid the costly mistake of underutilizing their capacity. By adjusting SOPs in response to demand, they can increase revenue without increasing their restaurant's existing capacity.

In conclusion, this research has provided important first evidence that restaurants that are primarily small businesses use the restaurant revenue management method of changing SOPs. These findings provide a basis for restaurant managers to take a systematic look at SOPs. In short, the findings demonstrate that small business restaurants can use the strategy of "selling the right seat to the right customer at the right price and for the right duration" (Kimes, 1999, p.17) to increase revenues.

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