

Revenue Management for the Hospitality Industry



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Introduction

When you stayed in that luxury hotel during your last vacation, did you check what your neighbor paid for her room? If she were a business visitor, she could have paid well above \$300 for the same room that you paid \$180. It is also possible that she paid \$120 provided she planned well in advance and managed to get that “*better*” deal which was elusive to you. So why do hotels charge different customers different rates for the same type of room?

Such differences are the result of an increasingly common strategy to maximize revenue (and profits) in the Hotel industry -- a practice referred to as *Revenue or Yield Management*. Revenue Management (RM) is a scientific technique that combines Operations Research, Statistics and Customer Relationship Management (CRM) and categorizes customers into price bands, based on various services. Statistical analysis of past data helps in forecasting demand and establishing the appropriate price bands. Applied correctly, Revenue Management helps hotels expand market size and increase revenues. Some industry practitioners also refer to RM as the art of selling the *right room* to the *right customer* at the *right time* and for the *right price*.

To understand the need for an RM system, let us take the following two examples. At the peak of the SARS epidemic in Canada, a resort experienced a 25% drop in number of visitors. Amazingly, this resort managed to limit decline in revenue to a bare 3%. During economic depression, a travel management company reduced its marketing budget by half, but still managed a revenue increase of 6%. How were these successes possible? The answer to both of these questions lies with the implementation of Revenue Management strategy.

Why Revenue Management?

- **Segmented Market:** Hotels typically segment their market (customer base) into a set of categories based on the price each category is willing to pay. Typical categories include the business traveler and the vacation traveler. Because demand patterns for each of these categories may vary significantly, hotels find it difficult to satisfy all of the demand simultaneously. A good example is the comparison between the time-conscious business executive and the price-sensitive vacation customer. The former is willing to pay a higher price in exchange for flexibility of being able to book a room at the last minute while the latter is willing to give up some flexibility for the sake of a more inexpensive room. RM tries to maximize revenues by managing the tradeoff between a low occupancy and higher room rate scenario (business customers) versus a high occupancy and lower room rate (vacation customers). Such a strategy allows hotels to fill rooms that would otherwise have been empty.



- **Fixed Capacity:** A hotel's capacity is relatively fixed - it is nearly impossible to add or remove rooms based on fluctuations in demand. If at all hotel capacity were flexible, there would be no need to manage capacity.
- **Perishable Inventory:** In the hotel industry, hotel rooms are the inventory. A hotel room that remains unoccupied for a night loses all its value for that night. This inventory cannot be stored and is lost forever. Because RM tries to manage demand instead of supply, it proves to be good business sense for the hotel.
- **Low Marginal Cost:** The fixed cost of adding a room in a hotel is heavily capital intensive. However, once the hotel manages to cover its initial fixed costs, the cost of serving an additional customer is low enough that the hotel can sell the room at a lower margin if it wishes. Such a strategy will obviously need to be balanced by one that also seeks to sell the room(s) at higher margins. Thus, the high fixed cost/low marginal cost nature of the business makes price differentiation a necessity – something that is made possible by application of RM.
- **Advanced Sales:** More often than not, requests for bookings start early. Therefore, hotels have enough leeway to adjust room prices based on the variation between realized bookings and expected demand. If all hotel rooms are sold at the same time, the hotel does not have the flexibility to adjust prices upward if demand picks up later. The tradeoff occurs when a manager is faced with the option of accepting an early reservation from a customer who wants a low price, or waiting to see if a higher paying customer will eventually show up.
- **Demand Fluctuations:** Demand for hotel rooms is characterized by crests and troughs, which the hotel factors in during the room pricing process. In peak season, the hotel can increase its revenues by raising room prices, while during lean seasons it can increase its utilization rate by lowering prices. Past data will offer the manager a way to forecast when these periods of high and low demand may occur. Unfortunately, it is very difficult to predict the actual demand with a high degree of certainty.

Therefore, the most critical challenge facing the hotel industry is predicting potential capacity, and developing a pricing strategy that will encourage maximum capacity and revenue. Revenue Management is the most effective technique to solve this challenge, similar to aggregate and hierarchical production planning techniques often employed in the manufacturing industry.



Revenue Management is based on complex optimization methodologies developed from advanced statistical and analytical models. In order to arrive at a solution, managers need to evaluate several millions of decisions, which requires a significant investment of skills, hardware and time. Many RM practitioners prefer to breakdown the actual business scenario into four sub-problems, and then identify an individual solution to some or all of these sub-problems. This would significantly reduce the number of potential non-optimal decisions thereby providing fewer choices, leading to quicker results. These four sub-problems are: a) Market segment identification, b) Forecasting and Pricing, c) Inventory allocation, and d) Overbooking.

How does it all work?

Market Segment Identification: The first and foremost step in a hotel RM system is the identification of the various market segments for the hotel room, followed by implementation of a differential pricing scheme. The objective in front of the hotel is the expansion of its market and in motivating the customer to pay more than he/she will usually spend. It is further observed that customers in the business class segment are less sensitive to higher prices as opposed to those in the vacation segment. An RM system helps hotels create additional price-points by building physical and logical fences around the different market segments, as shown in the table below.

| CHARACTERISTICS | HIGHER PRICE | LOWER PRICE |
|------------------------|---|---|
| Physical Fences | | |
| View | Pool view, ocean view, hill view | Non-scenic view |
| Size | Bigger room with more facilities and gadgets | Smaller rooms with fewer facilities |
| Temporal | Weekday bookings | Weekend bookings |
| Logical Fences | | |
| Length of Stay | Short stay. Often one or two days | Longer stay. One night revenue can spoil three nights revenue when demand is high |
| Flexibility | Cancellations and rescheduling are allowed at a low penalty | High penalty for cancellation and schedule changes |
| Time of Purchase | Bookings are made very close to date of check-in | Bookings are made quite early |
| Privileges | Are rewarded loyalty privileges either as free services or free stay vouchers | No privileges |



| | | |
|---------------------------|--|--|
| Size of Business Provided | Corporate business customers booking frequently | Self funding vacationers booking rarely |
| Point of Sale | Physical delivery and confirmations | By email or phone |

Demand Forecasting: The next step in an RM process is forecasting demand and pricing of the different market segments. Pricing and demand are inter-related and need to be coordinated. In the hotel industry, demand for a room is cyclic in nature (day of a week, months of a year) and follows a trend (demand growth due to economic growth). These forecasts are seldom precise but provide the decision-maker with an approximate set of inputs that are used in the planning process. RM models help pinpoint demand by minimizing uncertainty and producing the best possible forecast.

Allocation: The next important step in a RM process is the allocation of inventory (hotel rooms) among different market segments. The ratio of discounted versus full priced rooms is not fixed during the reservation period; rather, it is “tweaked” appropriately as the date of stay approaches. The opportunity cost of selling a discounted room instead of a full priced one has to be measured in order to make the best decision. Thus, when a customer approaches the hotel for a discounted price, the manager needs to evaluate this scenario with the *expected* revenue from another customer who might come at a later date, willing to pay a higher price for the same room. The manager would accept the request only if the discounted price now is more than the *expected* price at which the room might be booked by the second customer. The key word here is “*expected*”. RM systems use complicated mathematical algorithms to arrive at this decision using techniques such as Littlewoods and Expectation Maximization, referred to as the EM algorithm.

To explain these techniques, let us consider a simple two class scenario. A hotel has two price categories of rooms, say \$60 and \$100. Since the pricing is different for the two rooms, these rooms are each targeted at a different customer set. Based on the historical preference pattern of customers in each segment, it would be possible to estimate the number of customers who would be willing to buy these rooms at the given price, with a reasonable “variance”. The term variance refers to a tolerance level. For example, an average 50 customers may be willing to pay \$100 for some rooms, but it could also mean that the actual number of customers who turn up for the \$100 room could be 60 (or even 40) with some probability, or 80 (or 30) with a lesser probability. In statistical terms, this sort of pattern for the different customer segments is said to mimic a *normal* distribution.

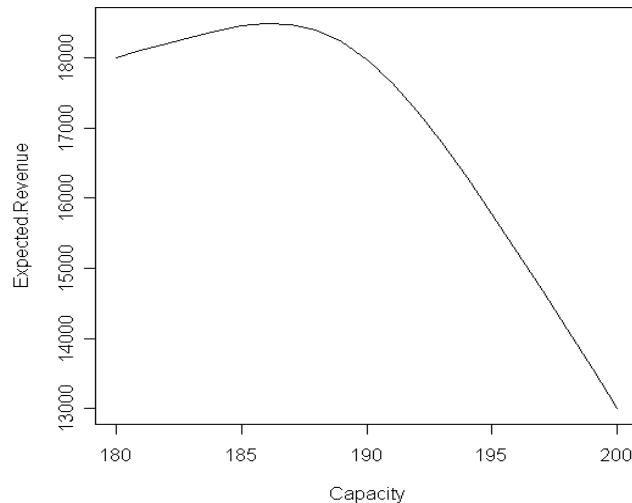
Using the past data and applying statistical know-how, we can actually estimate an “expectation” of revenue by quantifying the probability of a specific demand value and the actual revenue. In the same



example, let us assume that this hotel has 100 rooms, which are similar, but priced at the time of booking. If the booking is done fairly closely to the actual date of stay, the customers may need to pay \$100, whereas, they might have paid only \$60 had they booked in advance. Remember that, on an average, 50 persons are willing to pay \$100 for this room. Obviously, many more than 50 (say, 120) are willing to \$60 for the same room. We can use the Littlewoods rule to actually estimate the number of rooms that must be protected for those customers who are willing to pay \$100. If we protect too many rooms, some rooms may go vacant thereby resulting in a loss of potential revenue of at least \$60 per room. On the other hand if we protect too few rooms for \$100 customers, we lose the opportunity of \$40 per room on that number of rooms. The Littlewoods rule guides us to arrive at an optimal number of rooms that would maximize the expectation of revenues.

Overbooking: Overbooking is the practice of intentionally selling more rooms than are available in order to offset the effect of cancellations and no-shows. Studies estimate that although a hotel is fully booked, about 5-8% of the rooms are vacant on any given date. Poor overbooking decisions can prove to be very expensive for the hotel. In the short run, it is only a loss of room revenue, but over the long-term, casualties may include decreased customer loyalty, loss of hotel reputation, etc. American Airlines developed an optimization model that maximizes net revenues associated with overbooking decisions for the airline industry.

To illustrate the overbooking model developed by the American Airlines, let us consider a B757 jet flying from Chicago to Boston. The aircraft has about 180 seats. Based on the past travel pattern, it is observed that an average of 5% (or nine passengers) do not turn up at the time of boarding the flight. If the airlines book all seats for this leg, it is likely to fly with only 171 occupied seats. However it does not mean that it never flies with 172 or more (even 180) seats occupied. There is a lesser chance of the flight flying with 172 passengers, an even lesser chance of it flying with 175 and a miniscule chance of it flying with all 180 passengers. Therefore, if we book 181 passengers instead of 180, we are likely to end up with only 173 passengers (and almost always with lesser than 180 passengers). In an odd event of exactly 181 passengers reporting, the airline would need to bump one passenger. IATA has defined rules to compensate bumped passengers. If we can quantify all costs (including the cost of lost goodwill), the expected revenue would be the revenue from 181 passengers minus the expected cost of compensating the one additional passenger at that odd chance. Since the probability of exactly 181 passengers turning up is so low, the revenue from that additional passenger generally compensates more than the expected cost. For this example, the optimal number of passengers that can be booked would be 186 as illustrated in the figure below.



This model can be directly applied to the hotel industry as well. The driving force behind the model is the evaluation of the tradeoff between additional revenue accrued by selling an already-reserved room versus the downside from doing so. It has been found that net revenue increases with overbooking until the point where the downside from overbooking a room exceeds customer revenues. Beyond that point, the negative impact of overbooking increases rapidly because fewer and fewer customers appreciate being turned away.

Challenges

It is quite clear that while an RM system can guarantee increased revenues, it can be quite complicated to design and requires high levels of expertise for implementation. Some of the challenges facing hotels in the implementation of a robust and accurate RM system include:

- Measuring performance of an RM system is a major issue. Occupancy rates and yield are measures that are affected by external competition. An ideal measurement can be done using an opportunity model that indicates where the hotel stands in comparison to its maximum and minimum (no RM) revenue outcomes.
- Differential pricing is here to stay – customers seem resigned to the fact that hotels charge different prices for the same room. However, some customers do not like this practice and penalize the hotel by not becoming a patron. Therefore, in a fiercely competitive environment where quality of service is the key to success, RM may not work. In evaluating the efficiency of a RM system, the tradeoff between generating short-term profits and creating long-term customer loyalty and “mindshare” needs to be studied carefully.



- From an operational point of view, RM can impact the motivational level of the employees. In many cases, RM takes much of the guess work out of employees, thereby reducing their decision-making responsibilities. Sometimes, employees taking reservations are paid a percentage of the sales they make, motivating them to make group bookings, which in turn may be contradictory with the objectives of an RM system.

Conclusion

As part of ongoing changes in the industry, companies throughout the entire hospitality spectrum are placing a strong emphasis on implementing major operational changes. Beyond recognizing that meaningful cost reductions must be achieved without compromising safety, capacity and service levels, they are also looking at reducing costs by increasing flexibility and improving asset utilization through an RM strategy. In doing so, they continue to reassess their true core competencies, and are looking to outsource many of these processes, as they look to optimize business efficiencies and increase profitability

About the Author

Dr. Prem Kumar is a General Manager and Profit Center Head within the Research & Analytics business unit at KARVY Global Services. His expertise includes Supply Chain Optimization, Revenue Management and application of sophisticated Operations Research techniques in the Hospitality, Retail, Airline and Logistics industries.

KARVY Global Services' KPO Offerings for the Hospitality Industry

KARVY Global Services is pioneering the next-generation of outsourcing services for the global market with a unique combination of domain expertise, technology advantage and offshore capabilities. The company provides value-added outsourced services in the design, implementation and maintenance of Revenue Management systems to clients across a wide spectrum of industries, most notably Hospitality and Airlines. The KPO team has experience in solving large-scale optimization problems in these markets with hands-on experience in the design and implementation of Revenue Management solutions, for both large and small companies. KARVY Global Services' process-driven approach, governed by best practices such as Six-Sigma, delivers a high-quality service with a cost savings averaging 40%.

Additional outsourcing services include reservation/ loyalty contact centers, distribution, fulfillment, customer relationship management (CRM), human resources (HRO), technical support, help desk,



training and procurement. Given the importance of these functions, it is imperative to choose the right BPO partner – one able to combine the right people, processes and technologies to help achieve maximum efficiency and gain competitive advantage.

About KARVY Global Services Limited

KARVY Global Services is the Business Process and Knowledge Process Outsourcing subsidiary, of KARVY, the largest non-banking financial institution in India. KARVY is ranked in India as the number one registrar, the number two depository participant, one of the top five brokers and the number five investment bank.

KARVY Global Services provides a full range of Finance and Accounting Outsourcing (FAO – accounts payable, accounts receivable, billing, GL services, purchasing, reconciliation, fixed assets) Transaction Process Outsourcing (TPO – back office processing for a range of industries including Insurance and Healthcare), Knowledge Process Outsourcing (KPO – Research and Analytics), Human Resources Outsourcing (HRO – payroll processing, benefits administration, records management, compliance reporting), and Voice and Technology Support Services (VTO –inbound and outbound call center services, helpdesk support, technology development and application hosting).

Headquartered in Hyderabad, India, with three global delivery centers in Hyderabad, KARVY Global Services also has business development offices in New York, Los Angeles, San Francisco, Toronto, London, and Zurich. Additional information on KARVY Global Services is available at www.KARVYGlobal.com.