The Future of Revenue Management

Kelly A. McGuire, SAS Institute Inc., Cary, NC
Steve Pinchuk, SAS Institute Inc., Cary, NC

ABSTRACT

In many firms, revenue management (RM), pricing, customer relationship management, and distribution channel management are still a chain of separate departments with separate rulers, and in many cases separate goals measured on separate databases, analytical processes, and skill sets. Centralizing and integrating these functions to create a Profit Optimization department, using RM and pricing theories and tools, will allow firms to move away from traditional revenue management and towards Total Demand Profit Optimization. Under this umbrella, rather than simply managing existing demand, firms can create and direct demand by incorporating the demand generating capability and cost structure of customers and channels into the revenue management decision. This goal can only be accomplished with a centralized solution that integrates data from these disparate sources, automatically executes analytical processes, and provides a central view to all departments, so that demand management decisions are made according to a common profit optimization goal.

INTRODUCTION

Revenue management programs increase revenue by four to eight percent on average (Smith et al. 1992). The majority of this incremental revenue goes straight to the bottom line since few variable costs are associated with each additional unit of additional demand. These impressive increases have turned revenue management from a competitive advantage to a "must-have" for some industries. However, even firms with relatively mature revenue management programs can still benefit from innovative new programs. Future applications of revenue management will incorporate the capabilities of other departments within the firm and extend to other types of businesses. This paper discusses three general areas that relate to the future of revenue management:

- synchronizing demand control and demand generating functions under a larger profit optimization framework

- applying customer analytics in a systematic fashion to support customer centric pricing

- applying revenue management to non-traditional businesses

TOTAL DEMAND PROFIT OPTIMIZATION

Traditionally, revenue management departments have been responsible for controlling demand. Revenue increases result from pricing strategies that encourage bookings during slow demand periods and restrict access to only the highest paying customers during peak periods. Instead of accepting bookings in the order they come in, revenue management techniques reserve space for the most valuable customers that are forecasted to arrive, allowing firms to say no to lower valued customers before the rooms are fully booked. . Pure demand control techniques have increased revenue, but they generally fail to account for the impact of demand generating functions. For example, marketing departments manage loyalty programs that encourage customers to repurchase, but loyalty is not a factor in revenue management algorithms. Typically, revenue management decisions occur in the absence of specific customer preferences, willingness to pay data, or the cost of the demand generated by different distribution channels. Integrating marketing, pricing, and distribution with revenue management synchronizes demand control and demand generation. This integration moves the firm from revenue management to demand management (Anderson and Carroll 2007) and towards the goal of total demand profit optimization.

MARKETING

The marketing department is responsible for demand generation through promotions and loyalty program management. They manage customer databases that contain purchase data, product preference, frequency, and loyalty information. Promotions and programming are designed to cultivate the customer base and encourage repeat business. Usually the marketing department does not have access to revenue management's demand forecasts. This information could support revenue management efforts by generating lists of customers that are more likely to book during off peak periods. Promotions could be designed to support revenue management's efforts to sell the product. Without access to the demand forecast, the marketing department might either dilute revenue by offering

discount promotions during peak periods, or taking no action during periods when demand is needed. Integration between these two departments helps synchronize the decisions that generate revenue by stimulating demand or protecting rates. This synchronization also reduces promotional costs by making offers only when demand is needed and only to the customers most likely to respond.

PRICING

Traditional revenue management algorithms optimize on a pre-determined and fixed price schedule. These price schedules introduce price variability that allows different prices to be charged to different segments and during different periods. However, price schedules are typically not optimally calculated based on demand patterns or customer willingness to pay. Rather, they are derived by percentage increases over the previous year's schedule, calculated based on costs, or modeled after competitors' rates. Integrating dynamic pricing algorithms into the revenue management system ensures that prices reflect the customers' willingness to pay.

DISTRIBUTION CHANNEL

Distribution channels have different costs and attract differently valued customers. For example, Internet bookings through a third party typically demand a higher commission than booking through a company's Web site. These customers can be more price-sensitive and less loyal to a brand. Similarly, customers who are willing to pay the same rate have different profitability based on the channel that is used. Therefore, revenue management forecasts should consider the demand by market segment as well as the distribution channel. Then optimization algorithms can account for the associated costs of each channel when determining the optimal mix of business to accept. This information enables a business to proactively and systematically open or close distribution channels based on the level of demand and the profitability of each channel. Firms can also refine their distribution channel strategy from a marketing and brand management perspective, and drive business to their most profitable channels.

PROFIT OPTIMIZATION

Integrating revenue management with marketing, pricing, and distribution represents a move from traditional revenue management to profit optimization (Pinchuk 2007). Some integration can happen manually through improved communication and better data sharing. However, true integration is achieved with a system that integrates data from each department, synchronizes analysis, and automatically alerts users when action is needed or conflicts arise. Using this systematic approach forecasts from revenue management drive the proper promotion strategies from the marketing department, which offer customer-centric pricing based on customer willingness-to-pay, the value of the customer to the firm, and overall demand levels. These properly incentives customers are encouraged to book through the most profitable channels. Under this integrated framework, all departments have a single view of the data and can coordinate actions with the goal of overall profit optimization.

CUSTOMER INTELLIGENCE AND CUSTOMER CENTRIC PRICING

Future benefits come from the tight coupling of revenue management and customer intelligence, a key component of any profit optimization solution. The firm must collect, integrate, and process even greater amounts of data than is already used in traditional revenue management systems. In particular, incorporating information about specific customers requires tracking customer purchase history, product preferences and buying behavior. Detailed records must be kept of every interaction each customer has with the firm. This information is used to predict customer value, forecast likelihood to respond to offers, proactively respond to changes in customer behavior and develop customer-centric pricing. Sifting through volumes of customer data is technologically intensive, as well as labor intensive for the analysts who have to process decisions and take action.

The SAS Profit Optimization Global Practice is developing a new Customer Lifecycle Analysis System (CLAS) to handle this data-intensive and processing-intensive analysis. Rather than manually executing analysis on an ad hoc basis and sifting through the reams of related results, CLAS automates routine analysis, provides actionable recommendations and alerts users when they must take action (Pinchuk 2009). Freeing the analysts from having to design and conduct routine analyses provides more time to proactively manage operations, execute special projects, and dive deeper into the data.

Using advanced analytic techniques, firms can identify desired customer behaviors; locate customers likely to exhibit these behaviors, and understand correct actions that encourage these behaviors. For example, casino companies are concerned with retaining their most profitable customers. Today, analysts might run a database query to identify a set of high valued customers who have not visited with their normal frequency, or who have stopped coming. These customers can be sent an offer to encourage them to return. Casinos might already know which offers are incentives for customers to resume play after they have defected, but in many cases, it is already too late to recover the customer. An advanced customer intelligence system can identify behaviors that indicate when customers are about to defect, monitor the action of current customers in the database, and issue an alert when customers begin to exhibit this type of behavior. Rather than reacting to customers after they stopped play, the casino is proactively

retaining valued customers. Maintaining existing customers is much easier and cheaper than to try to recover lost customers.

An advanced customer intelligence system that is combined with revenue management capability is even more powerful. Customer information can drive customer-centric pricing programs so that pricing is determined on a customer-by-customer basis based on purchase behavior, overall value to the firm, and expected demand patterns. In the gaming and hospitality context, information about all customer interactions, beyond the room rates paid, provides a complete view of the customers' value to the firm. For example, a customer that uses the golf course, eats at the restaurants, and books spa treatments is more profitable than the customers that do not use the ancillary outlets. Frequency of stay and the timing of their last visit also provide clues to customer value. Predictive analytics can give an indication of the customers' total value to the firm both currently and into the future. A business can understand who are their most valuable customers and use this information in the revenue management system to optimize on total value rather than room rate and to design pricing specific for each customer. For example, a gaming customer might be very price sensitive about the room rate. If the room rate is discounted based on the level of play or use of ancillary outlets, then the business can recover the price reduction from other revenue streams. A revenue management system that optimizes only room rate closes off this discounted rate, but including gaming revenue increases the customer's value, and qualifies them for the discount.

Retail offers a similar example of customer-centric pricing. A major electronics company, tracking purchases over time, might know that customers who buy a flat screen television tend to also purchase a Blue-Ray player, a home-theater system, and upgraded speakers. The company also knows the typically time intervals between purchases, and whether the customer had a discount or purchased at full price. Using this information, the firm can track customers who purchase flat screen TVs, monitor subsequent purchases, and provide incentives for purchasing the next product in the cycle. Customers that bought at a discount might need a special offer for the next product in the cycle, while less price sensitive customers might simply need some additional information to encourage the purchase. The firm can avoid blanket discounts or expensive direct mail campaigns by targeting customers who are more likely to make the follow-on purchase, and offer the product at the right price point for each customer.

Without detailed information about purchase behavior, product preferences and price sensitivity derived from analysis of detailed customer information, true customer centric pricing is not possible. Historical customer behavior, combined with advanced analytics, provides important clues that lead to future profitability.

REVENUE MANAGEMENT FOR NON-TRADITIONAL INDUSTRIES

The success of revenue management in the hotel and airline industries has generated interest in other industries, within and beyond travel and tourism. Gaming and resort companies realize that opportunities exist beyond maximizing hotel room revenue. These properties have revenue-generating ancillary outlets with capacity constraints. For example, spa, golf courses, restaurants, and retail space can be profit centers for a hotel, casino, or resort, represent cross-sell and up-sell opportunities, and meet the necessary conditions for revenue management. Freight shipping companies need to maximize the revenue for each shipment from limited cargo space in containers, rail cars, airplane holds or trucks. Much like airlines, passenger bus, and rail companies have a limited number of seats available for each leg of a trip and different demand patterns for each location.

The first step in applying revenue management to a new industry is to identify whether the industry has the necessary conditions for revenue management: These are

- relatively fixed capacity;

- high fixed and low variable costs;

- time-variable demand;

- segmentable markets;

- and perishable inventory (Kimes 1989).

For example, golf courses have a limited number of tee-times available during the day; it costs relatively little to add one more group of golfers compared to the upkeep of the course; tee times early in the morning are more popular than those later in the day; golfers have different handicaps and price-sensitivities; and once the time has passed, the firm looses the opportunity to sell that tee-time on that day.

Revenue management techniques are based on manipulating two strategic levers: price and duration (Kimes and Chase 1998). The goal of a revenue management program is to move the firm towards variable pricing and fixed duration. For example, when booking a reservation at a hotel, the guest specifies the number of nights they will stay (fixed duration), whereas a guest making a restaurant reservation does not specify the amount of time at the table (variable duration). Hotels can increase revenue by applying variable pricing for their hotel rooms, based on location

of the room, the time period, or the characteristics of the rooms. If restaurants were able to sell time as opposed to the dinner event, then they could more efficiently book reservations to maximize the number of customers served and therefore increase revenue. In the presence of duration uncertainty, however, restaurants must be are more conservative with their reservation policies, resulting in booking fewer customers.

After defining the necessary conditions and the strategic lever that has the most impact, the firm should collect data about their demand patterns, including no-shows, cancellations, and turned down customers. Market segments and demand patterns need to be identified, as well as opportunities for overbooking to cover no shows and cancellations. Simple rules about pricing and demand management can be derived from the demand analysis. For example, the golf course might always overbook by one party at 7:00 AM because a no-show always occurs at this time or establish pricing rules that never offer discounts during peak periods.

Very basic data analysis and demand management rules generate revenue benefits and provide the foundation for a revenue management culture within the organization. Once the firm has mastered the basics, (or while they are mastering the basics), they can plan the development of more sophisticated forecasting and optimization algorithms. Out of the box solutions are not usually available for a new industry that wants to establish a revenue management program. The business might have to build solution from scratch or partner with a technology provider.

A business with multiple types of revenue generating outlets or services has the opportunity to create bundles or packages. Packages enable the company to fill low demand outlets or to disguise discounted rates for certain services in a fixed price bundle. When the firm designs fixed packages, suggests add-ons to bookings, or encourages dynamic packaging, all elements of the package must be revenue managed so that package buyers are not displacing higher paying customers. Forecasting and optimization algorithms that optimize pricing and inventory allocation for each outlet or each service determine when discounts on inventory like reservations or tee times, are offered and when bookings are restricted.

Dynamic packaging lets customers create their own packages from all the available services that a firm offers. Once the package is designed, the property's revenue management system calculates the demand levels for each outlet and derives an optimal price (and/or time) for each component in the package. This set of prices is used to calculate a minimum acceptable price for the custom package. Dynamic packages have the dual benefit of allowing the customer to select elements that have the most appeal and ensures that the firm receives the full value for each product or service. Clearly this type of flexibility in booking requires that demand levels and inventory availability be understood for each element of the package.

CONCLUSION

Future applications of revenue management will integrate demand generating and demand control functions, moving the firm towards total demand profit optimization. New applications will require intensive data collection, storage, and processing capabilities. CLAS is being developed to support in-depth understanding of customer interaction with the firm, future purchase behaviors, and customer centric pricing to support and enhance revenue management efforts. Revenue management techniques will be extended beyond traditional applications, allowing firms to generate revenue from non-traditional sources, and explore dynamic packaging opportunities.

REFERENCES

- Anderson, C.K. and B. Carroll. B. 2007. "Demand Management: Beyond Revenue Management." *Journal of Pricing and Revenue Management 6(4):* 260-263.

- Kimes, S.E. 1989. "Yield Management: A Tool for Capacity-Constrained Service Firms." *Journal of Operations Management* 8(4): 348-363.

- Kimes, S.E. and R. B. Chase. 1998. "The Strategic Levers of Yield Management." *Journal of Service Research* 1(2): 156-166.

- Pinchuk, S. 2008. "A system profit optimization." *Journal of Pricing and Revenue Management,* 7(1), 106-110.

- Pinchuk, S. 2009. "Changing revenue management and marketing using a new customer lifecycle system." *Journal of Pricing and Revenue Management,* 8(1), 109-112.

- Smith, B. C., J.F. Leimkuhler, and R.M. Darrow. 1992. "Yield Management at American Airlines." *Interfaces* 22: 8-31.

.

RECOMMENDED READING

- Cross, R.G. 1997. "Launching the Revenue Rocket: How Revenue Management can work for your business." *Cornell Hotel and Restaurant Administration Quarterly*,38(2):,32-44.

- Kimes, S.E. 2003. "Revenue Management: A Retrospective." *Cornell Hotel and Restaurant Administration Quarterly*,44(5/6): 131-139.

- Kimes, S.E. 2000. "Revenue Management on the Links." *Cornell Hotel and Restaurant Administration Quarterly*,41(1): 120-127.

- Kimes, S.E. and K. A. McGuire. 2001." Function-Space Revenue Management: A Case Study From Singapore." *Cornell Hotel and Restaurant Administration Quarterly* December:33-46.

- Metters, R. and V. Vargas. 1999. "Yield Management for the Nonprofit Sector." *Journal of Service Research* 1(3): 215-226.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Kelly McGuire
SAS Institute, Inc
Work Phone: 607-216-5800
Fax: 607-277-8571
E-mail: Kelly.McGuire@sas.com