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Management Insights

New Directions in Revenue Management Research
James D. Dana, Jr.

More general characterizations on consumer decision making and more explicit models of firm competition would enrich applied, theoretical, and empirical research in revenue management. In addition, because of the Internet and other technological changes, firms are experimenting with alternative price-setting mechanisms. This is another important area for future research in revenue management.

Strategic Management of Distressed Inventory
Guillermo Gallego, Robert Phillips, Özge Şahin

A merchant holding a fixed inventory of a perishable good is better off (at least in the short run) discounting his stock than allowing it to perish. This is true whether the item being sold is physically perishable, needs to be removed from the store by certain "out date," or a service that uses fixed capacity. The decision to sell inventory at a discount changes the future expectations of customers and hence their buying behavior. The merchants who consistently use markdown policies risk training customers to "wait for the sale." Contrary to the common belief, it is often optimal for the seller to limit second-period sales. The behavior of the optimal sales limit depends in part on the speed of customer updating. If customers update their expectations quickly, then the optimal sales limit can oscillate. If updating occurs more slowly, then the optimal sales limit tends to converge to a constant value that is strictly less than the capacity. Sellers who assume that demand is independent of past policies may overestimate customer demand at the full price and end up with substantially lower profits.

Managing Clearance Sales in the Presence of Strategic Customers
Dan Zhang, William L. Cooper

Clearance sales are widespread in retail industries. Among the benefits they offer are the liquidation of excess inventory and the potential to reach price-sensitive customers. Frequent use of clearance sales, however, can prompt some customers to wait strategically for lower prices, thereby reducing revenues. The authors analyze the impact of this type of consumer behavior on the pricing and availability decisions of a seller of a single product over two periods, a regular sales period and a clearance period. When the seller can price optimally, the analysis shows that it is not desirable to withhold the product from sale in the clearance period. When prices are fixed in advance, however, the analysis shows that it can be optimal to withhold from sale a fraction of the product that is leftover at the start of the clearance period. This means that if prices are potentially not set appropriately, then it is important for a retailer to consider restricting the use of clearance sales.

Dynamic Pricing with Constant Demand Elasticity
R. Preston McAfee, Vera te Velde

The authors present a practical theory relating the elasticity of demand to the yield management system. Because the elasticity is the commonly used method of characterizing demand, it is important to understand how elasticity relates to yield management induced pricing. Pricing shows a gentle rise over time, and prices are very steady except for the last few weeks prior to the takeoff. In addition, pricing is socially efficient; that is, variability of prices is entirely a consequence of variability in costs. In particular, price variation is *not* due to the exercise of market power. Because the U.S. Department of Justice tends to use price variation as a sign of market power, this finding could be important to countering antitrust actions by the government.

Multiperiod Models with Capacities in Competitive Supply Chain
Georgia Perakis, Marina Zaretsky

The authors study multiperiod price competition over a finite horizon in the presence of both vertical competition (due to the presence of suppliers and a retailer) and horizontal competition (due to the presence of many competing suppliers). Suppliers have hard capacity constraints and operate in a make-to-stock setting where the retailer can carry inventory. The authors establish, both in theory and simulations, that the use of dynamic strategies outperforms myopic and static strategies. As a result, an auction designer who wishes to allocate the orders of a retailer

to multiple suppliers should be aware of the trade-offs and advantages of dynamic strategies in auction design. Increasing an active supplier's capacity leads to a piecewise linear increase in the decentralized system profit. Furthermore, the variability in the consumer demand is amplified by the variability of the supplier's capacities. The authors consider a number of approaches to coordinate the supply chain when there is competition and thus to extract the maximum profit from the supply chain system. In particular, the authors suggest how a multiperiod auction designer can utilize toll-like contracts or alternatively real options on capacities to coordinate the supply chain. An efficient equilibrium (in terms of supply chain coordination) is achieved when utilizing these contracts.

Pricing, Allocation, and Overbooking in Dynamic Service Network Competition When Demand Is Uncertain
Reetabrata Mookherjee, Terry L. Friesz

The authors study the problem of combined pricing, resource allocation, and overbooking by service providers offering differentiated services with an explicit expiration date, having fixed amount of resources, and involved in a dynamic noncooperative competition on a network. This class of problem arises in airlines, car rental, and hotels' revenue management problem that uses capacity control as well as pricing mechanisms in the presence of cancellations and no-shows. The networks of interest are the organization development network (airlines), length-of-stay network (hotels), and duration of rentals (car rentals). The authors propose, analyze, and compute market equilibrium strategies for simultaneous price-allocation-overbooking decisions. Under fairly general regularity conditions, they prove the existence and uniqueness of a pure-strategy open-loop Nash equilibrium for the network competition described by our model. They also show that under most scenarios, competition leads to the underpricing of network services, which was also quantified numerically for an illustrative-example problem of intermediate size. They also compute the loss of efficiency (that is, price of anarchy) due to competition. Their proposed algorithm is computationally efficient for large problems and may be implemented using well-known off-the-shelf commercial software.

Revenue Management in Business Services
Brenda Dietrich, Giuseppe A. Paleologo, Laura Wynter

A rapidly growing segment of the service sector comprises firms that provide business functions to other businesses. The sector covers tasks such as payroll processing, procurement, and information systems management, as well as business consulting, technical support, call center operations, and software development. Firms may choose to purchase, rather than perform, these business functions to reduce costs, mitigate risk, or simply to focus on their processes that provide differentiation. Transferring a business function from within a firm to an outside supplier is often called outsourcing. The risks and benefits of outsourcing to the firm purchasing a business service have been studied in some detail by both academics and consultants. In this paper we identify features shared by a variety of outsourced services: nonstorability, resource reuse, short life cycles, standardization, customer heterogeneity, and buying power. We identify areas in which an analytical treatment, possibly with tools borrowed from revenue management, could benefit both the service providers and the final users.