

## PRACTICE PAPERS

# Gaming twist in hotel revenue management

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### ABSTRACT

**KEYWORDS:** *gaming revenue management, hotel revenue management, customer segmentation, customer valuation, special events, promotion management*

*Revenue management (RM) is a business discipline that balances supply and demand in a way that maximises revenue. Although RM concepts are similar across different industries, their application varies significantly. While leveraging much of the technology developed for the hotel industry, the extension of RM to manage room revenues for the gaming industry presents new challenges. This paper explores some of these challenges, which include customer segmentation, special events and promotions.*

### INTRODUCTION

Revenue management (RM) uses historical data and mathematical models to predict customers' behaviour at a micro-market level and optimise product availability and and/or price to maximise revenue and profit. RM was first applied to the airline industry shortly after the US Congress passed the Airline Deregulation Act of 1978. Since deregulation, RM has generated billions of additional dollars for many industries including airlines, hotels, car rental firms, cruise lines, media companies, utility firms and railways. A recent literature review of RM is given by McGill and Van Ryzin (1999).

This paper describes how RM can help manage room revenues at a gaming resort. On the surface, this appears to be a simple extension of the traditional hotel room RM problem. Both hotels and gaming resorts have several types of rooms with known capacities, varying lengths of stay, perishable inventories, many market segments, group reservations, special events, promotions and rates with purchase restrictions. Managing rooms for gaming resorts, however, requires additional considerations.

— A hotel generally maximises room revenue, while a gaming resort maximises the sum of room and gaming revenues. A resort may offer a

complimentary room to a guest with a history of wagering an average of \$5,000 per night on gaming tables while denying an unknown guest who is willing to pay \$300 per night for a room.

- If many people are staying in the same room, hotels typically charge a nominal fee (\$10–\$15 per person) for the additional guests. When two known players stay in the same room, however, the resort may find it advantageous to offer them a room discount based on their customer value.<sup>1</sup>
- The value of guests who stay many nights in a hotel is generally proportional to their length of stay. Most players wager larger sums, however, and gamble more frequently during their first day at a resort; their nightly gaming value usually diminishes each day during their stay.
- Resorts have a large number of special events that must be given particular consideration when designing a forecasting system.
- The gaming industry regularly practises promotions by offering free or discounted shows, meals, and hotel rooms to attract new customers or earn more business from their existing customers. Resorts must determine and manage the best mix of incentives by finding profitable trade-offs among competing demand for promotions and customer segments.

The rest of this paper focuses on how customer segmentation, special events and promotions affect RM in the gaming industry.

### **CUSTOMER SEGMENTATION**

Customer segmentation classifies customers so that those with similar attributes are mapped to the same category. In the gaming industry, the historical record of how much money each guest wagered is an important

attribute because it can be used to predict the customer's value to the resort.

### **Customer valuation**

Customer value is one of the main attributes gaming resorts use to segment customers. Many resorts offer frequent player programmes to attract gamblers to their properties. They provide patrons with distinguished services based on their expected value (Binkley, 2000). To support this type of programme, many resorts have implemented a customer tracking system to identify their most valuable customers.

The tracking systems can use a customer's betting activity in any affiliated resort or casino as the basis for rewarding the customer. The rewards may take the form of discounts in room rates, airline tickets, rental cars, meals, event tickets and cash vouchers, which are usually referred to as 'comps'. Some tracking systems use frequent-player cards, which provide key data about a customer's gambling habits. Typically, customers insert these cards into slot machines or hand them to resort supervisors. These cards can be used to track customer activity at different resort venues, such as special events, showrooms and hotels.

In addition to basic demographic information, resorts collect important game-related data such as betting frequency, the amount of each bet, winning profiles and each customer's favourite slot machines or table games. Table 1 illustrates four sample scenarios for evaluating customers based on their gaming activity.

Revenue managers at gaming resorts must choose how they measure customer value and ensure that their systems capture and store the appropriate information. Some resorts have developed proprietary customer valuation procedures. The industry leader in this field is Harrah's Entertainment, Inc., which owns a series of patents on customer valuation procedures and has

**Table 1: Sample scenarios for customer valuation**

Level	Customer valuation description
1	<ul style="list-style-type: none"> <li>• Customer value is based on the total amount of money wagered per visit.</li> <li>• Customer value is not discounted by how much the customer wins.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Customer value is based on the total amount of money wagered per visit.</li> <li>• Customer is tracked by type of game — machine or table.*</li> <li>• Customer value is not discounted by how much the customer wins.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Customer value is based on the total amount of money wagered per visit.</li> <li>• Customer is tracked by type of game — machine or table player.</li> <li>• Customer's winning profiles are monitored and customer value is discounted by how much the customer wins.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Customer is tracked by the customer's betting frequency, dollar level per bet, favourite slot machines and gaming tables.</li> <li>• Customer's winning profiles are monitored and customer value is discounted by how much the customer wins.</li> <li>• The probability of winning at each gaming machine or table is taken into account to compute the customer's expected worth to the resort.</li> </ul>

\*Machine players are worth more than table players because machine games have a higher margin than table games.

the most sophisticated, information-driven customer marketing capabilities in the gaming industry with 19 million customer accounts in its database (*PR Newswire*, 2000).

### Length of stay

Customer valuation procedures must consider the length of stay. Figure 1 shows an example of the percentage of a player's stake wagered daily during a four-day stay. As the figure illustrates, a longer stay does not yield a proportionally higher gaming value. Most players do not stay longer than four nights, and gaming resorts strongly favour shorter stays.

### Shared rooms

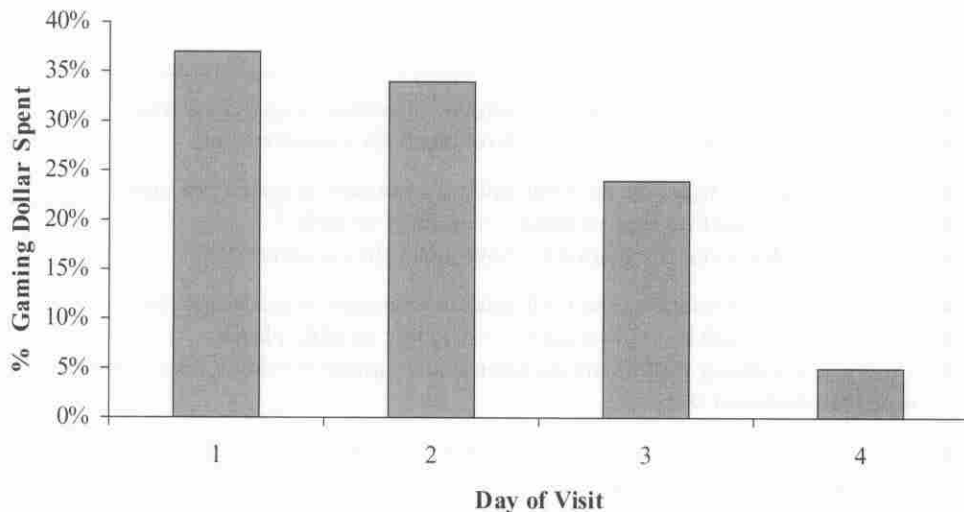
In a hotel, the number of guests per room influences revenue because many hotels charge a nominal fee for each additional person. In a gaming resort, however, the number of guests per room takes on added importance and complexity. For example,

if two guests, each with a gaming value of \$150, share a room at a gaming resort, it may be best to charge less for those guests than a single guest with a gaming value of \$200. In addition, a room may have a single occupant the first day, and two guests sharing the room on the second day. The first guest may check out on the third day, and the second guest may continue to stay additional days. Customer segmentation becomes more complicated given that guests may have different individual customer values and different lengths of stay. This is a key issue that must be addressed, because more than half of the guests share rooms at a gaming resort.

### SPECIAL EVENTS

Gaming resorts offer two types of special events. The first type of event also takes place in a traditional hotel and includes those days in which demand is unusually high (or low) because of a holiday or major sporting event. The second type

Figure 1: Dollars spent daily during a four-day stay



comprises events that gaming resorts create themselves, such as blackjack tournaments, which are referred to as casino events. Many casino events occur on an irregular basis and affect demand significantly. Casino events, however, may not affect all customer segments; for example, a blackjack tournament might only be available for customers whose gaming values are greater than \$200.

One way to handle special events is to use dummy or indicator variables as explanatory variables in the regression model. Each indicator variables has two allowable values, 0 or 1. For example, an indicator variable for Thanksgiving can be defined as follows:

$$X_t^{\text{Thanksgiving}} = \begin{cases} 1 & \text{if day } t \text{ belong to} \\ & \text{thanksgiving} \\ 0 & \text{otherwise} \end{cases}$$

Additional indicator variables are defined similarly for other special events. Each of these indicator variable predicts the value of a forecast variable; the associated coefficients, which reflect average differences in the forecast variable, are called special event factors.

The indicator variables are also used to segregate special event histories so that they do not bias other business statistics. For example, if a major boxing championship is scheduled for a Saturday evening, 95 per cent of the guests may stay only a single night. This observation cannot be extrapolated to suggest that the casino can expect 95 per cent of its Saturday customers to stay a single night, and thus it should not be allowed to contaminate forecasts of other Saturdays.

Gaming resorts have a large number of special events, which are mostly generated internally by their promotions departments.

### PROMOTION MANAGEMENT

Promotions are a micro-managed programme or combination of programmes designed to stimulate demand. The gaming industry practises promotions extensively by offering incentives such as gaming credits and rebates, free meals, free show tickets, cash vouchers, room discounts and other discounts from partner airlines and car rental firms. Customers are usually notified of promotions by mail.

Promotion management requires close coordination between marketing and RM. Marketing determines the target customers, promotion alternatives, and the characteristics and objectives of each promotion. In turn, the RM system manages promotional demand to maximise revenue and profitability and evaluate the effect of each promotion.

The next sections briefly describe promotion pricing in the gaming industry, explain interactions between RM and promotions, and present an example.

### Promotion pricing

Promotion pricing solves the problem of how to most profitably allocate promotion and incentive dollars to drive market demand. The process starts by identifying each promotion alternative, the target customer segments, a promotional time period and any applicable discounts and incentives.

Promotion pricing selects the best subset of alternative promotions based on the following factors:

- available promotion and incentive dollars;
- materialisation rate (1 per cent of direct mail becomes actual demand, for example);
- promotion strength (a promotion without a weekend blackout is stronger than a promotion with a weekend blackout, for example);
- promotion reach (the closer customers live to a resort, the easier it is for them to participate in a promotion, for example);
- promotion elasticities (a particular promotional demand increases by 5 per cent if room rate is reduced by 10 per cent, for example);
- non-promotional demand forecasts;
- available capacities.

### RM and promotions

RM selectively accepts or rejects reservation requests to maximise system revenue and profits by setting reservation availability based on the value of each reservation request. Reservation controls for a hotel and a gaming resort can include bid price, length of stay, booking limits, protection limits, optimal prices by length of stay and rate category and overbooking limits. In addition, control mechanisms in the reservation system may be discrete or nested. The level of detail at which a reservation request can be controlled directly affects the sophistication of any RM and promotion system.

Because each promotion is linked to a subset of customer segments, it can be managed in a gaming RM system. A promotion can be valid for any time period; it can have restrictions such as three months with weekend and holiday blackouts; or it may be associated with a special event such as blackjack tournament.

Promotional demand may displace higher-valued customers and thus lead to less revenue. Gaming resorts can control promotional demand using optimal booking limits, which the RM system computes by making profitable trade-offs among competing demand for promotions and customer segments.

A promotion for a special event may require allocation of a minimum number of rooms; otherwise, demand from less-valuable customers can arrive earlier and consume available capacity. If participation in the event is limited as a result, the target customers may not participate in similar promotions in the future. RM can provide protection limits to save rooms for each promotion associated with a special event.

A decision support tool can be added to a gaming RM system to evaluate the effectiveness of a past promotion. The incremental revenue from a promotion can be

determined by executing the optimisation model twice, once with the unconstrained observed demand without the promotion and a second time with the promotion, then calculating the difference. When evaluating a promotion, costs such as advertisement, personnel, incentives and discounts must be considered.

### Example

The following example illustrates the inter-relationship between RM and promotions. Revenue managers at a resort offer a room rate of \$20 to its known players with gaming values between \$25 and \$100 for a two-day blackjack tournament on 29th and 30th September.

The marketing department mails 50,000 letters and invites customers from neighbouring states. Historically, this type of promotion draws a 1 per cent response. RM managers are concerned that demand from lower-valued customer segments may arrive earlier and consume the available capacity, which is currently 400 rooms. To save rooms for this promotion, RM managers execute the optimisation model and determine that at least 180 rooms must be set aside for the blackjack tournament. In addition, they want to ensure that more valuable customers are not displaced by this promotion. By executing the optimisation model, they determine that a maximum of 350 rooms should be allocated for this promotion because they expect 50 additional higher-valued customers to visit the resort during the tournament.

After 30th September, RM managers can evaluate the effect the blackjack tournament had, by executing the optimisation model twice, based on unconstrained demand with and without the promotional demand, and considering the costs of the promotion. The resort can use this information to plan future promotions.

### SUMMARY AND CONCLUSIONS

Although hotels and gaming resorts have many similarities, the complexity of their RM applications differs dramatically. RM systems for resorts can contain sophisticated data warehouses full of valuable customer information. The range of customer values (the difference between the most valuable and the least valuable customer) plays an important role in this complexity because discrimination by value is much more important when the range is \$10,000 than when it is only a few hundred dollars. In addition, these gaming resorts have many special events and promotions.

This paper shows that a rich variety of technical problems and research opportunities emerge to advance the science of RM as it is applied to new industries. Areas of further research for the gaming industry include how to segment customers, handle a large number of special events and manage promotions.

RM technology must adapt to available customer information. As the Internet identifies more sophisticated customer information, traditional industries must reconsider the adequacy of their existing RM systems.

### ACKNOWLEDGMENT

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### NOTE

- 1 This paper uses the terms *customer value* and *gaming value* interchangeably.

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