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White Paper

Rate Optimization: Enhancing Your Hotel's Pricing Strategy

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For many hotels, developing effective pricing strategies remains a complex issue for revenue managers. Their goal, ultimately, is to maximize company-wide revenue and profits while building strong hotel partner relationships within their marketplace. The emergence of rate optimization has made strides to demystify pricing practices and help revenue managers understand the demand characteristics of their products, understand the price sensitivity of demand and design a rate spectrum that is tuned to all these. This allows hoteliers to take full advantage of their business opportunities, ensuring that they are capturing the maximum revenue at all times through an optimized rate spectrum.

Beyond the scope of regular revenue management practices such as selecting the correct overbooking, rate restrictions and best available rate, lies the challenge of selecting the correct rates to choose from in the first place. Rate Optimization is the practice of selecting the rates offered in a rate spectrum based on the historical price sensitivity of demand. The goal of rate optimization is to understand the demand characteristics of products and the price sensitivity of demand and define a rate spectrum that will capture the maximum revenue over time.

Price Sensitivity, or Elasticity of Demand

The *Price Sensitivity of Demand* is a measure of the change in demand to a change in price. If a small change in price is accompanied by a large change in demand, the product is said to be elastic, (or responsive to price changes). However, a product is inelastic if a large change in price is accompanied by a small amount of change in demand.

Price sensitivity can have a dramatic impact on revenue. For example, if the rate offered for a product is too low, the demand for the product may be significant; however the revenues from the sale of the product may be low. In turn, if a rate offered is too high, there is a risk that not enough demand will materialize, and the lack of demand for the product at the high rate may result in a reduction of potential revenue.

Between these two extremes is a rate offering that will capture the demand to maximize the overall revenue. It is crucial to determine, in advance, the correct rates to be used when there is excess capacity or excess demand. An incorrect determination of the rate spectrum is likely to affect the overall revenue for a set of products.

The reduced price offered to the price sensitive segment of the market may also be associated with the grade or class of service or reduced cost of delivering the service, but this is not necessary when employing market segment pricing.

Price Elasticity of Demand

Price Elasticity of Demand measures the effect of price changes on the quantity demanded. Sometimes a price increase causes quantity demanded to decrease significantly, other times it decreases only slightly.

Price Elasticity of Demand is defined as the percentage change (ΔD) in quantity demanded (D) given a percentage change (ΔP) in price (P). This can be represented by the following equation:

$$\varepsilon_D = \frac{\Delta D / D}{\Delta P / P}$$

Price Elasticity of Demand will always have a negative value in this context.

A large change in quantity demanded due to a change in price suggests that the demand is more elastic.

Price Elasticity of Demand is important because it predicts what is likely to happen to revenue due to the change in quantity demanded as the price is changed.

Price Elasticity of Revenue

Price Elasticity of Revenue measures the effect of price changes on revenue. Revenue is a function of the quantity demanded and the price.

Price Elasticity of Revenue is defined as the percentage change (ΔR) in revenue (R) given a percentage change (ΔP) in Price (P). This can be represented by the following equation:

$$\varepsilon_R = \frac{\Delta R / R}{\Delta P / P}$$

Relationship between the Price Elasticity of Demand and Revenue

The relationship between Price Elasticity of Demand and Revenue can be written as:

$$\textit{Elasticity of Revenue} = \textit{Elasticity of Demand} + 1$$

For example, if Price Elasticity of Demand is -0.4, the Price Elasticity of Revenue will be +0.6. If the price **increases** by 10 percent, quantity demanded will **decrease** by 4 percent and revenue will increase by 6 percent.

On the other hand, if Price Elasticity of Demand is -1.5, the Price Elasticity of Revenue will be -0.5. If price **increases** by 10 percent, quantity demanded will **decrease** by 15 percent and revenue will decrease by 5 percent.

For a given price change, the revenue increase or decrease depends on the Price Elasticity of Demand. If the price increases the revenue will increase as long as the Elasticity of Demand is between 0 and -1. The revenue will be maximized at the price point where the Price Elasticity of Demand equals -1 and Price Elasticity of Revenue equals 0. This means no additional revenue can be achieved by deviating from this price point.

The following example further explains the relationship, using a simplified linear deterministic demand function. A deterministic model assumes that the demand is not influenced by chance.

Consider a hotel with a capacity of 100 rooms with the following conditions:

- At a price of $0, 100 rooms would be sold and the total revenue would be $0.
- At a price of $40, 60 rooms would be sold and the total revenue would be $40 x 60 rooms = $2400.
- At a price of $60, 40 rooms would be sold and the total revenue would be $60 x 40 rooms = $2400.
- At a price of $100, 0 rooms would be sold and the total revenue would be $0.

Price	$0	$40	$60	$100
Demand	100	60	40	0
Revenue	$0	$2400	$2400	$0

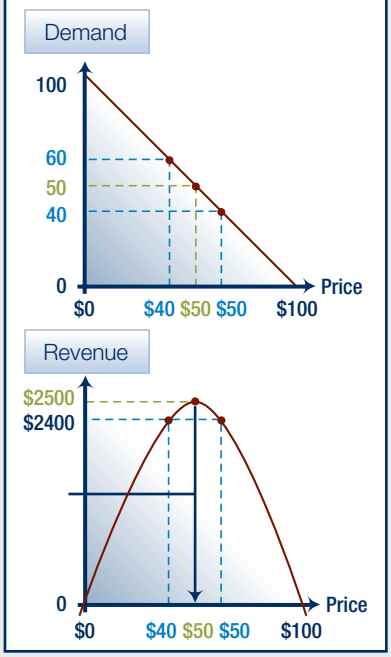

Figure 3.1: Relationship between Demand and Revenue by Price

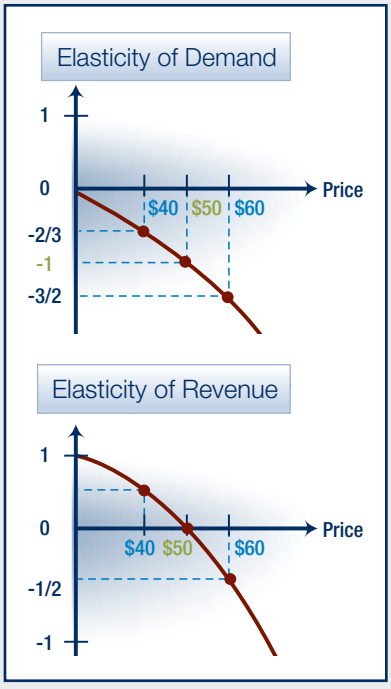

Figure 3.2: Demonstrating the Optimal Price with Elasticity of Demand and Revenue

See Figure 3.1

The price that optimizes revenue, i.e. generates maximal revenue, appears to be $50. At the price of $50, 50 rooms would be sold and the total revenue would be $2500. To verify that this price optimizes revenue, the earlier equations for Price Elasticity of Demand and Revenue can be used.

See Figure 3.2

From this example, it can be concluded that:

- At the price of $40 the Price Elasticity of Demand is -2/3 and the Price Elasticity of Revenue is 1/3. The negative value of Price Elasticity of Demand indicates an increase in price will decrease the quantity demanded and a decrease in price will increase the quantity demanded. The positive value of the Price Elasticity of Revenue indicates the revenue will increase with an increase in price and decrease with a decrease in price. Because the revenue could be increased (by increasing the price), the price of $40 is not optimal.
- At the price of $60, the Price Elasticity of Demand is -3/2 and the price elasticity of revenue is -1/2. The negative value of Price Elasticity of Demand indicates an increase in price will decrease the quantity demanded and a decrease in price will increase the quantity demanded. The negative value of the Price Elasticity of Revenue indicates the revenue will decrease with an increase in price and increase with a decrease in price. Because the revenue could be increased (by decreasing the price), the price of $60 is not optimal.
- At the price of $50, the Price Elasticity of Demand is -1 and the elasticity of revenue is 0. The negative value of Price Elasticity of Demand indicates an increase in price will decrease the quantity demanded and a decrease in price will increase the quantity demanded. The 0 value of the Price Elasticity of Revenue indicates the revenue will decrease with any change in price. Therefore, the price of $50 is optimal.

Practical Elasticity Analysis

The example uses a simplified linear deterministic demand function. Therefore, price elasticity analysis must be augmented by accounting for real world factors, such as nonlinearity and random effects on demand. In this case a stochastic nonlinear demand model is more realistic in determining the price sensitivity of demand and the optimal price points in the rate spectrum.

External and internal factors can affect the quantity demanded and change demand itself. A change in quantity demanded as a result of price change can be illustrated as a movement along the demand curve (the demand curve itself is not shifting). A change in demand (which is represented by a shift in the demand curve), occurs when one or more of the determinants of demand changes, even when the price is held constant.

Determinants of demand include consumers' preferences, income, economic and market conditions and the prices of substitute goods. Many of these factors are inherent in the historical data and need to be considered when analyzing demand sensitivity.

An approach to Rate Optimization

The elements that make up an effective rate optimization analysis are fundamental to a successful and profitable revenue management program. After gathering historical business data that includes capacity, occupancy and rate information for various products, a thorough analysis of the historical data must be conducted. Following the analysis, an evaluation of the price sensitivity of demand is necessary to determine refined price points. Companies can then estimate reference revenues under current and refined rate spectrums, enlightening revenue managers about appropriate present pricing information, relative to market segment. Typically, an effective rate optimization analysis requires a minimum of 12 months of historical data to perform the analysis and truly recognize demand, occupancy trends and patterns.

Summary

Price sensitivity is measured by calculating the change in demand as a result of a change in price. By understanding the price sensitivity of your business, your published rate plans are now more intelligent because they are based on analytics rather than gut feel or rules of thumb. Rate optimization will keep intelligent hotels from being dragged into constant price wars with their less analytically-savvy competitors.

Starting with the right set of rate plans, based on market characteristics and willingness to pay will give hotels a leg up on the competition. This enhanced pricing strategy represents the next big advance in revenue management, meaning the next opportunity for incremental revenue growth.

How can you improve your hotel's pricing strategy today?

IDeaS Revenue Optimization now offers a rate optimization service which assesses your current room rate spectrum and recommends changes that will maximize revenue without changing your existing revenue management practices. Learn more about IDeaS' Rate Optimization Service at **www.ideas.com**

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For more information on the benefits of Revenue Optimization visit IDeaS online at
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