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# Practical Applications of Revenue Management in Full Service Restaurants

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Practical Applications of Revenue Management in Full Service Restaurants

by

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A professional paper submitted in partial fulfillment  
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## **Chapter One**

### **Introduction**

Revenue management is the act of skillfully, carefully, and tactfully managing, controlling and directing capacity and sources of income, given the constraints of supply and demand (Forgacs, 2010). This field grew out of the yield management strategies developed for use in the airline industry beginning in the 1960s. They used data driven decision making to maximize revenues gained from every seat on every flight. The hospitality industry now views this field as one of the core competencies for successful profitability (Hayes & Miller, 2011). It is a multidisciplinary approach that blends elements of marketing, operations, and financial management to effectively forecast demand, set prices, and manage capacity. Through a review of extant literature on the field of RM, we can discover a number of methods that are suitable for application in restaurants.

### **Purpose**

The purpose of this paper is to analyze how the levers of price, time, and space can be effectively managed to generate revenue for full service restaurant operations.

### **Statement of Problem**

Restaurants have been slow to adopt revenue management practices employed by other industries such as hotels and airlines (Choi, 2011). Part of the reason for this problem is that managers may not believe they have the ability to alter prices in the same ways as other industries. Customers may perceive unfairness if charged different prices for the same product (Kimes & Wirtz, 2002). This was the case when airlines and hotels started using revenue management as well. Over time companies were able to educate their customers and now revenue management practices are commonplace and customers understand and expect the

differences in prices. Another reason may be that restaurants tend not to collect and store customer purchase data making the essential segmentation efforts of revenue management difficult.

### **Justifications**

This paper is justified by the needs of the restaurant industry to better manage revenue. Traditionally, cost control had been at the forefront of restaurant management as the primary method for operating a successful business (Hayes & Miller, 2011). Restaurants typically operate on slim profit margins estimated to be only 4.5% of revenues (Alvarez, 2017). At these margins any way more revenue can be generated should be a welcomed advance. Increases to revenue that don't proportionally increase costs can be taken directly to the bottom line (Choi, 2011). The realization of top line revenues that make it to the bottom line is incredibly important and therefore this paper's purpose of analyzing how revenues can be more effectively generated using revenue management is fully justified. Additionally, recent instability brought on by changing regulations seems to suggest that labor costs are on the rise. This further highlights the need to focus on maximizing revenues.

### **Constraints**

This paper will focus on revenue management principles and practices that can be used in full service restaurants. This excludes other restaurant types such as quick, and limited service restaurants. It may be the case that certain revenue management practices in quick or limited service restaurants can be applied to full service and if so this connection will be highlighted. Additionally, it may be necessary to discuss how revenue management is used in hotels and airlines, but the focus remains on how revenue management can be applied to full service restaurants.

## **Chapter Two**

### **Literature Review**

Revenue management (RM) is defined as the application of information systems and pricing strategies to allocate the right capacity to the right customer at the right place at the right time (Kimes, Chase, Choi, Lee, & Ngonzi, 1998). Generally, this is applied by matching prices to demand predictions so that price sensitive customers will purchase at non-peak times and customers who are not price sensitive are able to purchase during peak times. In theory, this results in the maximization of revenues because more capacity is available to those wanting to pay higher prices, while non-peak times are able to generate revenues from otherwise unused capacity.

### **Industry Attributes for RM**

There are a number of attributes that a firm should possess in order to realize benefits associated with RM. The first attribute of an industry primed for RM is a one with relatively fixed capacity (Cleophas, Yeoman, McMahon-Beattie, & Veral, 2011). Businesses that have constrained capacity need to ensure they are earning as much as possible on it. If demand is greater than capacity, prices should be increased to achieve this. Business that have unconstrained capacity are able to absorb period of high demand through the use of inventory as a buffer (Cleophas et al., 2011). Capacity can be either physical or non-physical. Physical capacity comes in the form of rooms in the hotel industry, or seats on airlines. Non-physical capacity, is generally time based like tee times used by golf courses.

Predictable demand and time variable demand are also attributes of firms that can use RM (Cleophas et al., 2011). Demand in firms with constrained capacity is made up of customers who have made reservations and those that are walk-ins. Using these groups of customers a

business is able to estimate, or forecast, the amount of demand they can expect making it relatively predictable. Demand that is time variable fluctuates day to day, as well as over time of day, and seasons. To effectively use RM, a firm should be able to forecast demand levels at different times as well.

The perishable nature of inventory is another attribute of firms that would benefit from RM (Cleophas, et al., 2011). Perishable inventory is one of the key characteristics of the service industry. If inventory goes unpurchased it expires. As hotel rooms go unsold, or seats in a restaurant unfilled, the business loses the opportunity to generate revenue from them. Additionally, those laborers who are available to provide the service become idle production capacity if there are no customers to serve (Hayes & Miller, 2011). This exacerbates the problem of perishable inventory as it is unable to generate revenue and results in unnecessary costs.

Finally, a business should have an appropriate cost structure (Cleophas, et al., 2011). Fixed costs should be relatively high and variable costs low (Cleophas, et al., 2011). Variable costs account for 30% to 50% in most restaurants (Susskind, Reynolds & Tsuchiya, 2004). This allows for greater flexibility in setting prices to shift demand and provide greater contribution margins to offset fixed costs. Hotels, and airlines are primary examples of firms with this kind of cost structure. While the focus of RM is on generating revenue, cost is still an important part of setting prices because the generation of long term profits is the ultimate goal of any business.

### **The Strategic Levers**

There are three strategic levels that a firm can use when implementing RM: space, time, and price (Kimes & Renaghan, 2011). Space refers to the actual physical space that is sold. This is a hotel room, airline seat. Space can be sold implicitly, meaning that the space being sold is

not overtly defined. The firm chooses how to arrange the space and sells it to different customers at different prices. Firms that sell their space explicitly are forced to provide the fixed amount purchased by customers. Time can also be sold explicitly. Time on an airplane, for example, is explicitly purchased in the form of a seat where the time of the trip from the departing destination to the arriving destination is the amount of time purchased. On golf courses, however, time is implicitly purchased. Golfers don't have a specific time limit to finish and don't like to be rushed. For greens fees the purchased time is not explicit, so the firm must estimate rate of play in predicting its capacity. Price is the final lever of RM. Price is defined as the measure of value given up by a buyer and a seller in a business transaction (Hayes & Miller, 2011). There are a variety of terms that are substituted for price such as fair, greens fee, room rate, or menu price. As a strategic lever price is varied to match and shift demand as needed. RM is analyzed and maximized in terms of revenue per available time based space, thus incorporating the three strategic levers.

### **Restaurant Revenue Management**

Due to the uniqueness of the restaurant industry and to distinguish its practices from others RM in the restaurant industry is called restaurant revenue management (RRM). RRM faces certain challenges that are different than other industries that use RM. The primary challenges are uncertainty of arrival and uncertainty of duration (Kimes et al., 1998). Restaurants that take reservations reduce uncertainty of arrival over those that only take walk-in customers. However, there is no disincentive to the customer for not arriving for a reservation so there is still a degree of uncertainty of arrival (McGuire & Kimes, 2006). The uncertainty of duration is a problem for RRM because it adds difficulty to forecasting available capacity. Where hotel guests have check-in and check-out times restaurant patrons do not. It is important

to able to forecast the amount of time that capacity will be used so you can know when it will next be available for sale. These unique challenges of RRM will be discussed in relation to the strategic levers to which they relate in forthcoming sections of this paper.

### **Space**

The strategic lever of capacity in restaurant revenue management (RRM) refers to the available seats from which revenue can be derived. Restaurants are somewhat unique in terms of capacity because they may have areas that can be opened or closed to adjust to demand levels, seasons, events, or other factors. For example, in nice weather an outdoor patio may enlarge the seating capacity of the restaurant or during a particularly busy day seating in a bar area not normally considered part of the dining room could be used for overflow. These kinds of capacity changing maneuvers could wreak havoc on a forecasting manager if not careful. Decisions on how capacity is calculated should take into account the restaurant's ability or pattern for changing seat counts. This is because inaccurate methods would result in skewed numbers that may affect the decision-making abilities of managers when presented with compromised numbers.

Reservations and waitlists can be used in restaurants to manage demand and the allocation of capacity. The decision whether or not to accept reservations is important for any new restaurant. Generally, not taking reservations means a restaurant would use the first-come-first-served (FCFS) model of seating. The Culinary Institute of America (2014) recommends that this decision be undertaken with a clear vision of the restaurant's style in mind as this impacts whether or not reservations should be accepted. Formal or casual service, and the expected volume of demand may all impact the decision. In the Culinary Institute of America's (2014) determination the proportional benefits of taking reservations outweigh those of FCFS. From an RRM perspective reservations would be desired because of the integral part they play in



forecasting. By taking reservations managers have a better idea of the expected demand on any given night than if they only used FCFS.

Of course, in taking reservations the question becomes how many should you accept. There is always the risk of reservations not being fulfilled and holding tables for reservations that are no-shows can result in reduced occupancy and RevPASH. This is known as the uncertainty of arrival problem (Kimes et al., 1998). Hotels manage this by overbooking (Hayes & Miller, 2011). Through an analysis of past trends they know a certain percentage of reservations are no-shows. To mitigate the damaging effect of no-shows they book more reservations than have space. The hope is that by overbooking they are able to generate revenue from the percentage of rooms that go unsold because of no-shows. If a lower percentage of guest no-show than usual and the hotel runs out of supply they often have procedures in place for securing rooms at other hotels for the displaced guests. Overbooking is not a common practice in restaurants (Kimes, 2011). Perhaps this because the negative effects of not honoring a reservation are more detrimental in restaurants than in hotels. Another reason could be that managers don't carefully track and analyze no shows so that they have a better idea of how many to expect. Additionally, the time of reservation plays a bigger role in restaurant reservations. Hotel reservations are daily and so are no shows. In restaurants the number of no shows could vary for every reservation time slot so coming to an accurate prediction of which reservations could be overbooked becomes much more complex. The preferred method for dealing with the uncertainty of arrival problem is to disincentivize no-shows and in the event they do occur fill the unused capacity via a waitlist.

In an effort to illuminate methods of reducing no-shows Kimes (2011) researched the use of several different reservation techniques and their perceived fairness among customers. The

common technique of table holding, in which reservations are given ten to twenty minutes after their expected arrival time before the table is given away is seen as a fair and acceptable practice (Kimes, 2011).

Another technique is described as entire party seating where the party is only seated if everyone is present was seen as neutral by customers. This is especially useful with large parties which could conceivably hold a number of seats that aren't actually occupied resulting in diminished RevPASH (Kimes, 2011). In this same vein is the short show technique, where a fee is charged per person that a reservation is short. This was seen as somewhat unfair by customers, as they feel burdened by the actions of the non-present persons (Kimes, 2011). However, short show fees can be especially useful in situations where items need to be prepared in advance and cannot be resold. Another method, the credit card guarantee, which charges a fee for no shows, disincentives the practice of making reservations and not taking the time to cancel them if you decide not to attend.

Finally, a maximum duration technique is used when guests are informed that there is a maximum time they are able to occupy a table. This may be useful for the revenue manager by reducing the uncertainty of duration however it is seen as "inhospitable" by customers (Kimes, 2011). Some restaurants use this technique on special occasions when multiple seating are required and demand forecasting is imperative such as New Year's Eve. In actuality, any and all of these techniques may be strategically employed in a restaurant to fit the needs of management. However, it is important to assess the risk of impacting customer satisfaction.

Another possible avenue for RRM is the unbundling of reservations from the core services provided by a restaurant (Kimes & Wirtz, 2016). This would mean that reservations were purchased by customers in addition to the service and food, effectively turning the

reservation book into a revenue center. Some reservation platforms have already been developed which do just that. While OpenTable and similar platforms charge the restaurant for each booking, new platforms, such as KillerRezzy.com, instead charge the customer up to \$25 for hard to get reservations and pass some of the charge on to the restaurant. Admittedly, this practice seems more viable and useful for busy restaurants that have more demand than they can effectively satisfy.

Research conducted by Kimes and Wirtz (2016) suggests that only a small percentage of potential customers would find paid reservations an acceptable practice. The vast majority of diners have a negative perception of paying for reservations. In this study, four pay-for-reservation methods were given as scenarios for and judged based on familiarity, fairness, motive, and impacts on satisfaction. The key finding of this study is that while only a small percent of respondents were familiar with each practice the level of familiarity correlated positively with perceived fairness and satisfaction. Basically the more someone knows about the policy the more freely they engage in it. This comes as no surprise as paying the maître d' for a table was once a common and widely accepted practice, although it had no positive financial impact for the restaurant (Kimes & Wirtz, 2016). While that practice may have fallen by the wayside, a new, more transparent paid reservation policy could be acceptable given that the restaurant clearly explains how it works and its benefits to the guest.

Assuming a restaurant does decide to use reservations that generally means an investment in technology (Gregorash, 2016). The desire to look for ways to improve business functions through the use of technology is described as a firm's technology orientation (Oronsky & Chatouth, 2007). This is a process that once undertaken in earnest requires a long term view and a regular surveying of advances in the technology one adopts. One of the most important factors

to consider in the adoption of new technology is the financial impact (Kimes, 2008). The first step is to conduct a financial analysis to determine if the cost of the technology will be more than offset by the benefits (Kimes, 2008). It has been shown that restaurants that take reservations have higher check averages than those that do not (Gregorash, 2016). So the question for managers is whether that increase is big enough to cover additional expenses from investment in the technology. The 2% to 5% increases in revenue through the use of RRM practices in conjunction with appropriate technology is often more than enough to offset costs (Kimes, 2008). Furthermore, appropriate technologies have been shown to increase customer's satisfaction which results in greater intention to return and therefore increases demand. This highlights a possible correlation between the use of reservation technology and increases in demand and revenue.

Whether reservations are taken or not, many restaurants still take walk-ins and operate waitlists at times when demand is greater than capacity. Generally, waitlists operate on a FCFS basis. However, according to McGuire and Kimes (2006) a number of waitlist management techniques that violate FCFS can be used to enhance revenues. For example, the matching of party to table size was perceived as a fair and acceptable practice even if it violates FCFS. This maximizes occupancy and theoretically enhances RevPASH. Additionally, operating a call ahead waitlist, giving the restaurant a small planning window, was seen as acceptable as well (McGuire & Kimes, 2006). Seating VIPs ahead of same size parties was seen as very unfair. A fourth practice that can be common at restaurants that don't normally take reservations is taking them for large parties. Large parties can disrupt the normal flow of service if not properly planned for and can also negatively impact occupancy if a table needs to be held empty for an unreasonable amount of time while waiting for a few remaining seats to come available.

Respondents who were unfamiliar with this practice found this somewhat unfair, while those familiar thought it to be acceptable (McGuire & Kimes, 2006). Here again the benefits of using these techniques must be weighed against the risk of negative effects on customer satisfaction.

The goal of a restaurant's seating methods should be to ensure the minimization of wait times and the reduction of unused seating at occupied tables. Not only should managers seek to reduce wait times to increase utilization but also because wait times have been shown to be a major source of customer dissatisfaction (Hwang, 2008). Effective management of seating can provide capacity by reducing wait times and therefore increase revenues. Hwang's study of seating methods looked at different combinations of business levels and party sizes to analyze the effects of seating methods on wait times. Party sizes distribution was categorized into four levels. Level one consisted of only large parties of six or seven customers, level two were small parties of two or three, level three were mixed parties of only one or eight, and level four were equal parties with one through eight customers. The seating methods were determined to be front to back, where tables were filled starting at one side of the restaurant and moving to the other, out-in, where the tables are seated in a circular fashion moving to the core, in-out, the reverse of the previous method, and random, where customers were matched to tables with no formal method being used (Hwang, 2008).

To test the effectiveness of each seating method they were used with arrival rates of slow, moderately busy and very busy and controlled distributions of party size levels. Simulations ran these models to find the method that produced the lowest wait times. The front to back method was proven to be the best overall method with ten to fifteen percent reductions in wait times over the worst performing random method (Hwang, 2008). The out-in method was shown to work best when only large parties were being seated because it offered more flexibility in table

combinations. This is an unlikely scenario as restaurants tend to have a mix of party sizes and it would be highly unusual to only seat large parties. Perhaps this could be used in seating private events where tables are set in advance but in this case flexibility would not likely be needed. In-out and random seating methods worked poorly because of a lack of spatial flexibility (Hwang, 2008). Here again we see some difficulties with the research due to the fact that customer preference for a table could throw off the entire seating model. For example, if a restaurant were using out-in, but before the sides are filled a customer requests to be seated in the middle. Strategies to handle these kinds of situations ought to be developed to mitigate the effects customer requests may have on the seating method.

The concept of spatial flexibility in restaurants relates to the restaurant's ability to change the table mix in order to achieve higher capacity and higher seat utilization which should result in higher revenues. In an effort to optimize RevPASH through spatial flexibility, Kimes and Thompson (2004) developed a model for determining table mix. Through the collection and input of several variables including the distribution of party sizes, mean dining duration, and hours of peak demand one can accurately calculate the total number of each table size to maximize capacity utilization and increase RevPASH (Kimes & Thompson, 2004). The model was used to optimize the table mix in an actual restaurant and after testing and measurement with controls it was shown to have a net positive impact of 5.1% on RevPASH. The model has since been updated to include further spatial considerations, however, as more changes to the model are made its practical use becomes less reasonable (Thompson, 2015). The original model, while only a simple rough calculation, continues to produce significant results and can help restaurants in the design of a new restaurant or the redesign of an existing one with minimal data collection and limited specialized mathematical knowledge.

A number of mathematical models have been developed to achieve optimal capacity (Hwang, Gao, & Jang, 2010; Thompson, 2002, 2015). These models tend to become relatively complex problems as many variables are taken into account such as the randomness of arrivals and distribution of party sizes. At worst, these models require a number of key assumptions which are not likely to hold true in actual practice. At best, modest increases in RevPASH can be achieved. However, the practicality of using such models on a regular basis is often prohibitive. Regular forecasting, a clear and controlled reservation system, and sensible seating methods used with a flexible table mix provides managers with the best chances of optimizing capacity on a regular basis.

### **Time**

The strategic lever of time, refers to the duration that units of inventory are being consumed. In restaurant revenue management (RRM) this is the duration each seat is occupied. The amount of time analyzed by managers is often in seat hours although with dedicated data collection this can be reduced even further to quarter hours or even spending per minute (SPM). Duration is one of the most difficult aspects of RRM because of the significant variability and uncertainty included in every sale. While hotel rooms, and airplane seats are sold for relatively fixed durations a restaurant seat usually has no such time limits attached. The goal for RRM is to forecast duration as best as possible in order to properly plan for effective capacity.

As Bloom, Hummel, Aiello, and Li (2012) evidenced in the study of casual full service restaurants, meal period, and number of customers per table (party size) are the main determinants of meal duration. By calculating mean duration for parties ranging from one to nine guests, and the standard deviations, they were able to determine that party size had a significant relationship on the total duration (Bloom et al., 2012). This was also shown by Bell

and Pliner (2003) where they researched the effect of party size on meal duration in three different lunch scenarios. Taken together these studies appear to be at least tacit proof of something many restaurant managers have long suspected. Lunch customers have a shorter window to dine in and therefore average duration should be shorter than dinner customers for like size groups. Furthermore, on average smaller party sizes finish quicker than larger parties. This is not to say every table of eight has a smaller duration of every table of nine but for planning purpose we could expect a table of four to have a lesser duration than a table of eight on average. Through a coordinated effort of data collection a manager could obtain this information about their own restaurant and form their own regression equation for predicting duration. While this equation would most likely not be a useful tool to estimate wait times in the middle of business, it could be useful for forecasting efforts.

Seo and Hwang (2014) have further shown that gender composition of parties, and a number of other factors contribute significantly to meal duration. On average gender balanced parties spent nearly ten minutes less dining than all male or all female parties (Seo & Hwang, 2014). Furthermore, gender balanced parties exhibited the highest SPM. These two factors taken together would suggest that it is a segment worth targeting for managers.

Party size was found, once again, to increase duration, but also to have the opposite effect on SPM (Seo & Hwang, 2014). Larger parties were found to take up valuable capacity for longer periods while spending less. Part of the reason for this finding may be simply in the operational mechanics of serving large parties. It requires more hands, more trips, and more resources and can therefore take longer to complete each stage of service. While each person may be spending a similar amount on average to those in smaller parties the ratio of spending appears to be less beneficial because the time it takes to serve has increased due to inefficiencies



of service. Managers should seek to eliminate these kinds of inefficiencies and serve each person at a similar rate to gain more accurate spending data and reduce the effect party size can have on duration.

The presence of alcoholic beverages was also shown to be a factor contributing to increased meal duration in gender balanced and all female groups (Seo & Hwang, 2014). Wansink, Payne and North (2007) also studied this phenomena, showing when wine is added to the dining environment it increases the consumption of food and therefore the duration. Part of this may be due to what has been described as conformity effects, where a diner's impression of the environment and companions alters how much they consume (Bell & Pliner, 2003).

The addition of alcoholic beverages is often a favorite upselling tool of servers and managers alike. Indeed, Seo and Hwang (2014) also found a significant link in all gender groups between the presence of alcoholic beverages and spending. For RRM, the strategy here would be to try to upsell alcohol more during off peak hours to encourage higher revenues at a time when duration has less of an impact. At peak times the duration is more important and so upselling items that increase duration would reduce table turns and could negatively impact RevPASH.

Kimes and Robson (2004) looked at the effects of table characteristics on duration and subsequent SPM. The focus of the study was to analyze the effect of restaurant design on RRM. Tables of four set horizontal compared to diagonal showed no difference in RRM performance measures. The study did find that banquettes (the frequent sight of large parties) had the longest duration and lowest SPM (Kimes & Robson, 2004). Booths were found to have the highest average checks, although an increased duration likely attributable to the privacy and comfort of the booth resulted in higher than average duration and lower SPM (Kimes & Robson, 2004).

Another interesting finding of this study was that anchored tables, those along interior walls (including banquettes) and those protected on three sides (booths), performed worse on average duration and SPM than unanchored tables (Kimes & Robson, 2004). Unanchored tables are those that are not along any walls or affixed to another structure. These have long been assumed to be less profitable. Unanchored tables, including “bad tables” (close to kitchens, bathrooms, or service stations) were found to have shorter than average durations and higher SPM (Kimes & Robson, 2004). So perhaps bad tables are not as bad as previously thought, at least from an RRM perspective. This assessment must be taken in stride, however. It must be understood that the goal of RRM is to capture as much revenue as possible while still providing the customer with expected value. The bad tables may look good on paper but the risk to customer satisfaction must be carefully evaluated. Certainly, a manager would not take these results and endeavor to design a restaurant comprised entirely of bad tables to in order to maximize SPM. A more viable option could be offering an incentive for bad tables to head off a negative impact on satisfaction while still generating revenue.

In addition to the research of Kimes and Robson (2004) on restaurant design characteristics, studies have been conducted analyzing the effects of music on customer behavior. These serve as further proof of the importance that design of the servicescape has on business performance. Research has shown how the type of music, when in synergy with the other design aspects of a restaurant, can effect spending and duration (North, Shilcock, & Hargreaves, 2003). Classical, and jazz music were found to increase total spending and duration respectively. As stated previously herein, the goals of RRM are demand shifting to achieve maximum revenues. This would suggest playing congruous music during times of peak demand may actually increase duration and therefore the trade off with revenue must be analyzed by

managers. Caldwell and Hibbert (2002) have shown that changes in music tempo can be effective at changing duration. In their study it was found that slower tempo music affected the perception of time spent in the restaurant thereby slowing consumption and increasing duration. This also resulted in increased spending highlighting this study's usefulness in RRM. Slow tempo music could be during lower demand periods when turnover is not a goal but revenue increases would be more beneficial. Conversely, it was found that high tempo music would reduce duration and could therefore be a tool for RRM during peak demand to increase table turnover (Caldwell & Hibbert, 2002).

Further efforts to manage the uncertainty of duration can be focused on the service side of the restaurant. Managers can, and should, analyze the service process design in order to eliminate inefficiencies that may unduly be extending meal duration. This would include looking for bottlenecks and making sure that the restaurant was properly staffed to meet forecasted demand levels (Kimes et al., 1998). Additionally, the menu should be designed in a way that is clear and easy to use to facilitate quicker ordering. Kimes et al., (1998) goes on to suggest measures such as having a separate area for coffee and dessert could free capacity for new diners. In most cases there will still be some element of uncertainty of duration but there are a number of methods that should be employed by service staff to reduce the duration as much as possible on the part of the restaurant. Pre-bussing, check presentation, and other visual or non-verbal cues can be used to signal the end of the meal to the guest with little perceived impact on satisfaction (Kimes et al., 1998).

### **Price**

In restaurant revenue management (RRM) the importance of price in the marketing mix cannot be overstated. Absent the presence of other indicators, price is the primary indicator of

quality. Price is the crucial tool managers can use to effectively ration the scarce resource of capacity (Hayes & Miller, 2011). One of the goals of RRM is to optimize revenues while providing the customer expected value in order to yield the greatest profit. This requires not only the knowledge of cost and expenses that must be covered but also some intuition of customer behavior and willingness to pay. According to Hayes and Miller (2011) the true value of the product is equal to what the consumer is willing to pay for it, and this why prices should always be value based.

While RRM focuses more on the value proposition, cost is still a useful place to start when setting prices. There are several cost based methods that can be used to varying degrees of success. There is the product cost percent method. For this method the product cost is divided by a management defined target cost percentage to find the selling price (Hayes & Miller, 2011). Then there is the pricing factor method where 1 divided by the desired product cost percent equals the pricing factor (Hayes & Miller, 2011). The pricing factor is then multiplied by product cost to find the selling price. Most restaurants set prices based on an analysis of the contribution margin (Raab, Hertzman, Mayer, & Bell, 2007). In restaurants, the contribution margin (CM) is often calculated as revenue minus cost of goods sold which is more commonly known as the gross margin. This includes step costs, which often act like fixed costs, into the CM. To find the selling price using this approach product cost is added to a desired CM.

Raab et al. (2007) argues that using the CM method for price setting is inferior to an activity based costing method. In activity based pricing overhead is analyzed and distributed to corresponding products so that it traced directly to the selling price. Traditionally labor, although a large expense for restaurants, is not included in the calculations for determining price.

Activity based costing, however, does include labor as well as other fixed costs to ensure that prices result in profitability.

Whatever method of price setting is used menu engineering is a useful tool for analyzing item performance (Hayes & Miller, 2011). Menu engineering (ME) is the practice of comparing menu items CM, or operating profit margin if using ABC, and popularity. Additionally, items CM is compared with the averages of the entire menu to establish a profitability factor (PF). The PF should be close to 1.0 and the range of PF across the menu should be as small as possible (Raab, et al., 2007). Based on the results items are grouped into a 2X2 matrix. Items with high CM and popularity are stars and should be pushed to customers. Items with high CM but low popularity are puzzles, and some consideration should go into finding a way to increase popularity whether by a decrease in price or increase in quality. Items with low CM and high popularity are workhorses. Depending on how high the popularity of the item is perhaps, a price increase could turn the item into a star. The items that have both low popularity and CM are dogs. These items don't do much for the restaurant in terms of profitability. Sometimes an item is a dog but just needs to be available because the style of restaurant. If that is the case some effort should be made to at least move it to the puzzle or workhorse category. It may also be time to considering removing the item from the menu.

Revenue management has traditionally employed the use of differential pricing in order to optimize revenues. Differential pricing is the practice of charging different prices to different customers for the same or slightly different product or services (Hayes & Miller, 2011). This is also known as demand-based pricing, segmented pricing, or discriminatory pricing. There are a number of factors that impact differential pricing. Broadly speaking, prices can be altered based

on any combination of customer characteristics, location, time, quantity, channel, version, bundle, or payment terms.

A crucial aspect of differential pricing is the perceived fairness of the offer. If customers believe a business to be operating unfairly they will refuse to patronize it (Kimes & Wirtz, 2002). While differential pricing may result in a boost in short term profits if it is seen as unfair it could alienate customers and lead to declining profits over time. Therefore, fairness is key for the maximization of long term profits which is the ultimate goal of RRM (Kimes & Wirtz, 2002). From the customer's perspective, fairness is directly related to the value of the offer presented by the business. Customers determine value through the combined perception of products and services offered less the price charged (Hayes & Miller, 2011). If price is greater than perceived quality then there is negative value in the offer and the customer is unlikely to purchase. As perceived quality of either the product or service, or both, increase so does the perceived value. Value also increases as price decreases. It is important to note, however, price is so essential to this equation because if price falls too low it can drag perceived quality down with it. Conversely, if price is much higher than quality it is viewed as a "rip off" and perceived quality is further reduced as well.

Fairness in pricing is best explained by the economic principle of dual entitlements (Kimes & Wirtz, 2002). This rule states buyers are entitled to a reasonable price and sellers are entitled to reasonable profit. For the seller this means changes in price should be in direct relation to changes in costs. In essence, a firm shouldn't engage price hikes while costs decrease in effort to unfairly maximize revenue. This would suggest, however, that buyers have some insight into profit margins of a business. In the case of RRM, this is not universally true because often times the change in price may be tied to something as simple as a table with a better view,

for which there is no observable difference in cost to serve over any other table. The dual entitlement principle is further complicated by whose money is being spent and who the money is being spent on. This results in four distinct value formulas (Hayes & Miller, 2011). If it is your money being spent on yourself or someone else, or if it's someone else's money being spent on you or someone else. Dual entitlements is most applicable when evaluating a purchase decision for yourself with your own money. However, it is less applicable when you are spending someone else's money.

When using differential prices the goal is lowering prices enough to encourage some that would not otherwise make a purchase to do so, while at the same time insuring those that are willing to pay a higher price do not receive the discount. The appropriate RRM method to do this is by establishing rate fences (Kimes & Wirtz, 2002). Rate fences are specific requirements or rules that are imposed to describe who is and is not eligible for certain prices (Hayes & Miller, 2011). Rate fences act to encourage self-segmentation of customers based on their adherence to the rules and willingness to pay (Kimes & Wirtz, 2002). Rate fences need to be fixed, logical, and transparent to be fair. They should also be easy to understand and not unduly complicated to discern. Transparency is important because it allows the customer to draw clear conclusions on the perceived quality and price from which they estimate value. Rate fences need to be fixed so that they cannot be circumvented, meaning they are designed so that customers are not receiving lower rates though they were intending to pay higher ones.

Rate fences can be physical or non-physical. Examples of physical rate fences in RRM include charging different prices based on the location of services rendered, the furnishings available to the customer, the presence of a desirable view, or other service amenities not otherwise offered (Kimes & Wirtz, 2002). Non-physical rate fences include time, such as happy

hour, transaction characteristics, such as pre-payment, buyer characteristics including senior citizen discounts and controlled availability (Kimes & Wirtz, 2002). Controlled availability refers to set amount of a promotion distributed or allowed such as a fixed number of coupons.

In a 2002 study Kimes and Wirtz analyzed the perceived fairness of five rate fences as well as the framing of the offers. A survey was administered in which respondents were asked to rate how fair they perceived the restaurant offers. The price situations included different prices according to meal period (lunch or dinner), on weekends and weekdays, times of day (e.g. Happy hour, early bird), a two for one coupon, and table location. The price differences were also framed in two different ways as a surcharge or a discount.

Kimes and Wirtz (2002) found that differential pricing used for meal periods was seen as fair. However, this finding was accompanied by the perception that portion sizes, and menu mix, would also differ or perhaps there would be some form of entertainment. This suggests that without some sort of added value it may be perceived only as neutral or unfair if exactly the same offer is presented. Day of week and time of day differential pricing was also seen as fair (Kimes & Wirtz, 2002). For all three of the preceding offers, framing as a discount increased the level of perceived fairness while framing as a surcharge decreased perceived fairness. The coupon offer was seen as the most fair. This is unsurprising as it is a valuable and popular tool in RRM, so long as it is being used to build demand during slow periods and not being given to customers that would otherwise pay full price.

Differential pricing based on table location was the only situation perceived to be unfair especially when presented as a surcharge (Kimes & Wirtz, 2002). A discounted price for table location was seen as slightly fair. This suggests that revenue could be obtained by otherwise undesirable tables if some discount were offered although impacts on satisfaction are unknown.



If a restaurant were to use a surcharge for table location it is recommended that it be hidden as either a cover charge or minimum table spend to increase the perceived fairness.

Another important concept when assessing fairness of pricing is the reference price. The reference price, or reference transaction, is what the current offer presented is compared with (Kimes & Wirtz, 2002). It is the price the customer last paid for the same quality product, or combination of quality and price, and therefore the value of the current offer is assessed in relation to the reference price. The reference price may also be what other customers have said they've paid, or what market prices have been observed in the past. However, some have argued that reference price is an imprecise tool used in measuring customer willingness to pay and their perception of fairness. Raab, Kim, Mayer, and Shoemaker (2009) argue that especially for services, reference prices can become confused in the mind of consumers and therefore produce a lack of specific price limits. Instead, a market based measurement of price sensitivity can be conducted to obtain a more precise range of prices to and elevate perceived fairness (Raab et al., 2009).

In order to accurately gauge the price sensitivity of a buffet in Hong Kong researchers distributed a questionnaire designed to assess the customer willingness to pay (Raab et al., 2009). Respondents were specifically asked at what price they would see the buffet as being too inexpensive and negatively impact their perception of quality and at what price they would see the buffet as being of good quality and good value (Raab et al., 2009). The price sensitivity data collected was then used to establish the indifference price, neither cheap nor expensive based on price and quality, and the optimal price point, the crossover point of too cheap and too expensive. The resulting range between the indifference price and the optimal price is the stress range, in which the price may be altered without impacting perceptions of quality and value

Based on these measurements they were able to show the restaurant's current price was too low and could be raised without negatively affecting demand. While this study was conducted in a buffet it does not preclude the findings of the study from being applicable to other restaurants, such as full service.

The ability of RRM strategies to shift demand from peak hours to period of low demand is crucial. Susskind et al. (2004) researched the effects several incentives have in shifting demand. The incentives studied were price based, or at least altered the value proposition available to the guests by providing additional non cash value. Restaurant customers were surveyed to see how desirable they perceived various time shifting incentives. Seventy seven percent of the 367 customers surveyed responded in favor of receiving incentives for dining at off peak times. Of the five incentives, a time restricting coupon, a fixed price menu, and a cash discount were found to be significant and likely to shift demand. The other two incentives, distinctive services or product offerings, changed the value proposition rather than explicitly changing the price but were found to not be likely to shift demand. This study highlights the effectiveness of rate fences and differential pricing strategies in shifting demand to possible increase revenues.

### **Conclusion**

RRM's potential to improve restaurant performance is immense. It is a practice that has been very beneficial to other industries, and while restaurants face certain unique challenges, they can benefit as well. RRM requires managers to look not only at the prices they charge but also the process through which they provide service and even the design of the space. Additionally, a clear understating how the customers' perceive the value proposition your restaurant is offering is required so informed decision that alter that proposition can be made.

Through an analysis of the strategic levers of space, time, and price managers can develop strategies to provide the right mix of customers with the right products at the right times thereby generating sufficient revenues and ensuring long term profits.

## **Chapter Three**

In the previous section a wealth of research into restaurant revenue management (RRM) practices was reviewed. Here these practices will be further examined in an effort to present a course of action for the application of RRM. The strategic levers are looked at in a more holistic way to provide an understanding of how they can be managed in concert to achieve success. Additionally, questions that arise from some of the previously presented literature will be examined.

### **Discussion**

The first step in the application of restaurant revenue management (RRM) is to find the baseline performance measures of the restaurant. This requires implementing a process of data collection to ensure the metrics being used to analyze performance are accurate. There are a number of methods for data collection in restaurants, the most common being the use of the point-of-sale (POS) terminal. Additionally, some of this data (duration and demand) can be collected via a reservation system or log book if reservations aren't taken. Reservation systems also provide the ability to track individual customer related data that can prove useful in building relationships and identifying the most profitable customers. Figure 1.1 displays the data to be collected and how it can be used post service.

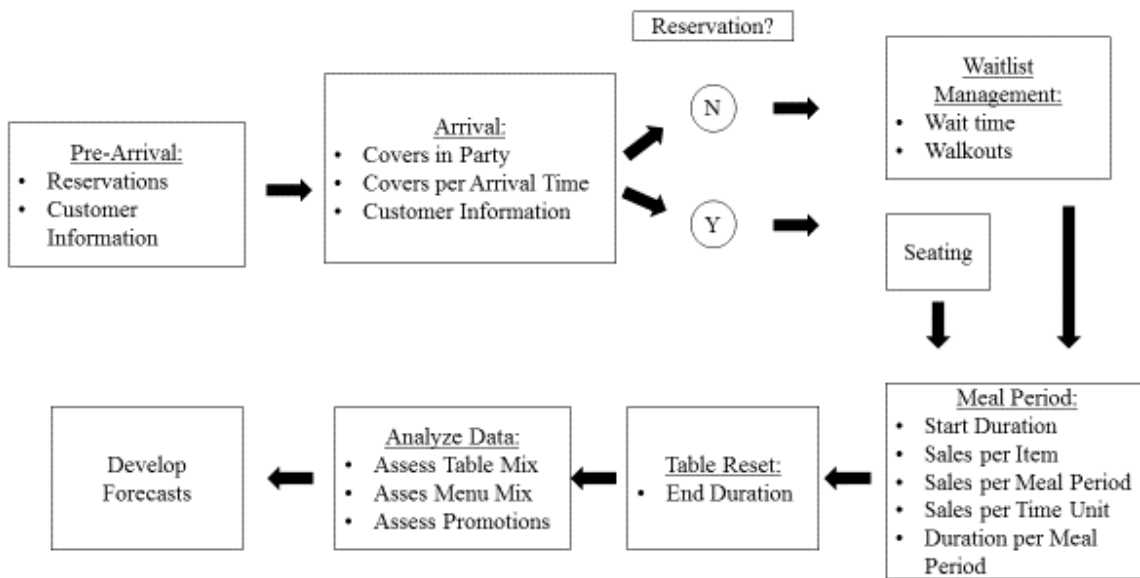


Figure 1. Data collection and usage.

Using POS or reservation systems a manager is able to collect data related to demand, duration, and sales. More specifically, during any given period they can see how many covers they serve, the length each check is open, and the price and quantity of items sold. From this managers can calculate seat occupancy, average duration, average check, revenue per available seat hour (RevPASH), and spending per minute (SPM). There are, however, a number of sources of error that must be addressed to ensure accurate results.

Referencing Thompson & Sohn (2009), the time period used to calculate RevPASH is important for gathering accurate results that help guide decision making. Often revenue will be allocated to the time the check was opened, front loading the RevPASH throughout the meal period. Instead, allocating the revenue over the true time, or entire duration the seats are occupied, results in more accurate calculations. To correctly gather the true duration of each check, managers must provide clear instructions to service staff regarding the opening and

closing of checks, and standardize this process. It is common for checks not to be opened until an order is placed. We know though that customers often sit with menus for a length of time before ordering. Sometimes very long if waiting for others to arrive or when having a meeting. This issue could be remedied by instituting a policy of opening a check prior to greeting the table.

Another area where duration is collected is in the reservations system. OpenTable software allows for the tracking of table duration data, although it could also be logged without any special software. A properly trained host staff will start the clock, or log the time, when the table is seated and end it when the table is ready for another group of customers. To do this requires clear process instructions and communication between service and host staff to ensure that gaps are minimized. A possible complication from this method is that POS and reservation technology often don't communicate and would thus require the consolidation of data from different sources.

Another common source of error is in the collection of demand data. What constitutes a cover can vary from restaurant to restaurant. It could be one customer, only customers ordering meals, or simply exclude all customer in a bar area. The most accurate method is to count every customer that occupies a seat as an individual cover. Here the data could be logged in both the POS and the reservation system so communication between service and host staff must again be controlled to ensure accurate data.

Another type of demand data that could be of interest to managers is walkouts, or the number of covers that are lost during peak demand. Many of the previously discussed research studies that focused on managing space and time, had set wait times of no more than 20 minutes after which it is assumed that customer satisfaction is suffering and there is the possibility of

losing business. Collecting this information could give some insight to the amount of demand that could be shifted to non-peak hours or inform pricing decisions to generate greater revenue during peak hours.

With regards to price and quantity of items sold, traditional control measures for ensuring the accurate recording of this data through POS are appropriate. If these are not being followed it likely means the restaurant is losing money on items not being charged to guests. One important issue that may arise is in the coding of items that are offered at differential prices. If a discount is applied to an item it should be logged as a separate item at the differing price. Otherwise it may be difficult to establish the effectiveness of promotions and the price sensitivity of customers for certain items.

Once clear policies for the collection of customer generated data are established and sources of error are controlled for, managers can begin the critical forecasting process. Forecasting of demand is key for revenue managers because it provides them with a picture of what to expect in the time periods to come which they can then plan around. In actuality, forecasting begins before data collection with the planning process. Planning involves decisions related to the use of the forecasts, the types of data to collect, the time horizon, and forecast method to be used. Restaurants benefit greatly from forecasting demand as it helps in the purchasing of inventory and scheduling of staff. RRM forecasts can be used to identify periods of peak and off peak demand during which prices can be adjusted, or promotions offered.

Using prepared forecasts managers can plan for predicted levels of demand. How this demand is managed will vary based on a number of context specific decisions. This includes the decisions of whether or not to take reservations and how to manage waitlists. Reservations may be appropriate for one restaurant but not another. In the case of a restaurant with constantly high

demand and short meal duration reservations may only exacerbate the uncertainty of arrival problem by holding tables that could be generating revenue. In this case a more appropriate choice might be a call ahead waitlist. This could provide a near term picture of expected demand without the need to hold tables, and less of an impact if parties don't arrive. As previously stated herein, these decisions are very context specific making it difficult to lay out a one size fits all prescription to this problem. Whatever method of reservation or waitlist chosen, it is important that the process is fair and that customers become familiar with it. The more familiar they are with the demand management process the more likely they are to view it as fair, and the less likely it is to have a negative impact on satisfaction

If reservations are accepted there are signs that some restaurant types might benefit from charging for them. Specifically, high end restaurants that operate near peak demand at all times, making reservations difficult to get. By charging for the reservation they are more likely to reduce no shows. Additionally, some restaurants have begun selling the meal and seat together like a ticket to a show. The price paid includes the reservation, and the multi course menu to be served. Beverages, such as wine pairings, are not included in the upfront price and therefore represent significant revenue enhancement when purchased. In doing this the restaurant can identify the revenue it desires from each seat to cover all costs and meet the desired profit then charge the appropriate price.

Decisions regarding the restaurant design and table mix are also important when implementing RRM. Using baseline data collected on party mix and duration, managers can find the appropriate table mix which offers the greatest flexibility. If the data suggests parties the restaurant sees more large parties early on but only parties of two later then the design should allow for large tables to be converted to smaller ones to meet the party mix demands. The



greater the flexibility the less seats go unused offering greater potential for revenue optimization. Furthermore, different types and locations of tables have been shown to have an impact on meal duration and spending. Using average duration in combination with party mix can provide clues as to how long a certain table will be occupied depending on how many seats are being used. This can help in planning how many times the seats can be used in a given meal period.

Finally, differential pricing, can be used in RRM to manage demand and increase revenues by shifting demand to non-peak hours. The key for managers is to find what pricing methods, and incentives work best in the specific context of their restaurant. In their study, Susskind et al. (2004) showed that financial based incentives such as coupons and cash discounts worked best. For other types of restaurants or scenarios it may be that product and service differentiation in combination with price changes may work best to shift demand. One example of this could be the use of prime rib specials in steakhouses. Often, prime rib is prepared in limited quantity due to the long preparation times. If a restaurant were to aggressively price it as a special only available early in a meal period or on a specific day, they may be able to shift some amount of demand to that earlier period and increase RevPASH during those times.

It's important to remember that differential pricing must be designed to prohibit customers willing to pay a higher price from receiving discounts. Often this happens when differential pricing is used with poorly designed rate fences. Rate fences prevent customers with high price sensitivity from receiving discounts during periods of peak demand. To do so, and be fair they must be clearly presented, and easy to understand. Unduly complicated rate fences could result in confusion and impact customer satisfaction. Furthermore, the rate fences must be strictly adhered to by staff, not allowing promotions to be accepted outside of set periods. By establishing fair and clear rate fences, you are more likely to have customers willing to pay

higher prices during higher demand periods, and customers that desire price discounts will self-segment to off peak hours thus increasing RevPASH.

### **Conclusion**

The strategic levers of price, space, and time can be effectively used by managers to increase revenue. Whether it is by price adjustments, changes in design, ambiance, or seating techniques RRM can positively impact restaurant performance. Ultimately, it is a combination of policies and practices that enable RRM to be effective and it requires manager to carefully collect and analyze their own restaurants data to determine the effectiveness of different strategies. As customers become more aware of RRM and how it works it is likely to become more widely used and accepted. Restaurants should continue to keep a close eye on costs, as they have done in the past, but the ability to boost profitability through increased top line revenues should drive managers to adopt RRM strategies.

### **Recommendations for Future Research**

After an analysis of the extant literature in the field of RRM several areas have been found in which future research could be conducted. One such area is the use of overbooking. This is a common practice in hotels and airlines, two industries that also implement revenue management. In restaurants, difficulties for implementing overbooking include the difficulty in tracking lost customers at peak demand, and the many times at which customers arrive. Generally, customers arrive and board each flight at the same time. Likewise hotel check-in begins at a set time and customers buy the space for the remainder for the time. The inconsistency of arrival and duration times in restaurants make adopting overbooking difficult, but by no means impossible. Research into how overbooking could be applied would be highly beneficial for RRM.

Another area where research could advance the field of RRM is in studying a greater variety of context specific strategies. Much of the extant literature lacks generalizability because of the highly diverse nature of the restaurant industry. If more research can be done in a different contextual settings managers will have more strategies that they can apply in real world situations thereby increasing the pertinence of RRM. For example, methods for assessing price sensitivity that managers can apply in a variety of restaurants could be highly beneficial.

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