

Dynamic Pricing Model: An Analysis in Relation to Revenue Management

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Abstract:

The Research paper throws light on the processes involved in Dynamic pricing in attracting the customers in balancing the price sensitive and time sensitive issues. It examined the how market volatility constrained in maximising the benefits and measures strategized in optimising the profits with the paramount importance to the customer satisfaction in terms of price and services. It also critically located the practices of a few players in manipulation in the pricing at certain times in maximising the utility of services with relative profits and customer satisfaction.

Keywords: Profit-making, Paramount, Analysis, Capacity, Dynamic pricing, Customer satisfaction, Revenue management, price sensitive, refinement, Operation research.

I. Introduction

Customers are highly unpredictable. It is virtually impossible to understand how customers perceive a product or service. There are some customers who give priority to the price whereas some other kinds of customers look for the timely availability of service. It all depends upon the customers whether they are price sensitive or time sensitive but it is imperative for the organization concerned to understand the customers' demands. So, customer satisfaction has a paramount importance in every profit-making organization. At the same time the profit and cost are to be optimized in order to exist in the market place. Keeping view to the market volatility and constrained supply it is very difficult to optimize profit and cost. Cost cutting is virtually impossible because of limited resources. In this crucial juncture the pricing adjustment is coming to be a great weapon for the organizations. Keep on changing the price depending upon the situation (e.g. demand, season, taste and preferences etc.) has given rise to the concept of "Dynamic Pricing". It is a concept of the Revenue Management which optimizes the price and timely availability of the product.

Dynamic pricing is the dynamic adjustment of price of the product or service that the customer is willing to pay. It is highly a developed concept where the "capacity" is a constraint. In case of hotels; the number of rooms available is a constraint because it can't be increased at one point of time if there is a high demand for it. Again, if the demand is less than the existing service can't be stored making it highly perishable. These variations are because of the seasonalities and trends in the market place, existence of the bigger brand hotels and the changing consumer behaviour.

Dynamic pricing requires demand forecasting and an efficient pricing system. This depends upon the extensive past data to have an accurate demand forecasting for different types of customers. And later on, the optimal prices on behalf of them are fixed. Currently data driven models, inventory-based models and the simulation-based models are overwhelmingly used by airlines, hotels and the transportation industry. This paper explores by analyses a few studies in understanding the process of revenue management in which different studies formulated in different models by using the data. And the nature of revenue management in relation to dynamic pricing of the firms. As the study focusses on the data driven model. It uses the past data to compute optimal dynamic pricing to suggest the applicability and necessity of dynamic pricing in customer satisfaction; Which would enable to build up a model by analysing the past data for determining optimal prices.

Concept of Revenue Management

In Revenue Management under dynamic pricing model approach a technique on a group of customers on room bookings was carried by Marriott International's and the aspects of Group Pricing Optimizer (GPO) to evolve a decision support system which would enable the personal to optimize revenue by executing demand segmentation, price elasticity modelling. This system helped the hotel industry in emerging considerable profits to the company (2006).

In a study on Revenue Management performers drivers (Queenan, C.C., Ferguson, 2010) conducted a logit analysis on two groups with a comparison on the practices of the Revenue Management on the aspects of

fairness and unfairness. It proved the customers behaviour is a very much dependant on the perceptions of the personal working in the hotel industry.

Another study on tourism related hotel room occupancy showed an important element of seasonal demand and forecasting in generating revenue on the basis of recurring phenomenon where a focus was laid upon the seasonality of the tourist vacation (Lim, Chang, 2011)

Perceptions on Revenue Management:

In literature, many authors use the term Revenue Management (RM) interchangeably with Revenue Management (RM). Some consider RM only to be related with revenue derived from accommodation whereas RM may encompass all areas of hotel revenue (Burgess and Bryant, 2001). Therefore, it is important to highlight the term RM and clarify its meaning for the purpose of this thesis. Many definitions are available on RM, revenue is calculated by taking revenue realized and dividing it by revenue potential (Jones and Val, 1993). Hence, revenue can be explained as a way of calculating the effectiveness of a company in order to increase revenue. Further, RM is often associated with the following definition: "The application of information systems and pricing strategies to allocate the right capacity to the right customer at the right place at the right time." (Kimes, 2000, p. 121)

RM is therefore related to how an organisation applies different tools, e.g. computer systems, in order to control the price so that it will be correct according to each customer and that the room sale takes place at the right time, in the correct way, and at the right place. However, Jauncey et al. (1995) have, through an analysis of literature, come up with what they call a "best fit" definition: "An integrated, continuous and systematic approach to maximizing room revenue through the manipulation of room rates in response to forecasted patterns of demand." (Jauncey et al., 1995, p. 25)

A description of RM, according to Jones and Val (1993), is to apply basic economic principles to pricing and to control the supply of rooms for the purpose of maximizing room revenue. This would mean that in order to have an effective RM system in place one would need to understand the basic economics of supply and demand so that the right price could be set and increase room revenue for the company. As discussed in the introductory chapter, the areas of capacity, price, sales and marketing, customer, cost and human resource management have a direct or indirect influence on revenue. Hence, these areas are linked to the management of revenue and also to RM. Nevertheless, as a starting point in this literature review, the history of RM and the relation to supply and demand will be presented.

The History of Revenue Management:

When looking at the literature from a historical perspective, it is the airline industry that has been credited with the development and refinement of RM following the deregulation of the US. airline industry in the 1970s (Kimes, 1989 and McMahon-Beattie et al, 1999). The resulting heavy competition led to a price cutting war. Nevertheless, managing inventory became an important part of running a successful business already in the early 1970s (Rothstein 1971; 1975; Bitran and Caldentey, 2003; Weatherford, 2003).

Managing inventory is a major component of RM and therefore it is interesting to see where the development within inventory management, and hence RM, started. As mentioned, the development started in the early 1970s. The focus was on overbooking policies and practices used within the airline industry at the time. It can be said that the underlying model is the basic economic model of supply and demand. Supply as well as demand depends on several factors. When the two are combined in a market with perfect competition, the market equilibrium is established. At the given price there are just as many customers willing to buy as there are suppliers willing to sell.

Different models have been constructed on how to describe the market and its demand in relation to capacity management. Rothstein, one of the pioneers within RM, presented a model in 1971 on how airlines should determine their overbooking policies on their flights in order to gain more revenue. The basic notion of Rothstein's theory is that overbooking policies are constructed to either maximize revenue taking the cost of overbooked passengers denied boarding into account, or to maximize revenue, that is constrained by operating characteristics, namely the probability of denied boardings and the proportion of reserved passengers denied boarding. To obtain the right policy, the model uses a discrete time approach, the reservation process is viewed as a Markovian sequential decision process and the underlying transition probabilities are time-dependent. The system changes state from time to time based on passenger demand and other transition probabilities such as cancellations, no-shows and other issues. It is constructed in such a way in order for the airline to minimize revenue loss through overbooking and hence, maximizing capacity on their flights. One important aspect of the theory is that at that time price was not the critical factor, price was assumed to be fixed (Bitran and Caldentey, 2003). As a result of competitive circumstances, RM began to be adopted in the hotel industry in the middle of the 1980s as the industry was faced with excess capacity, severe short-term liquidity problem and increasing business failure rates (McMahon-Beattie et al., 1999).

Purpose of Revenue Management

According to Jones and Hamilton (1992) among others, RM in the hotel business context tries to maximize guest room rates when demand exceeds supply and maximize occupancy when supply exceeds demand, even at the expense of the average room rate. Nevertheless, a vast amount of authors agree that the purpose of RM is the maximization of room revenue through the manipulation of room rates in a structured fashion, so as to take into account forecasted patterns of demand (Jauncey et al., 1995; McMahon-Beattie et al., 1999, Siguaw et al., 2001). It is a procedure that attempts to maximize profits by using information about buying behaviour and sales to create pricing and inventory controls (Lee-Ross and Johns, 1997). The system consists of techniques that allow managers to gain more insight into customers' buying behaviour and consequently, to make adjustments in the marketing mix to maximize revenue and achieve significant increase in profitability through customer preferences (Siguaw et al., 2001). Hence, the ability to control rates is dependent on correct predictions of future patterns of demand. This involves modelling the rate and volume of predicted reservations over time, based on historical data.

II. Conclusion:

In the above literature that RM consists of two separate but interrelated parts, room inventory management and pricing (Kimes, 1989; Brotherton and Mooney, 1992; Writs et al., 2003). Inventory management deals with how different rooms are to be allocated according to demand, and pricing procedures is about charging the best price. All the same, Weatherford et al., (2001) suggest that the two interrelated strategies that should be used in order to influence room revenue are pricing and duration of customer use. Duration of customer use involves controlling the length of stay. Also, price can be fixed or varied and duration is either predictable or unpredictable and involves controlling, predicting length of stay or service. According to Weatherford et al., (2001) and Kimes (2000) different industries use different combinations of variable pricing and duration control.

References

- [1]. An econometric analysis of hotel-motel room nights a New Zealand with stochastic seasonality, *International Journal of Revenue Management*, Vol 5, Issue 1, February, 2011, pp. 63-83,
- [2]. Brotherton, B. and Mooney, S. (1992), "Revenue Management Progress and Prospects", *International Journal of Hospitality Management*, Vol. 11 No. 1. pp 23-32.
- [3]. Burgess, C. and Bryant, K. (2001). "Revenue Management the Contribution of the Finance Function to Profitability", *International Journal of Contemporary Hospitality Management*, 13/3. pp. 144-150.
- [4]. Jauncey, S., Mitchell, I. and Slamet P. (1995). "The Meaning and Management of Revenue in Hotels". *International Journal of Contemporary Hospitality Management*, Vol. 7, No. 4, pp. 23. 26.
- [5]. Jones, C. and Val, P. (1993). *Accommodation Management*, UK: Redwood Books
- [6]. Lee-Ross, D. and Johns, N. (1997). "Revenue Management in Hospitality SMEs", *International Journal of Contemporary Hospitality Management*, February, pp. 66-69.
- [7]. Kimes, S. (2000). "Revenue Management on the Links: Applying Revenue Management to the Golf-Course Industry", *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 41, No. 1, pp 120-127.
- [8]. Kimes, S. (2002), "A Retrospective Commentary on Discounting in the Hotel Industry: A New Approach", *Cornell Hotel and Restaurant Administration Quarterly*, August, pp. 92-93.
- [9]. McMahon-Beattie, U., Donaghy, K and Yeoman, J. (1999). "Revenue Management in Hotels". In Constantinos, S. and Wood, R.C. (Eds.) (1999). *Accommodation Management Perspectives from the International Hotel Industry*, UK: International Thomson Business Press.
- [10]. Queenan C.C., Furgason, ME (2010), "Revenue Management Performance Drivers: A exploratory analysis within the hotel industry", ISSN, 14766930.
- [11]. Weatherford, L. (2003), "Disappeared Fares Within a Fare Class: How Can the Reality be Harnessed?" *Journal of Pricing and Revenue Management*, Vol. 3. No. 1, pp. 26-40.
- [12]. Writs, J., Kimes, S., Ho Phuong Thing, J. and Patterson P. (2003). "Revenue Management Resolving Potential Customer Conflicts", *Journal of Revenue and Pricing Management*, Vol. 7. No. 3, pp. 216-226.