



CHR Reports

YIELD **M**ANAGEMENT



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The “4-C” Strategy for Yield Management



Executive Summary

Yield management is the umbrella term for a set of strategies that enable capacity-constrained service industries to realize optimum revenue from operations. The core concept of yield management is to provide the right service to the right customer at the right time for the right price. That concept involves careful definition of service, customer, time, and price. The service can be defined according to the dimensions of the service, how and when it is delivered, and how, when, and whether it is reserved. Timing involves both the timing of the service delivery and the timing of when the customer makes known the desire for the service, whether by reservation or by walking in to the business. Price can be set according to the timing of the service, the timing of the reservation, the type of service, or according to other rules that seem appropriate. Finally, the customer can be defined according to demand characteristics relating to the service, the timing, and the price. The ideal outcome of a revenue-management strategy is to match customers' time and service

characteristics to their willingness to pay—ensuring that the customer acquires the desired service at the desired time at an acceptable price, while the organization gains the maximum revenue possible given the customer and business characteristics.

The strategic levers of yield management can be summarized as four Cs: namely, calendar, clock, capacity, and cost. They are bound together by a fifth C: the customer. The strategic levers of yield management are geared to matching service timing and pricing to customers' willingness to pay for service in relation to its timing. Based on customers' demand levels and characteristics, management can shift the demand of those customers who are relatively price sensitive but time insensitive to off-peak times. Shifting that demand clears prime times for customers who are relatively time sensitive but price insensitive.

C1: Calendar. Calendar-related yield-management levers rely on demand forecasts to determine the dates on which demand is strong or slack. By correctly forecasting demand, a yield-management system can recommend

Summary continues on page 16



A “4-C” Strategy for Yield Management

Center for Hospitality Research Report, by Glenn Withiam

Yield management has developed into a powerful strategy for boosting revenues and improving the flow of customer demand. To accomplish those objectives, yield management uses the basic strategy of providing the right service at the right time to right customer at right price. Each element of that strategy involves specific strategic levers that allow a manager to conduct an effective and profitable yield-management strategy. The most important strategic levers connect price with timing. This report explains those strategic levers and give the steps for applying them in a variety of service organizations.

The key concept underlying yield management’s strategic levers is to match the timing of service delivery with the customer’s willingness to pay for a service rendered at that time. The time element is a key to yield management, both in terms of when a service is ordered (or reserved) and when that service is performed. Most yield-management strategies

involve price-related methods of shifting demand

according to a consumer’s price sensitivity and the duration of the service involved. To shift demand, a manager must be able to predict the peaks and valleys, either by keeping track of past experience or by watching reservation patterns.

The goal of a successful yield management strategy is to gain control of customer demand by using the time- and price-related strategic levers. Four factors enter into the tactics used to execute this strategy. These factors can be remembered as “4Cs”: calendar,

clock, capacity, and cost. The 4-C factors are inextricably bound together as yield-management revenue levers. The calendar-related tactics involve controlling when the sale (or reservation) is made. Clock-related tactics revolve around the timing of the service delivery. The capacity issue involves clearing the market by selling available capacity, while smoothing out the peaks and valleys in customer demand. Finally, cost is the price of the service, which is set at a level that permits the effective functioning of the other factors. Ideally, a manager can control the flow of customer demand by setting a market-clearing price according to when the sale is made and when the service is delivered, so that the business sells its available capacity for the most possible revenue.

Yield management is not *per se* a discounting strategy, even though it does involve adjusting prices and giving discounts under certain conditions. What sets yield management apart from blanket discounting strategies is that yield management sets rules (known as rate fences) on offers of discounted prices. Yield management works most effectively at the margin—as companies seek to expand overall



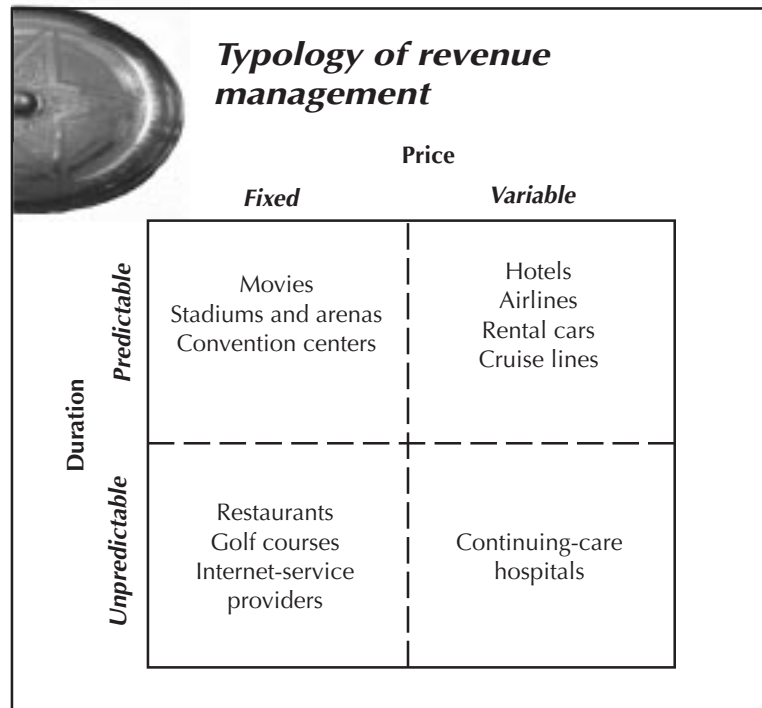
The goal of yield management is to use strategic levers to match demand with availability.

sales by adjusting prices and service timing to fill out demand for a given period (whether that is a meal period, a room-night, or an airplane flight). From the company's point of view, yield management is a way to maximize revenue during busy times and to obtain at least some revenue from service units that would otherwise go unused (e.g., unsold hotel room-nights, empty restaurant seats).

An effective yield-management strategy separates price-insensitive customers from price-sensitive customers according to the time the service is rendered or a reservation is made. To obtain service at premium times, price-insensitive customers pay top dollar, while price-sensitive customers take advantage of lower prices during non-peak times. The outcome of a well-executed yield management strategy should be higher revenue for the operation and customers who are satisfied that their particular demand characteristics have been met. That is, customers who are willing to pay for peak-time service will receive that premium service, while customers who seek a price concession are happy to pay a reduced price in exchange for their willingness to follow whatever policies qualify them for that price.

The nature of the service business dictates which strategic levers will be most effective. Businesses that offer a service with a known or fixed duration, but which have a variable price can use price incentives to manipulate demand. Businesses that do not offer a service of specific duration must work to define their service in terms of duration. Restaurants, for instance, should work to define their service as duration at table, rather than as a meal. Since their prices are relatively fixed (that is, they generally cannot change the price of a meal according to, say, when a reservation came in), restaurants must use other tactics, such as forecasting and controlling guests' arrival and departure to maximize revenue from available customers.

To return to the the airline industry, for instance, the duration of the customer's use of the service is entirely predictable: it is the length of an airplane flight. Other industries with



Although all of the businesses in the boxes above have capacity constraints, they are subject to different combinations of pricing and duration for their services. A classic yield-management tactic is to use a variety of price classes to shift demand for a service of a known duration. Thus, airlines and hotels are ideally suited to operating yield-management levers. Restaurants and golf courses, on the other hand, have to adapt the strategic yield-management levers, because their prices are largely fixed and the duration of the service is variable and unpredictable. By using price fences of various kinds and by using process management and other tactics to standardize their services, restaurants and golf courses can figuratively move their operations into the upper right quadrant occupied by classic yield-management firms

Restaurant rate fences

Tangible rate fences

- Table location
- Party size
- Menu type
- Presence or absence of certain amenities (e.g., bread on the table)

Intangible rate fences

- Group membership or affiliation
- Time of day or week
- Duration of use
- Timing of booking
- Walk-in or reservation
- Type of reservation (guaranteed or not)

Although restaurants are not ideally suited to yield management (owing to the fact that their prices are essentially fixed), restaurant operators can still apply yield-management-type tactics to their prices to improve revenues. The key to virtual yield management for a restaurant is to use time-based strategic levers. One of those levers is the use of rate fences. The rate-fence rules must make sense to the customer and not offend customers' sense of fair play. Tangible rate fences are those that are visible to the customer, while intangible fences are not immediately apparent. Many restaurateurs apply some or all of the above tactics, but yield management requires the integration of tactics with strategy.

similarly predictable duration of customer use are hotels (use of the room for a night or specified number of nights) and car-rental firms (use of a car for an agreed-on rental period). In contrast, although restaurant operators can make an educated guess regarding how frequently they can turn their tables, customers may still elect to linger. Thus, restaurant service duration for restaurants remains unpredictable. The same is true for golf courses, since the time elapsed to play a round of golf depends on many uncontrollable factors.

Price is another matter entirely. Even though airlines know the duration of their service, the price they will charge for that service varies considerably, depending chiefly on anticipated demand for the flight. Given a demand forecast, the airline can open or close low-price seats (with travel restrictions) in an attempt to fill the plane for the highest possible revenue.

Hotels encounter a set of challenges somewhat different from those of airlines and restaurants. While a hotel does not have to unravel the same service-duration issue as a restaurant, most hotels do not have sufficient marketing power to change room rates at will, as airlines do. One reason for hotels' less-flexible pricing is that would-be hotel guests generally have more choices of accommodation than do would-be fliers. As explained later, some hotel companies have attempted to use variable room rates by applying specific rules, known as rate fences, to enable a price-based yield-management strategy.

The starting point of a yield-management strategy is forecasting demand.

C1: Calendar

The heart of a yield-management strategy is forecasting demand and having a reasonably firm idea of when customers will arrive (and depart) so that one can manage that demand. Most yield-management systems rest on historical demand patterns for each

rate class. However, a key matter to be included in any mathematical solution is the extent of cannibalization among rate classes—that is, the number of high-price units that go unsold because buyers have taken advantage of a lower price.

Overbooking is a topic that also has been heavily researched. The forecast model must make allowance for overbooking policies and include likely percentages of no-shows. If overbooking policies are integrated with the yield-management system, a company will usually end up underselling a given time period. Airlines have alleviated this problem by selling nonrefundable tickets, but many ticket holders can still renege or reschedule. As a result, the airlines use overbooking to hedge their forecasting bets, based on their historical estimates of the number of refundable-ticket holders who will actually embark on a particular flight. Hotels and restaurants use similar overbooking strategies, but have made little progress in selling nonrefundable reservations, in part owing to the greater supply of hotel rooms and restaurant seats (as compared to airline seats).

To invoke the full potential of a yield-management system, managers must know the demand elasticity for each rate class. Since price changes affect demand, the model must consider the likely change in demand in response to a given price change. However, those pricing decisions cannot be made in a vacuum. One key issue involved in pricing is that a company cannot change its prices without taking into account the reaction of competitors. Moreover, none of the above is possible without an effective and accurate information system. While this usually means computerized reservations, that is not essential as long as management can obtain solid information on volume levels for each rate class.

The that system is used to forecast demand must be fast, reasonably accurate, and inexpensive. One common method is to use what is known as a threshold curve (see the next page for an example). This model has been popular because it does not involve intricate mathematics. To develop a threshold curve, the

Restaurant duration-management methods

Reduce uncertainty of arrival	Internal measures	<ul style="list-style-type: none"> • Improve forecasting • Use overbooking
	External measures	<ul style="list-style-type: none"> • Require guaranteed reservations • Reconfirm reservations by phone • Offer service guarantees
Reduce uncertainty of duration	Internal measures	<ul style="list-style-type: none"> • Redesign menus • Use process analysis • Schedule employees • Improve communication systems
	External measures	<ul style="list-style-type: none"> • Use pre-bussing • Improve check delivery • Offer a coffee and dessert bar • Provide visual signals of time spent • Apply process analysis • Improve communication systems

Two key strategic levers for restaurant revenue management are to ensure that guests arrive when expected and to standardize the length of the meal once they arrive. The tactics to activate those levers must operate in the context of the gracious hospitality of the restaurant business. Thus, tactics that ensure guest arrival are aimed at encouraging them to make and honor reservations. Tactics aimed at reducing the uncertainty of duration all focus on controlling the time guests sit at a table, without overtly rushing them. With the uncertainty of arrival and of duration reduced, a restaurant manager can concentrate on the main focus of yield management, which is to shift demand to achieve the best revenue outcome.

company collects historic data on bookings for 60 to 90 days before a given date and graphs that booking data as a curved line. Managers build a booking curve for each block of inventory (e.g., a night, a meal period, a flight). Next, the manager calculates an acceptable range of deviation from the average, generally represented as a parallel curve. The variation

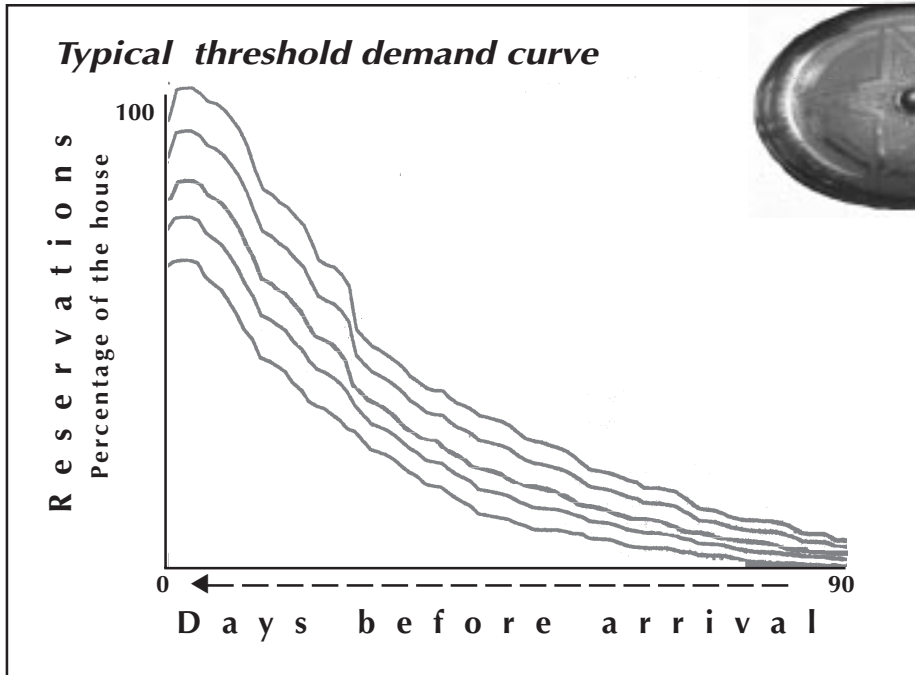
could be a set fraction of a standard deviation from the average or perhaps a percentage. While this solution is static and does not necessarily optimize demand, it is simple to use and offers a reasonable result. The threshold curve uses aggregate demand, rather than demand for each rate class.

C2: Clock

To reiterate, the essence of yield management is to match service timing to customers' willingness to pay for the service. To do that, managers must shift demand according to customers' price sensitivities. The chief price-related mechanism to accomplish the matching task is differential pricing—which often involves charging customers different prices for using the same service at the same moment. To accomplish this feat, which some customers might find offensive, managers must use price in conjunction with other yield-management levers. To

review, those levers involve duration management, accounting for arrival uncertainty, and maintaining rate fences for differential rates.

Duration is the length of time it takes to complete one service cycle for a particular



Based on its historical records (day 0 on the graph above), a hotel yield manager would develop a graph of expected average demand for that date, represented by the middle line. To activate a yield-management strategy, the manager sets trigger points at which to open or close rate classes either to encourage or discourage demand. If reservations fall on the gray lines below the expected-reservation line, the manager can open low-price rate classes and accept more business to bring reservations back up to the expected average. On the other hand, if reservations exceed the average and rise to the lines above the middle, the manager can close low-rate classes and accept only high-rate business to dampen demand and avoid overbooking. As explained on the next page, group business creates distortions in the demand curve because of group room blocks.

customer (or party). Measurement can be in terms of time or event, but the most effective way to manage duration is to define each service cycle in terms of time. As discussed below, restaurateurs must calculate the average length of a meal to gain some control of the time element. Duration-management levers include shifting customers' time of arrival, reducing uncertainty of arrival, and controlling length of stay. These levers must be implemented against a background of customers' characteristics.

Most operations that employ yield management use some type of advance-reservation mechanism. In an ideal world, a customer would appear as arranged to claim the reservation—thus allowing managers the luxury of knowing exactly how much of their perishable inventory will be sold. Such certainty is rarely possible, because customers frequently arrive on their own schedule—and sometimes not at all. The chief problems arising from customers' erratic behavior are no-shows and late arrivals. Yield managers seeking tactics to offset those problems usually rely on overbooking, cancellation penalties, or deposits (depending on customer characteristics and the nature of the business).

Even though customers are aware of overbooking practices, hospitality firms realize that few customers are pleased to be denied service as a result of overbooking. Thus, companies have developed other policies to shift some of the responsibility for arrival uncertainty to the customers themselves. Cruise lines and resorts commonly request deposits to hold reservations, for instance. Airlines have long imposed cancellation penalties on their low-price tickets, and most hotels request credit-card guarantees for guests arriving so late that their room cannot be sold if they fail to arrive. Some restaurants are experimenting with similar policies, including asking for credit-card numbers when taking reservations and charging the cards a fee if the customers do not show or are unduly late.

A major tactic in managing capacity as a strategic lever is to gain control of the duration of a given service cycle.



C3: Capacity

A major tactic in managing capacity as a strategic lever is to gain control of the duration of a given service cycle. If companies have a good estimate of service duration, they can come closer to the yield-management goal of selling out their inventory in each period. Hospitality companies use a number of mechanisms to control duration. As with arrival uncertainty, managers can forecast the length of use (as well as the number of early and late arrivals and departures) so that they can accommodate guests more effectively. A restaurateur who has a good sense of how long a typical party will spend in the dining room can make effective decisions regarding when to accept reservations. Likewise, a hotel manager can forecast the number of guests who will leave a night early or stay a night extra—and do this for each rate class. Airlines struggle with duration control when trips involve more than one leg, which is a common occurrence.

Restaurants can implement internal-process changes to achieve greater consistency of duration. By analyzing bottlenecks in the delivery process, restaurants can not only speed service delivery but gain a greater control over the timing and duration of service. An example of how this works is shown on page 9.

Changeover time is also a substantial factor in any calculation of service duration. Changeover time is the amount of time between customers, when planes are being cleaned and serviced or tables are being bussed and reset. Process management is also the tool for examining ways to reduce changeover time and thus increase available inventory. Many restau-

rants, for instance, employ table-management systems that track the tables in use and progress of each meal.

Although some operators have added penalties for guests who leave early, most companies have so far not been willing to risk consumers' ire by penalizing them in such a fashion.



Price is one of the chief strategic levers, but yield management does not involve giving blanket discounts.

C4: Cost

Managing price strategies may be the most challenging aspect of yield management, since the core tactic is to charge customers the highest price that they feel is fair for the service they will receive. Companies offer a variety of prices that are connected with different demand characteristics, and those firms do not want (and cannot afford) to have high-rate customers availing themselves of rates meant for price-sensitive customers who are buying services during marginal time periods.

The first step in controlling prices for yield management is to have a logical set of prices that make sense to potential customers. Most service firms set their prices using rate fences, or rules that discriminate among price categories. The rules need not be complicated, but they should be somehow logical. The classic example might be the airlines' requirement of a Saturday-night stayover and 14-day prepurchase for certain fare categories. This logically separates low-rate leisure travelers (who would probably be staying over on Saturday and can plan in advance) from high-rate business travelers (who are more likely to be traveling during the weekdays or on a moment's notice). Rate fences can be physical (based, for instance, on the size of a room or location of a restaurant table) or they can

involve customers' buying characteristics, such as time of use or membership in a particular group or organization. Another type of rate fence involves the addition of certain amenities (e.g., a golf cart, free breakfast) if a customer accepts a particular rate class. Rental-car companies have used this approach for years to upsell renters at the desk, by offering them a larger car for a slightly higher rate. At this point, the rental firm has great certainty about whether the upgrade car will be rented (it won't be) and thus the opportunity cost of the upgrade is nil, with any increased revenue being essentially pure profit.

Some companies, however, still offer a variety of rates without rate fences. That is, if customers figure out to ask for a lower rate they can get that rate without any specific limitation or qualification. The classic example is hotel rack rate, which travelers in most hotel segments know not to pay. Customers see no reason for paying higher rates and can be resentful when they discover that they could perhaps have obtained a lower rate. Thus, the hotel industry's experience has demonstrated the principle that good rate fences make for neighborly customer relations.



The chief danger of yield management is the possibility of alienating customers who run afoul of the rate-fence rules.

Potential pitfalls of yield management

The chief potential downside of yield management is the possibility of alienating customers who run afoul of the rate-fence rules. Especially if there is not a "fair" or "logical" reason for differential prices, customers who discover that they have paid more than others for a particular service may become disgruntled.

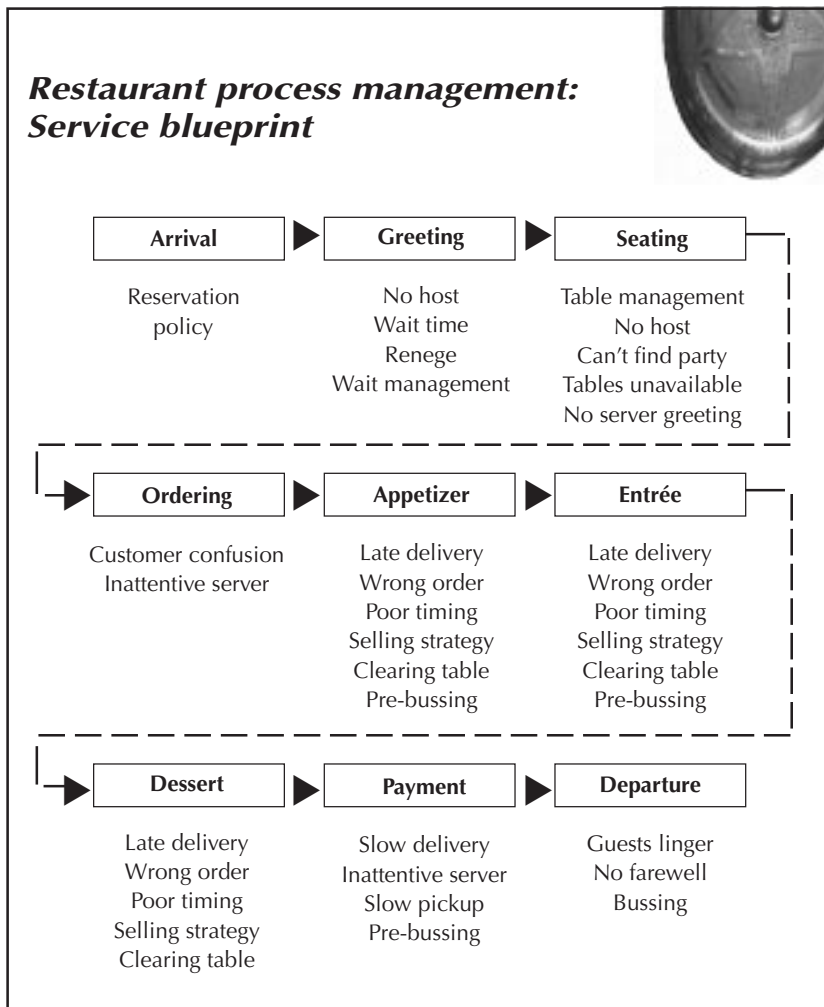
Other potential downsides include the possibility of a misdirected organizational focus and consequent damage to employee morale. If

the organization's focus shifts primarily to maximizing short-term profits, managers might ignore longer-term issues of producing and delivering good service and being responsive to customer demand. Similarly, if employees (particularly those in the sales office) believe that the yield-management system is "running things," they may feel that the system rules are substituting for their own professional judgment about the mix of price and services they should offer. In particular, group-sales departments may feel blocked by yield-management systems. Group sales often involves taking in large volumes of relatively low-rate business. With yield management, the incentive structure for the group-sales employees may have to be changed to reflect the reality of having some room blocks held for higher-rate, transient business when the yield-management system so indicates.

Companies must also organize their operations to take advantage of yield-management systems, by maintaining strong information systems and by training employees in how yield management works and how to use it. All of this stems from strong management commitment, without which any sales or marketing program (let alone yield management) will not succeed.

Specific applications of the 4C Strategic Levers


Yield-management applications for transient hotel guests and airline travelers seem fairly straightforward because the duration of the service is reasonably well defined. Applications for other operations, such as restaurants and country clubs, or group sales in hotels require additional analysis of how to control the duration of service, as discussed below.



A service blueprint is a stepwise analysis of the service process. The pinch points for the restaurant in question are listed here, allowing managers to gain better control of meal duration. Some of the issues (such as the host's being occupied and not greeting or seating guests) occur during busy times. Other pinch points occur because of the restaurant's particular layout (e.g., the bar is on a different level from the dining room and can be crowded) or because of a complex menu. The restaurant's upselling strategy also slows service during busy times. The outcome these service impediments was that meal duration was widely variable and difficult to control, thus interfering with the restaurant's ability to prosecute a yield-management strategy.

Restaurant Strategy

As mentioned above, the key to restaurant revenue management is to redefine the unit of sale from a meal or cover to a time-based unit, in this case the seat-hour. The goal of a restaurant yield-management program is to maximize the revenue per available seat-hour, abbreviated RevPASH. Having defined the operation in this time-oriented fashion, managers can then focus on the



Yield-management strategy gauge

Tactics	Slow time	Busy time
• <i>Suggestive selling</i>	Use	Avoid
• <i>Reservations</i>	Accept	Decline
• <i>Host</i>	Multiple duties	Greet and seat only
• <i>Menu variety</i>	Wide	Narrow
• <i>Prices</i>	Regular	Prime
• <i>Promotions</i>	Available	Not offered
• <i>Chips and salsa</i>	Brought by server	On table

The Cal-Mex restaurant studied for this report used process analysis to identify service bottlenecks, as shown on the previous page. Management then discontinued certain time-consuming practices during busy times. The result was not only faster table turns but more consistent meal duration—a key strategic lever for restaurant yield management.

strategic levers that drive RevPASH. Those levers are meals of predictable length, menu design, process analysis (to standardize operations), and labor scheduling, plus certain specific operating policies (such as pre-bussing, check delivery, and reducing turnaround time).

Gaining control of customer demand and meal duration are the primary goals for restaurants pursuing yield management. Most restaurants face two challenges with regard to customer demand. One is the familiar challenge of uncertainty of arrival, which bedevils all hospitality and tourism operators. Restaurants also face an additional problem—uncertainty of departure. Although most restaurant managers have a reasonably solid idea of the typical

duration of a meal in their restaurant, guests can, in reality, stay as long as they wish. Moreover, internal restaurant processes may slow a meal even when guests wish it to move ahead.

To deal with uncertainty of arrival, restaurant managers can apply tactics common to many hospitality firms. They can make forecasts of arrivals based on reservations, or they avoid taking reservations and depend on a queue for a steady flow of customers during busy times. Restaurants that take reservations might use overbooking, but that has not been a practice typical of the restaurant business. Instead, restaurants can use walk-in business as a buffer against no-shows.

Some restaurants are requesting reservation guarantees via credit card, and American Express has set up a “No-Show Initiative” that charges patrons a fee if they fail to honor their reservations. On the other hand, some restaurant operators take a service-oriented approach to preventing no-shows by phoning customers to reconfirm reservations.

Restaurant managers who wish to exert control over the duration of their customers’ meals have many avenues open to them. To begin with, these managers must be certain that their operation functions effectively enough to allow control of meal duration. The restaurant must therefore design its menu and processes to ensure that the meal goes smoothly. Managers might consider revising or removing menu items that require excessive preparation time—or offering those items only during off-peak hours. Similarly, the restaurant might want to remove menu items that cause diners to linger (particularly if those serving those items diminishes RevPASH). To ensure that restaurant procedures are not interfering with RevPASH, the manager can use process analysis to find and resolve any operating hitches. The example on page 9 shows how pinch points can be found and removed.

Some specific tactics that can help move guests through the meal in a gracious fashion include having table server pre-buss tables whenever possible, ensuring a speedy check

delivery and settlement (a weak spot for many restaurants), and offering a coffee and dessert bar rather than serving dessert at the table. Finally, the restaurant can reduce the time needed to reset the table between customers.

Once the restaurant has gained control of the strategic levers of yield management, it can establish a baseline RevPASH and then experiment with methods of increasing revenues. Differential pricing is one way to accomplish this, but such pricing must be carefully implemented using logical rate fences to avoid annoying customers. Rate fences available to restaurateurs including table location, party size, menu type, and absence or presence of certain amenities (e.g., a visit from the chef). While customers may resist the idea of raising prices for premium service, restaurants can effectively charge large groups more by implementing a service charge for parties over a certain size or by offering a special package that bundles a number of menu items for a given price.

Restaurants also have available to them the same types of rate fences used by other hospitality operators, such as charging according to group membership (e.g., labor union, frequent-diner club), time of day or day of the week, duration of the meal, timing of the reservation, whether the reservation was guaranteed, and, indeed, whether the guest made a reservation at all or walked in.

Many restaurants use one or more of the above strategies to increase revenues. The early bird menu is a classic example of a demand-shifting technique. However, yield management creates an integrated framework for the strategic revenue levers, and the RevPASH statistic gives managers a measuring stick to determine how well those levers are functioning.

A Restaurant Example

Coyote Loco, a Cal-Mex restaurant located near Cornell University in Ithaca, New York, wanted to implement a yield-management system based on the RevPASH measurement. The restaurant seats 72 in its main dining room, plus 27 in the bar and, in good weather, 66 on an outside patio. When

Once restaurant managers gain some control over the duration of a meal, they can experiment with ways to increase revenues.



the revenue-management study began, the restaurant offered a menu comprising a dozen appetizers, 30 to 40 entrées, and a half-dozen desserts.

To begin its yield-management study, the restaurant needed to establish baseline data on arrival patterns, meal duration, and RevPASH. The arrival data were collected in hourly segments, which is appropriate for a restaurant of this type. Other types of restaurants can use different arrival intervals; quick-service restaurants, for instance, might record arrivals in 15-minute increments. The data can be drawn from POS records, from direct observation, or both. Existing computer software can analyze POS data for arrivals, and those POS data can be checked by direct analysis for sample nights (e.g., one time-series analysis for each night).

From the POS data, the researchers calculated the average meal duration for each period. More important, the researchers calculated the standard deviation (or variation) in meal times. The average meal duration was just over one hour, but the deviation was 30 minutes—a statistically large number. This meant that sometimes guests finished their meal in about 35 minutes and sometimes they lingered for 90 minutes. Further study revealed that those meal durations were frequently not entirely under the customers' control, but instead resulted from process difficulties. Finally, the researchers calculated the RevPASH for each hourly interval. For dinners, that figure ranged from \$.76 (Monday, 5:00) to \$7.33 (Friday, 8:00). Perhaps the biggest surprise for management was the anemic RevPASH for lunch—under \$1.00.

The time study documented the timing of each section of the meal, starting with the time guests were seated (and the number of guests). The other steps were the time the guests were

greeted, the time the appetizer was delivered (if ordered), the time the entrée was delivered, the time dessert was delivered (if ordered), and the time the guests left.

The next step was to analyze why the meal steps took the time they did. For instance, most guests had been sitting at the tables for as long as 15 or 20 minutes before they received appetizers, and the entrées took another 20 minutes after the appetizers appeared. One analytical tool includes a service blueprint (which is a critical path of service steps, see page 9). The service blueprint stated the service process step by step, giving explanations of each step and the potential problems that would cause delays.

Another analytical tool is a fishbone diagram, which charts problems by the categories of causes. In the case of Coyote Loco's fishbone diagram, the problem was defined as the high standard deviation of meal duration. Researchers examined solutions in the areas of personnel, information, equipment, methods, and products. As examples, one method-related problem was the restaurant's tendency to hold tables open for people who had reservations but had not yet arrived, even during busy times when walk-ins were waiting. One equipment problem was the absence of adequate storage in the kitchen or on the main floor; cooks sometimes had to run to a downstairs storage area for supplies.

To remedy the problem of uneven meal duration, Coyote Loco's managers took several steps. They trained employees to think in terms of yield management; developed standard operating procedures (the absence of which showed up on the fishbone diagram); and improved table management. Delivery times were standardized for each meal course; tables were bussed continually; and the payment timing was shortened.

The researchers then set a pattern of yield-management strategies, based in part on whether the restaurant was busy (see the chart on page 10). To move guests through the meal during busy times, the restaurant discontinued

suggestive selling, declined reservations, put in place a dedicated host, narrowed menu selection, bumped up prices, and offered no special promotions. Rather than have servers bring chips and salsa (a gracious gesture appropriate to slow times), the tables were instead preset so that servers could focus their attention on table management. Thus, one outcome of the study was the realization that one set of strategies worked better at increasing RevPASH during slow times, while another set was most effective during busy times.

Revenue management for golf courses

The core concept of revenue per unit of time can apply equally to golf-course operation as to other capacity-constrained operations. For a golf course, the yield-management concept is revenue per available tee time. The key inventory measurement is available tee times, which is, in turn, driven by the length of time available on the

The strategic levers relating to revenues per unit of time works as well on the golf course as in restaurants or hotels.



golf course.

To activate a yield-management strategy, a golf-course manager has available the following strategic levers: reducing the uncertainty of arrival, redefining the concept of the duration of a golf match, reducing the uncertain of that duration, and reducing the tee-time interval.

Reducing either the uncertainty of arrival or of the duration of a round involves tactics that can be labeled either internal or external. Internal tactics are those that are within the operation and are essentially invisible to customers, while external measures involve customers' actions as well.

By defining the unit of sale as an available tee time, a manager can first establish when

demand is strong, when it is moderate, and when it is weak. Armed with that knowledge, a manager can then set strategies to manage demand at each level. The manager may wish to shift demand from strong times (when, presumably, people are turned away) to weaker times, when more customers can be accommodated.


The job is greatly complicated by the fact that the core product is a golf round of uncertain duration. For this reason, tactics that reduce the uncertainty of duration are key to operating the strategic levers of yield management for golf operators. Internal approaches include a course design that allows for duration management. External approaches include requiring guests to use carts during busy times, using course marshals or caddies to move things along, and posting golfers' playing times. Shotgun starts or playing the course out of order can also help smooth demand during busy times.

Some of the above efforts are negated by the uncertainty of arrival that haunts all hospitality operations. Like restaurants and hotels, golf-course operators can refine their forecasting mechanisms and possibly use judicious overbooking during busy times. Those internal measures can be supplemented by requiring guests to guarantee reservations with a credit card or at least reconfirming reservations by phone during busy times. If the market permits, an operator could charge a fee for no-shows.

If a course operator has implemented the above tactics to operate the strategic levers relating to duration and arrival uncertainty, the operator can use forecasting as a guide to encourage customers to shift their tee times from the busiest (and, presumably, most desirable) times to slack times. The key strategic levers are based on pricing structure, as well as certain tactical measures, such as shaving cycle time.

Demand shifters. Most of the demand-shifting levers involve setting prices according to demand predictions. In general, the strategy is to set the highest prices at the busiest times and then to offer discounts for customers who are

Golf-course duration-management methods



Reduce uncertainty of arrival	Internal measures	<ul style="list-style-type: none"> • Improve forecasting • Use overbooking
	External measures	<ul style="list-style-type: none"> • Require guaranteed reservations • Reconfirm reservations by phone • Enforce a no-show fee • Charge a fixed fee for reservations • Offer service guarantees • Flexible course design • Employ technology (e.g., GPS)
Redefine "duration"	Make it event-based Make it time-based	
Reduce uncertainty of duration	Internal measures	<ul style="list-style-type: none"> • Use equipment (e.g., require carts) • Employ appropriate technology
Reduce tee-time interval	External measures	<ul style="list-style-type: none"> • Use course marshals or caddies • Post golfers' playing times

willing to schedule tee times for less-busy periods. An important tactic for activating this strategy is to employ rate fences to ensure that the discounts are given only for golfers who sign up for slack times. That approach assumes the likely case that the golf course accepts reservations. A part of this strategy is to determine how to handle walk-in customers. One must determine, for instance, whether walk-ins qualify for discounted rates at slack times or whether a reservation is essential to get a discount. As with other hospitality operations, golf-course managers cannot be certain that golfers will honor their reservations.

One process-management issue is

whether the time between tee times can be reduced. If the current schedule is ten minutes between tee times, then reducing that to nine minutes would increase the number of tee times. However, that would necessitate more careful management of the golfing parties, generally to encourage them not to dawdle when they play.

The Special Case of Forecasting Hotel Group Business

Group business for hotels has its own set of characteristics that invoke a slightly different set of strategic levers from the typical approaches for transient guests. In particular, one big question is how well one can forecast group business and what factors to look for.

Forecasting group business is particularly important during high-occupancy times, when

accepting group business means deferring transient business, which is usually more lucrative. Failing to accept sufficient group business, on the other hand, may mean empty rooms that could otherwise be filled.

A study of forecasting errors for group business found, not surprisingly, that the average forecast error declined and the forecast became more accurate with time. Moreover, large hotels were able to forecast group business more accurately than small properties. Those hotels that had a substantial group business were able to forecast groups' arrivals most accurately. Hotels that regularly updated their forecasts were more accurate, particularly during the two weeks before arrival. Since the yield-management system takes the group forecast as one of its given factors and adjusts availabilities and rates based on those givens, the group-business forecast must be as accurate as possible so that the system can perform at its peak.



Executive Summary (concluded)

when to open or close price categories for specific service periods. Opening rate categories generally fills slack times, while closing rate categories closes off all but top-price demand from strong times.

C2: Clock. Clock-related strategic levers are related to the timing of when the service is ordered. Most yield-management strategies rely on some form of reservation-driven system that employs rate fences to separate customers according to their demand characteristics. Those who are willing to abide by the "rules" of a rate fence can receive the same service as those who do not, but at a lower price (and sometimes at a different time). One clock-related strategic lever involves tactics to ensure that customers honor reservations once they are made.

C3: Capacity. Since yield management is used chiefly by capacity-constrained

businesses, it is essential that the operation make the most of existing capacity. This is particularly true for businesses such as restaurants and golf courses, in which the duration of the service is not consistent. Yield managers can use process control and other strategic approaches to attempt to standardize the duration of each meal or round of golf, thereby gaining a more reliable forecasting of demand.

C4: Cost. All yield-management strategies rely on the lever of variable pricing. A yield manager establishes price classes according to demand forecasts to shift low-price demand into slack times and encourage high-price demand in strong times. Those prices are set according to the rules of the rate fences that are designed to parse demand into various rate classes and match the service offering to customers' characteristics.



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Sources

- Sheryl E. Kimes, "Yield Management: A Tool for Capacity-constrained Service Firms," *Journal of Operations Management*, Vol 8, No. 4 (October 1989), pp. 348–363.
- Sheryl E. Kimes, Richard B. Chase, Sunmee Choi, Philip Y. Lee, and Elizabeth N. Ngonzi, "Restaurant Revenue Management: Applying Yield Management to the Restaurant Industry," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 39, No. 3 (June 1998), pp. 32–39.
- Sheryl E. Kimes and Richard B. Chase, "The Strategic Levers of Yield Management," *Journal of Service Research*, Vol. 1, No. 2 (November 1998), pp. 156–166.
- Sheryl E. Kimes, "Implementing Restaurant Revenue Management: A Five-step Approach," *Cornell Hotel and Restaurant Administration Quarterly*, No. 40, No. 3 (June 1999), pp. 16–21.
- Sheryl E. Kimes, Deborah I. Barrash, and John E. Alexander, "Developing a Restaurant Revenue-management Strategy," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 40, No. 5 (October 1999), pp. 18–29.
- Sheryl E. Kimes, "Group-forecasting Accuracy in Hotels," *Journal of the Operational Research Society*, Vol. 50 No. 11 (1999), pp. 1104–1110.
- Sheryl E. Kimes, "Revenue Management on the Links: Applying Yield Management to the Golf-course Industry," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 41, No. 1 (February 2001), pp. 120–127.

For more information

- Robert G. Cross, "Launching the Revenue Rocket: How Revenue Management Can Work for Your Business," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 38, No. 2 (April 1997), pp. 32–43.
- Ellis D. Norman and Karl J. Mayer, "Yield Management in Las Vegas Casino Hotels," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 38, No. 5 (October 1997), pp. 28–33.
- Eric B. Orkin, "Wishful Thinking and Rocket Science: The Essential Matter of Calculating Unconstrained Demand for Revenue Management," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 39, No. 4 (August 1998), pp. 15–19.
- William J. Quain, Michael Sansbury, and Stephen A. LeBruto, "Revenue Enhancement, Part 1: A Straight-forward Approach for Making More Money," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 39, No. 5 (October 1998), pp. 41–48.
- William J. Quain, Michael Sansbury, and Ted Abernethy, "Revenue Enhancement, Part 2: Making More Money at Your Hotel," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 39, No. 6 (December 1998), pp. 71–79.
- William J. Quain, Michael Sansbury, and Dennis Quinn, "Revenue Enhancement, Part 3: Picking Low-hanging Fruit—A Simple Approach to Yield Management," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 40, No. 2 (April 1999), pp. 76–83.
- William J. Quain, Michael W. Sansbury, and Stephen M. LeBruto, "Revenue Enhancement, Part 4: Increasing Restaurant Profitability," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 40, No. 3 (June 1999), pp. 38–41.

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