

Restaurant Profitability Management

The Evolution of Restaurant Revenue Management

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While the term *restaurant revenue management* was defined in this journal in 1998, the history of publications in the *Cornell Hospitality Quarterly* (CHQ) related to managing restaurant profitability spans nearly fifty years. Of the 160 published articles related to restaurant profitability, more than one-quarter have appeared in the CHQ, which is more than three times that of any other journal. This article presents a new, decision-based framework for restaurant profitability, which expands on the earlier revenue-focused framework. The existing CHQ articles are categorized using the framework, and the gaps are used as the basis for identifying a large number of worthwhile, but as yet unanswered research questions related to restaurant profitability.

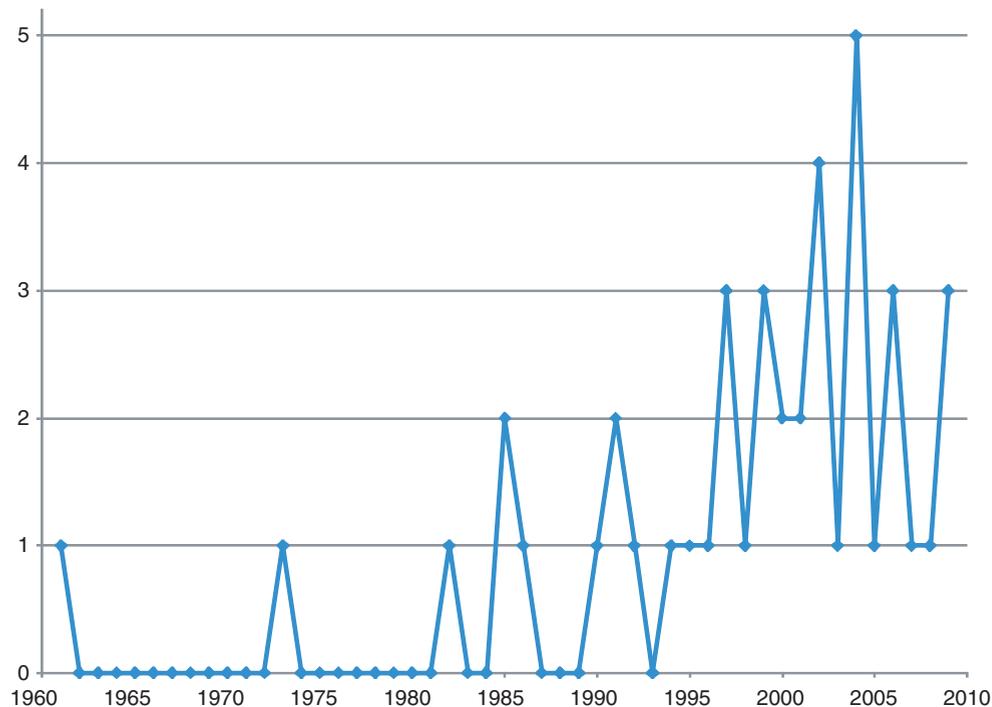
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Twelve years ago in this journal, Professor Sheryl Kimes and her coauthors (1998) first coined the term *restaurant revenue management* (RRM). According to Kimes and her coauthors, RRM is the application of yield management to restaurants, where the classic definition of yield management was given by Smith, Leimkuhler, and Darrow (1992) as “sell[ing] the right inventory item to right customer at right time at right price.”

Though the term *restaurant revenue management* is relatively recent, papers on related topics stretch back to 1961. Across the years, the *Cornell Hospitality Quarterly* (CHQ), largely under its earlier name of the *Cornell Hotel and Restaurant Administration Quarterly*, has been the main outlet for RRM-related research. Indeed, a thorough literature search on topics related to RRM identified 160 articles in peer-reviewed journals (a full bibliography is available from the author), of which 43,

Exhibit 1:

Number of Restaurant Revenue Management (RRM)-Related Articles Published in the *Cornell Hospitality Quarterly*, by Year



or 26.7 percent, have appeared in the *CHQ*. The next four highest-quantity outlets were the *Journal of Foodservice Business Research*, with 14 articles (8.7 percent); the *Journal of Hospitality and Tourism Research*, with 12 articles (7.5 percent); the *International Journal of Hospitality Management*, with 11 articles (6.8 percent); and the *International Journal of Contemporary Hospitality Management*, with 8 articles (5.0 percent).

Kimes et al.'s seminal 1998 article seemed to have provided a catalyst for RRM-related work. I am aware of only sixteen RRM-related articles published in the *CHQ* prior to 1998, while twenty-six RRM-related papers appeared in the *CHQ* after 1998. Exhibit 1, which displays a chart of the number of RRM-related articles published in the *CHQ* by year, clearly shows the sustained

jump in the number of RRM-related articles that occurred in the late 1990s. The volume of papers published since 1998 suggests that the topic of RRM has resonated, certainly with the academic community. There is evidence that the topic can improve practice, too. For example, Kimes (2004) reports on a restaurant that was able to increase its peak revenue by approximately 30 percent, primarily by changing its mix of tables to better match the customer mix.

My goals in this article are threefold. First, I wish to bring cohesion to the RRM-related work that has been done to this point. In doing so, I will focus on work published in the *CHQ*, befitting its dominance as an outlet for RRM-related material. Second, I introduce a different and, I believe, broader way of looking at RRM, which uses a

decision-based framework focusing on restaurant profitability, rather than on restaurant revenue. Third, I wish to identify hanging research questions related to restaurant profitability, so that the next decade of work on the topic might continue to expand on work performed to this point.

The structure of this article is as follows. I first provide an overview of the literature related to RRM, focusing on the themes that exist. I then present my decision-based framework for restaurant profitability management, classify the relevant articles published in the CHR using the framework, and identify hanging research questions.

Literature Review

In the review of the literature, I will focus primarily on two areas: the emergent themes in the literature and the “strategic levers” of RRM. I discuss each below.

Emergent themes. The RRM literature can be viewed from the perspective of emergent themes. There are two dominant themes: capacity management and customer experiences. A large component of capacity management deals with the mix of tables in restaurants. The rationale for focusing on the mix of tables is simple: by better matching capacity to demand, a restaurant increases its effective capacity. To investigate that proposition (Thompson 2002), I examined whether it is preferable to have smaller tables that can be combined together to seat larger parties or to have a mix of table sizes, and I found that a mix of table tends to perform better, other than for small restaurants. In a follow-up paper (Thompson 2003), I attempted to identify the positioning of the combinable tables that yields the revenue maximizing layout. Kimes (2004) reported on an RRM implementation where changing the table mix was a big driver of a restaurant’s increased revenue.

Kimes and her coauthors have done much of the work related to customer experiences.

Kimes and Wirtz (2002) examined the degree of customer acceptance of different demand-related pricing policies, finding the least acceptance of different prices based on table location. Kimes and Robson (2004) used a fast casual restaurant to examine how the characteristics of where customers were seated affected the amount of money they spent, finding, among other things, that customers tend to spend more if they are at a bigger table. McGuire and Kimes (2006) used a survey to explore customers’ sensitivity toward different reservations policies, finding that customers were least favorable toward VIP-based seating policies.

Strategic levers. According to the most prolific RMM author, there are two strategic levers for applying RRM: price and meal duration (Kimes 2004). Price management involves such things as “offer[ing] different menu prices based on customers’ willingness to dine (or make reservations) during slack times . . . [through such actions as] happy hour, early-bird specials and restricted-use coupons” (Kimes 2004, 52). Restaurants can also offer higher-priced meals during higher demand periods and such things as “daypart pricing, day-of-week pricing, and price premiums or discounts for different party sizes, tables and customer types” (Kimes 2004, 52). Kimes and Wirtz (2002) found that customers were generally accepting of differential pricing across days and across day parts within days and of promotions.

Duration management includes refining the definition of duration, reducing the uncertainty of arrival, reducing the uncertainty of duration, and reducing the time between meals (Kimes 2004). Kimes (2004) gives a nice example of an RRM implementation process, which includes how these specific aspects of duration can be evaluated and managed.

There are several shortcomings of the strategic lever view of RRM. First, the focus on duration can be misleading for many

restaurants. A large simulation study showed that reducing dining duration increases revenue only by about one-quarter of that expected (Thompson 2009). A big factor affecting the amount of revenue bump achieved for a given reduction in dining duration was the number of table turns the restaurant was experiencing during its peak periods. Moreover, there can be a significant challenge in reducing duration without making customers feel rushed. Duration as a lever, then, tends to apply best when the restaurant is already achieving a high number of turns—quick-service restaurants (QSRs), for example, would be the ideal environment in which to reduce duration. A second and more problematic limitation is suggested by the term *restaurant revenue management* itself, which is a focus on revenue, rather than profitability. Third, restaurateurs have a greater range of decisions that affect profitability than just duration-related and pricing-related. Those decisions range from short-term to long-term. For these reasons, I will next present a new framework, based on the decisions restaurateurs face.

A Decision-Based Framework for Restaurant Profitability Management

Before identifying the decision-based framework, it may be helpful to identify characteristics of customer demand that are relevant to managing restaurant profitability:

- *Number of parties.* The number of parties is a typical demand measure in a restaurant. The number of parties commonly is tracked by arrival (or reservation time). It is affected by many decisions, such as the location of the restaurant and its concept.
- *Party size.* The party size is another important demand characteristic. For example, a party of four will place different demands on the restaurant than will a party of one. The mix is also

affected by a restaurant's location and its concept, among other things.

- *Party composition.* All parties of the same size are not equivalent. Party composition can vary, for example, by age, gender, and family relationships. For example, a party of four comprising two adults and two children will be significantly different from a party of four on a business meal.
- *Items purchased.* Another aspect of customer demand is the particular items purchased, for example, the number of courses; consumption of specials, wine, or other alcoholic beverages; in-house, delivery, or pick-up ordering; and purchases of ancillary items, such as branded T-shirts or food items.
- *Meal duration.* The meal duration is affected by the characteristics of the customer—for example, the party composition—as well as by the restaurant's concept, size, staffing, and nature of the service.
- *Time dependency.* All of the customer demand characteristics listed above can vary across time. The implication of this is that the demand characteristics must be forecast, rather than simply assuming a static customer demand, for the most profitable planning and control of the restaurant operations.

The decision-based framework of restaurant profitability management (RPM) contains decisions that affect demand (typically strategic and marketing decisions) and operations. I will next consider the demand-affecting decisions. The decisions listed below are not meant to be an exhaustive list of all the options in each category, but rather are meant to be representative:

- *Location(s).* This decision concerns where the restaurant (or restaurants) should be located. For example, whether it would be in a strip mall or standalone location. When multiple restaurants are to be cited, cannibalization effects can

- come into play, depending on the size of the restaurant.
- *Size and size flexibility.* The size refers to the decision regarding the seating capacity of the restaurant. Size flexibility relates to the ability to increase the seating capacity at certain times, such as patio seating.
 - *Concept.* The choice of a concept (e.g., American, Italian, Moroccan, Thai, Peruvian) can have a large impact on customer demand, particularly as regards competition.
 - *Brand or independent.* This decision is whether the restaurant is run as part of chain or brand or as an independent.
 - *Colocation.* Colocation, which is also known as cobranding, refers to two or more different restaurant concepts, or brands, operating in the same location. This phenomenon is seen with some regularity in QSRs, for example.
 - *Décor and amenities.* Decisions on décor and amenities include such things as lighting, music, valet parking, and smoking or nonsmoking sections.
 - *Market segment.* The market segment decision addresses whether the restaurant is, for example, a QSR, fast casual, or full service.
 - *Quality level.* The decision about the quality level relates to the market segment decision. However, even within the same segment there are differing levels of quality.
 - *Service level and service design.* Within a segment, there are service-level-related decisions, such as regarding the number and type of staff, self-serve components, and payment structure (cash, credit cards). Service design options include such things as allowing take-out orders, having a bar, or providing catering services.
 - *Pricing.* Pricing decisions involve setting the prices for all menu items. Prices may vary by day of the week, by day part, or even from day to day if new menus are printed daily.
 - *Promotions.* Promotions include such things as two-for-one appetizers in a happy hour or for senior citizens or coupons offering a special or discount.
 - *Operating hours.* The decision about operating hours involves the particular days and meal periods during which the restaurant will be open.
 - *Menu.* There are many decisions related to menus, including the total number of items on the menu, the particular food and drink items offered, the portion sizes, and menu design.
 - *Reservations and overbooking.* Reservations and overbooking decisions determine how customers will be handled: whether only walk-ins will be taken; whether reservations will be allowed for all parties at all times, or only for certain size parties or on certain days and times; whether a nonrefundable deposit is required for reservation; whether to accept call-ahead reservations; and, if reservations are taken, the ways in which customers can make the reservations (i.e., in-person, by telephone, or online).
 - *Layout design.* The particular mix of tables in the restaurant can influence the effective seating capacity and affect customer demand by making it practical (or impractical) to serve certain party sizes. Layout design would also include such things as whether tables are anchored or can be moved and the flexibility inherent in the design that would allow the restaurant to accommodate particular customers.
 - *Training.* I include training-related decisions under demand-affecting decisions, because the staff's ability to deliver on the concept clearly has an effect on long-term customer demand.
 - *Retailing.* Retailing decisions relate to ancillary sales of restaurant-branded or related items such as T-shirts or specialty food items.
- Other factors that affect customer demand are not directly connected to the restaurant, including the following:

- *Demographics.* The general demographics of the local community can affect demand, particularly if the restaurant's concept, service level, and market segment are such that the restaurant draws customers primarily from the local community.
- *Previous experiences.* This factor represents the effect of the restaurant's customers' previous experiences at the restaurant.
- *Reputation.* This factor captures the general buzz about a restaurant, including diners' comments available online.
- *Ratings.* There are various sources that rate restaurants. Some customers regularly consult rating services when deciding which restaurants to patronize.

I next identify the operations-related decisions facing restaurateurs. I will separate these into forecasting-related decisions, planning decisions, and control decisions and identify each below.

Forecasting decisions. Forecasting decisions relate to forecasting or predicting what will happen in the future. Forecasts are commonly made using some combination of a prediction based on historical data and a prediction based on managers' knowledge, experience, and intuition.

- *What to forecast.* The specific demand characteristics that need to be forecast should be identified. Any demand characteristic that affects planning and that varies over time should be forecast.
- *Planning intervals.* This decision involves identifying the appropriate time interval over which to track the demand characteristics being forecast. It may be appropriate to track certain characteristics by day part or meal period (such as dining duration), while other characteristics, such as arrivals, may need to be tracked using much shorter intervals.
- *Performance criteria.* This is the choice of the metrics by which forecasting methods will be judged. Commonly

used metrics include mean absolute forecasting error, mean absolute percentage forecasting error, and mean forecast error.

- *Methods.* This decision involves selecting an appropriate forecasting method. There is no reason why the same method has to be selected for all the demand characteristics being selected. Food and beverage outlets in lodging properties may also have the advantage of creating demand forecasts using information about the properties' forecast occupancy.
- *Managerial adjustments.* The decisions related to managerial adjustments of forecasts are whether such adjustments should they be allowed; whether to create blended forecasts, by combining the historical-based forecasts with managerial forecasts; and, if so, how to perform the blending.

Planning decisions. Operations planning decisions are those made in advance, and typically are affected by the forecasts of customer demand. The decisions include the following:

- *Data management.* As a planning decision, data management mainly involves the choice of the type of point-of-sale (POS) system used, if any. Small restaurants may eschew a POS, using manual tickets instead, but that choice may limit the data available for analysis and decision making.
- *Reservation and seating policies.* Reservations policies include, for example, when and for which customers reservations would be taken, whether call-ahead reservations are accepted and for which customers, and whether online reservations or ordering can occur. Seating policies cover the rules used to determine which party is assigned to a just-freed table or which table is given to a just-arriving party.
- *Equipment.* Equipment as a planning decision would represent the planned

deployment of equipment over time. For example, in a QSR, the number of cashier tills staffed could range from one to several, depending on the forecast of customer demand.

- *Table mixes.* The table mix planning decision is the configuration of tables in the restaurant, with the goal of having its capacity match demand. The mix need not be static but could vary from day part to day part, or even within day parts, for example, if large parties were only seated early or late in a meal period.
- *Service levels.* Service-level planning decisions relate to the level of service to be provided to customers, based on various metrics. For example, a service standard in a full-service restaurant might be that customers' drinks are delivered within three minutes of their being ordered. While the standards could be static, they may vary by day part; with tighter standards for lunch or pretheatre customers, for example.
- *Staffing and process.* The staffing planning decision is the number of staff that will be needed, by day part (or shorter periods). The process decision relates to how the staff will perform the work. For example, at slow times, QSR cashiers may take and fill customer orders; while at peak times there may be separate staff to fill the orders taken by the cashiers.
- *Raw materials.* Raw-materials-related planning decisions include purchasing, supply chain, and inventory management. For example, deciding which, if any, ingredients should be purchased or stored frozen rather than fresh.
- *Stations.* Stations are the table assignments of wait staff, commonly seen in fast-casual and full-service restaurants. The stations may vary across meal periods, depending on the service requirements of customers.
- *Cherry picking.* Cherry picking is the plan as to which customers to accept and which should be rejected. For example, in many restaurants, smaller parties take less time to dine than larger parties and spend more per person. A manager

of a busy restaurant, then, might decide only to seat parties of four or fewer people at peak times.

Control decisions. Control decisions are the decisions restaurateurs make in real time. They are constrained, in part, by the planning decisions. The control decisions include the following:

- *Staffing.* Real-time staffing decisions include sending employees home early, calling additional employees in to work, or sending people or recalling people from breaks.
- *Table assignments.* Real-time table assignment decisions involve determining which of the waiting parties gets assigned to a newly free table, or which of the free tables gets assigned to a newly arrived party. In the latter case, for example, the assignment could be based on the smallest table that fits, or the table size that historically has yielded the most revenue for that particular party size.
- *Station assignments.* Station assignment real-time decisions include determining which of the wait staff will cover a party newly assigned to a table.
- *Accept or reject specific parties.* The real-time decisions about rejecting or accepting a specific party relate to walk-in parties: should they be seated, placed on a wait list, or turned away?
- *Food preparation.* Food preparation decisions in real time can relate to whether items are prepared in the order in which they were received or whether some degree of batch preparation should be used.

Classifying the Literature into the Decision-Based Framework for Restaurant Profitability Management

The decision-based framework for RPM presented above can be used to classify the RPM-related literature that has appeared in the *CHQ*. I do this in Exhibit 2. Exhibit 2

Exhibit 2:

Classification of Restaurant Profit Management (RPM)–Related Articles Published in the *Cornell Hospitality Quarterly*, Based on the Decision Issues Addressed

| <i>Category</i> | <i>Decision</i> | <i>References</i> |
|-----------------|---------------------------|--|
| Overview | N/A | Schmeid 1973 [O]; Sill 1991 [O]; Kimes et al. 1998 [O]; Robson 1999 [O]; Quain, Sansbury, and LeBruto 1999 [O]; Kimes 2008 [O] |
| Metrics | N/A | Schmeid 1973 [O]; Pavesic 1985 [C]; Hayes and Huffman 1985 [O]; Bayou and Bennett 1992 [S]; Kimes et al. 1998 [O]; Thompson and Sohn 2009 [C,M] |
| Marketing | Location | Knutson, Elsworth, and Beck 2006 [S]; Parsa et al. 2005 [S] |
| | Size and size flexibility | Quain, Sansbury, and LeBruto 1999 [O]; Parsa et al. 2005 [A] |
| | Concept | Parsa et al. 2005 [S] |
| | Brand or independent | Kim and Kim 2004 [S]; Parsa et al. 2005 [A] |
| | Colocation | Boone 1997 [S] ^a |
| | Décor and amenities | Robson 1999 [O]; Susskind and Chan 2000 [S] |
| | Market segment | Swinyard and Struman 1986 [C] |
| | Quality level | Stevens, Knutson, and Patton 1995 [S]; Susskind and Chan 2000 [S]; Oh 2000 [S]; Lynn 2001 [E,S]; Sulek and Hensley 2004 [S]; Gupta, McLaughlin, and Gomez 2007 [S] |
| | Service level and design | Fitzsimmons and Maurer 1991 [S]; Sill 1991 [O]; Field, McKnew, and Kiessler 1997 [C]; Susskind and Chan 2000 [S]; Sulek and Hensley 2004 [S]; Quain, Sansbury, and LeBruto 1999 [O]; Knutson, Elsworth, and Beck 2006 [S]; Gupta, McLaughlin, and Gomez 2007 [S] |
| | Pricing | Kreul 1982 [S]; Carmin and Norkus 1990 [C,E]; Sill 1991 [O]; Kelly, Kiefer, and Burdett 1994 [C]; Cotter and Snyder 1996 [S]; Lewis and Shoemaker 1997 [S]; ^b Kimes et al. 1998 [O]; Oh 2000 [S]; ^c Naipaul and Parsa 2001 [E]; Kimes and Wirtz 2002 [S]; Susskind, Reynolds, and Tsuchiya [S]; ^c Knutson, Elsworth, and Beck 2006 [S]; Gupta, McLaughlin, and Gomez 2007 [S] |
| | Promotions | Schmeid 1973 [O]; Kimes et al. 1998 [O]; Taylor and Long-Tolbert 2002 [S]; Quain, Sansbury, and LeBruto 1999 [O]; Susskind, Reynolds, and Tsuchiya 2004 [S]; ^c Knutson, Elsworth, and Beck 2006 [S]; Wansink et al. 2006 [E] ^c |

(continued)

Exhibit 2: (continued)

| <i>Category</i> | <i>Decision</i> | <i>References</i> |
|-------------------------|----------------------------------|--|
| | Operating hours | Sill 1991 [O] |
| | Menu | Schmeid 1973 [O]; Kreul 1982 [S]; Pavesic 1985 [C]; Hayes and Huffman 1985 [O]; Sill 1991 [O]; Bayou and Bennett 1992 []; Quain, Sansbury, and LeBruto 1999 [O]; Wansink, Painter, and Van Ittersum 2001 [E]; ^c Knutson, Elsworth, and Beck 2006 [S]; Wansink et al. 2006 [E] ^c |
| Marketing | Reservations and overbooking | Sill 1991 [O]; Kimes et al. 1998 [O]; Quain, Sansbury, and LeBruto 1999 [O]; McGuire and Kimes 2006 [S]; Kimes 2008 [O] |
| | Layout design | Robson 1999 [O]; Kimes and Robson 2004 [C] |
| | Training | Schmeid 1973 [O]; Sill 1991 [O]; Kimes 2004 [C] |
| | Retailing | |
| Operations: Forecasting | What to forecast | Sill 1991 [O]; Kimes et al. 1998 [O] |
| | Planning intervals | |
| | Performance criteria | |
| | Methods | |
| | Managerial adjustments | |
| Operations: Planning | Data management | |
| | Reservation and seating policies | |
| | Equipment | Avery 1961 [O]; Schmeid 1973 [O]; Sill 1991; Sill and Decker 1999 [C] |
| | Table mixes | Schmeid 1973 [O]; Thompson 2002 [M,E]; Thompson 2003 [M,E]; Kimes 2004 [C] |
| | Service levels | Fitzsimmons and Maurer 1991 [S] |
| | Staffing and process | Sill 1991 [O]; Sill and Decker 1999 [C]; Kimes 2004 [C]; Choi, Hwang, and Park 2009 [C]; Thompson 2009 [M] |
| | Raw materials | |
| | Stations | Sill 1991 [O] |
| | Cherry picking | |
| Operations: Control | Staffing adjustments | |
| | Table assignments | Quain, Sansbury, and LeBruto 1999 [O] |
| | Station assignments | |
| | Accept/reject specific parties | |
| | Food preparation | |

Note: Regarding the type of studies, A, C, E, O, M and S refer respectively to archival data, case study, experiment, opinion piece, simulation experiment and survey.

a. Hotel-restaurant colocation.

b. In hotels.

c. One restaurant.

includes two additional categories of articles: articles that mainly provide an overview of some aspect of RPM and those that focus on RPM metrics. In addition, Exhibit 2 classifies each article based on the type of methodology it employs: studies using archival data, case studies, experiments, opinion pieces, simulation experiments, and surveys.

Exhibit 2 can be a useful tool for thinking about where the field of RPM would benefit from additional research. Certainly any empty cells are candidates for research. However, any cells where the articles have been primarily case studies and opinion pieces would also benefit from more broadly-defined investigations. The next section talks about those hanging research questions.

Hanging Research Questions

Given that research related to RPM has been published in the *CHQ* for nearly fifty years, there are a surprisingly large number of worthwhile research questions that remain unanswered. Here is a list of the questions and topics that I feel are the most relevant:

- *Location.* There is little guidance in the literature related to evaluating restaurant location decisions. For example, research could investigate, perhaps based on existing outlets of one or more chain restaurants, the factors that affect the profitability of a location, such as accessibility, foot or vehicular traffic counts, proximal demand generators, and the location of competitors.
- *Size.* No definitive studies have been performed related to identifying the ideal size of a restaurant. While the size and location decisions are often commingled, managers would benefit from studies addressing how size affects restaurant profitability.
- *Concept.* The location and size questions identified above assume that a concept exists and that one is looking to find a location for the concept. However, there are also situations where one already has a location in mind and the decision is to find the best concept for the location. Research that could benefit this decision would attempt to identify the characteristics of the market, location, and competition that affect the profitability of a particular concept. For example, is it best to be the first of a concept in an area? Is profitability related to consumers' general awareness of a concept? (In other words, is there an advantage or disadvantage with a relatively unknown concept?)
- *Colocation.* There have been no studies on restaurant colocation. Relevant research could identify the conditions under which profitability increases under colocation and identify the requirements for successful colocation. For example, is colocation more profitable when kitchen facilities can be shared? When space is at a premium? When the market segments of the individual restaurants are similar? When the individual restaurant's concepts are narrowly defined?
- *Pricing.* Only a single case study has been published that examines the sensitivity of customer demand to pricing changes (Kelly, Kiefer, and Burdett 1994). While the authors of the paper formed a company with the purpose of consulting with the restaurant industry regarding optimal pricing decisions, suggesting the importance of the concept, no broad-based follow-up studies have been reported. Thus, interesting research questions would include, Which menu items tend to be the most useful for driving profitability? In which market segments can pricing have the largest affect on profitability? Are there market- or facility-based limitations of using pricing changes to drive profitability?
- *Price discounting timing.* There have been a number of instances where price discounting has been advocated as a

tool that can drive revenue in off-peak periods. Depending on the timing of the discounts, however, peak revenues can be affected. Thus, a research question relates to identifying the ideal timing restrictions and the nature of the discounts, to best drive a restaurant's profitability.

- *Up-selling timing.* Up-selling is the process of trying to increase a party's check size, by pushing such things as specials, desserts, and coffee. A hanging research question is when such actions should best be done so that the restaurant's overall profitability increases.
- *Discounting versus up-selling.* The question for discounting versus up-selling is whether both of these actions belong in a restaurateur's tool kit or whether one action tends to dominate the other.
- *Operating hours.* I am aware of no scientific study that examines the ideal operating hours for restaurants. For example, intuition would suggest that if there is a queue when the restaurant opens, then the owners should consider opening earlier. However, if the longer operating hours yield little increase in the table turns, then profitability will decline. In other words, the operating hours effect could be similar to what I observed in the study on reducing dining duration (Thompson 2009), where the revenue bump was much smaller than expected and greatly affected by the length of the peak demand period. An interesting study, then, would attempt to identify the conditions under which restaurateurs should lengthen (or shorten) their restaurants' operating hours.
- *Reservations.* There are a number of hanging questions related to reservations. To date only a single study, from one restricted geographical location, has examined customers' reactions to different restaurant reservation policies. So the first task would be to conduct a broader study of customer reactions to different reservations policies. That could lead to the question, What are the conditions under which reservations should be offered? If reservations are to be offered, what is the ideal mix of reservations to walk-ins? What are the benefits of taking reservations online? In addition, there are a number of questions related to wait lists for walk-in customers: What affects the waiting tolerances of walk-in customers? How should waiting time be estimated? Should the wait estimates quoted to customers be biased or unbiased?
- *Layout design.* To date, the effects of restaurant layout on customer spending have been examined only for a limited number of specific restaurants. Expanding the number and type of restaurants examined would be useful for establishing more broadly applicable guidelines for restaurateurs.
- *Retailing.* Since no study has examined retailing in restaurants, there are a number of unanswered questions: What are the advantages and disadvantages of retailing? How much space should be allocated to retailing? What items should be offered? Should the retail items be offered online? Under what conditions does retailing offer a useful approach for driving restaurant profitability?
- *Forecasting.* Considering how little has been done related to forecasting in restaurants, researchers largely have a blank slate. Some questions that come to mind include, Which aspects of customer demand should be forecast? What is the appropriate length of planning intervals for tracking and forecasting demand? (As an example, in the context of scheduling employees, see Thompson 1998.) What metrics and methods are currently used by the restaurant industry to track forecast accuracy? Which methods should be used? How frequently do model parameters need to be updated? How frequently should the choice of a forecasting method be reevaluated? Do managers' changes to forecasts actually improve

forecast accuracy? In lodging settings, can occupancy information be used to improve the accuracy of restaurant demand forecasts?

- *Data management.* While anecdotal evidence suggests that most restaurants use some form of POS, there are hold-outs. An empirical study linking restaurant profitability to POS usage would be helpful.
- *Equipment.* The only writing on managing restaurant equipment to drive profitability has been the prescriptive guidelines of Sill (1991). It would be interesting to see what practices are in use in the industry, to establish the validity of Sill's ideas.
- *Table mixes.* While a number of studies have examined issues related to restaurant table mixes, there remain interesting unanswered questions. The first concerns the accuracy of the naïve table mix calculations (first defined in Thompson 2002). Second, in the studies on table combinability, there was an assumption of conservation of seats, so that, for example, combining two 2-tops yielded a 4-top. Thus, relaxing that assumption could show a stronger benefit of allowing combinable tables. Third, the earlier studies on combinability assumed that only tables to the left or right of a table could be combined. Allowing a greater degree of combinability may also show a stronger benefit of using combinable tables.
- *Raw materials.* Because I am aware of no restaurant-specific articles related to inventory management, there is, again, an open slate for researchers. For example, surveys could be used to establish how restaurateurs manage purchasing, supply chains, and inventory, with the goal of establishing best practices. This area would seem to particularly relevant with the movement toward local sourcing and reducing the carbon footprint of operations. Some possible questions are as follows: In which market segments are there profitability benefits

from local sourcing? How does the restaurant concept affect the ability for local sourcing? What are the most effective relationships to develop with suppliers? Is it more profitable to vertically integrate and grow the restaurant's own produce or other items? Which drives profitability more, local or organic?

- *Stations.* Other than the opinions of Sill (1991), nothing has been written on the issue of stations in full-service restaurants. As such, there are a number of interesting questions related to stations: What is the ideal station size? What factors affect the ideal station size? How does the ideal station size vary depending on whether the wait staff share table assignments? Does the ideal station size vary with the level of demand? Is the ideal station size different in restaurants using only reservations versus only walk-ins?
- *Customer cherry picking.* To my knowledge, the issue of customer cherry picking has not been addressed in the literature. Possible research questions include, What are customers' reactions to cherry picking? How does the choice of a rule for assigning parties to tables result in implicit cherry picking of parties? Should cherry picking be applied and, if so, with what party sizes and what timing restrictions?
- *Real-time staffing adjustments.* Real-time staffing adjustments are designed to ensure that the actual service level and labor cost matches that planned. The real-time control actions are useful, in that actual demand only rarely matches that forecast, and because employees commonly fail to perform as scheduled (they are tardy or absent, for example). In an earlier article (Thompson 1999), I discussed real-time control of labor schedules, but not in a restaurant-specific context. Restaurant-specific real-time staffing-adjustment questions include, What practices are used in restaurants for real-time staffing control? What is the relative importance

of customer service and labor cost in driving the control actions? How do restaurateurs determine when such control actions are necessary?

- *Real-time table assignments.* Real-time table assignments should have the effect of driving profitability. Evidence suggests that parties may spend more when seated at a larger table (Kimes and Robson 2004), yet assigning a party to a larger than necessary table could mean forgoing a larger overall revenue from a later-arriving party. Thus, relevant research questions related to table assignments include, What is the best-performing static rule: assigning an available table to the largest party that fits; the longest-waiting, right-sized party; or the party with the largest blended value of size and waiting time? What blended assignment rules work best? How should contextual considerations (table size, location) best be considered when assigning parties to tables?
- *Real-time station assignments.* The issue of real-time station assignments has as yet received no attention. Relevant research questions include, Is there any advantage of having dynamic, rather than static, station assignments? How do the decisions of table assignments and station assignments interact?
- *Real-time accept or reject decisions.* The issue of real-time accept or reject decisions relates to applying cherry picking in real time. For example, it may be the restaurant's policy to accept parties of more than six people, but perhaps a party of eight would be seated if the restaurant were slower than normal. As such, interesting research questions would involve identifying the practices currently used in the industry and conducting experiments to develop context-sensitive prescriptive guidelines for restaurateurs.
- *Real-time food preparation decisions.* Research questions involving real-time food preparation relate to batching. What is the ideal batch size for each à

la carte item? At one extreme, the batch size would be the number of the specific items in each party's order. At the other extreme, which could apply in a restaurant with fixed seating, would be a batch size equal to the sum of the specific item across all the parties' orders. While batching offers kitchen efficiency, it can reduce food and service quality if the batches become too large. A similar issue exists for buffet restaurants, and that is the size of food pan. Larger pans may allow more efficiency from the perspective of preparation but also result in more spoilage, particularly toward the end of the meal periods. Another real-time food preparation decision is how to best handle stock-outs. No study has yet been done regarding customers' reactions to stock-outs.

Conclusions

This is an exciting time to be a person with research interests related to increasing restaurant profitability. Despite a history stretching back nearly fifty years, there are a surprising number of important and unanswered questions. These questions are not just those that might interest an academic but those that can make a difference to the performance of individual restaurants and to the restaurant industry as a whole.

In its history, the *CHQ* has published more than one-quarter of the RPM-related articles, more than three times the amount of any other journal. My personal hopes are that the *CHQ* continues to be the dominant outlet for RPM-related work and that the research questions I have presented in this article can stimulate additional work in the area.

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