The study of effect of dynamic pricing in rooms division on incremental room revenue in star rated hotels

Authors

1. Dr. Deepa Prasad Venkatraman
   Associate Professor
   Department of Management Sciences (PUMBA)
   Savitribai Phule Pune University, Pune India
   Email ID- deepaprasad.pumba@gmail.com
   Contact No- 9822752725

2. Prof Pratik Satpute
   Assistant Professor
   Suryadatta College of Hospitality Management and Travel Tourism
   Pune India
   Email ID- psatpute5@gmail.com
   Contact No- 8149115209

Abstract
The paper is a part of a detailed research which is been undertaken to study the effect of dynamic pricing on the incremental room revenue. The detailed research of which the paper is a part deals with various revenue management techniques used in star category hotels and check its impact on the hotel room revenue. After a detailed analysis and thorough classification there have a list of revenue management strategies which have been listed out. Dynamic Pricing is one of most important revenue management technique amongst the all listed revenue management techniques. Here the relation of dynamic pricing is studied with the incremental room revenue and a detailed analysis is put forth whether there is a relation between the both the variables. Finally, some light has put forth on the future research prospects.

Key words
Revenue management, Room revenue, Dynamic pricing, Rooms division, Star rated hotels, Incremental room revenue

Introduction
With the advent of technology over the past few years hotel industry has flourished in leaps and bounds. The hotel industry is currently part of tourism industry which is in the biggest sector in services industry. With increase in hotels worldwide there was an increase in the competition between hotels to get the highest share in the market. Airlines first practiced the concept of yield management in 1980’s which was a major step in optimizing the revenue in coming years. This concept was further implemented in hotel industry and was later evolved in to a better version known as revenue management. Hotels now a days are using revenue management in daily revenue operations to get the highest possible share of revenue in the competitive market. Revenue management has namely five elements to set up the platform- right product or service, right price, right time, right customer and right distribution channel. When all in these five elements are defined correctly by any organization, they reach the level of earning an optimized revenue.

Hotels have namely two major areas of revenue generation- rooms and food & beverage. There are also other areas but these are the prominent ones to give the necessary revenue. In hotels the 60% room revenue is generally earned by sale of rooms. So, we can always say that room revenue forms a major part in the total hotel revenue. Now the main question amongst any hotel organization is how can we get the maximum room revenue as maximum room revenue is the key factor to achieve a good profitability. Revenue management is considered as a solution for this question. Hotels implement revenue management, but which techniques or practices of revenue management are being used or can be used or which techniques can give the best possible revenue is the primary question. Hotels are getting well educated about revenue management but are revenue management techniques giving the necessary results we are not aware.

Considering the above question, a detailed literature review has been done to put forth a new classification of revenue management techniques. The classification is sub divided into three major categories namely- pricing revenue management techniques which have price as a major factor in implementation, non-pricing revenue management techniques which take into consideration other factors rather than price and last one combination revenue management techniques which take into consideration price as well as other factors. So, under each main type there are various techniques which have been listed out. When we study the impact of all these techniques individually on room revenue in hotels, we can conclude whether the using of techniques to strategize the business is effective or not.

Dynamic pricing is setting up the price of any product or a service depending on the laws of economics of demand and supply. Dynamic pricing involves price as one and the only factor and hence it considered as a pricing revenue management technique. Further if we consider room revenue, we can divide in in to two parts- first is break even room revenue which is sum of all fixed costs and variable costs involved in rooms division in hotels. Break even room revenue can also be considered as a point of no profit and no loss. It is the point of equilibrium. Second part is incremental room revenue which is the profit earned after covering of all costs. So, a higher incremental room revenue leads to higher profitability.

Dynamic pricing is such a technique where any person sells a product or service depending on the demand and supply principles, high is the demand higher price will be incurred and vice versa. Similarly in case of high supply lower the price to earn maximum revenue and in case of low supply enhance the prices to earn the optimum revenue. So, the main aim of dynamic pricing
is earning additional revenue. The hotel has already earned the break-even room revenue by selling some rooms to the guests beforehand. So, we can say that studying the effect of dynamic pricing on incremental room revenue makes more sense.

Thus, the purpose of the paper is to study whether star category hotels are implementing the technique of dynamic pricing and if they are using it, then whether there is a relation between dynamic pricing and incremental room revenue. Here we can say that independent variable is dynamic pricing and dependent variable is incremental room revenue.

**Literature review**

Revenue management is process of selling the right product or service to the right customer at the right time at the right place at the right price using the right distribution channel in order to optimize the revenue (Hereter, 2017). So according to above definition, revenue management involves six major components namely product or service, customer, place, time, price and distribution channel. Revenue management can be defined as a next level of the concept of yield management which was adopted few years back. As per Varini & Sirsi (2012) revenue management is famous amongst hospitality and tourism organizations as one of the main characteristics of these firms is having a perishable inventory. This perishable inventory in turn compels organizations to do market segmentation taking into consideration customer needs, booking behavior and their willingness to pay various prices with regards to time of the booking.

From the perspective of Ivanov & Zhechev (2011), revenue management can be an important aspect for matching of demand and supply by segregating customers into various segments and strata depending on the intentions of purchase and allocating the inventory amongst these various segments in order to optimize revenue of the particular organization. Also, it can be said that revenue management is an application of pricing strategies and integrated information systems in order to allocate the right inventory to the right customer at the right time at an appropriate price. So, the inference is revenue management contributes essentially to businesses which have features like perishable inventory, a static capacity, ever changing demand, market with various sub segments, advance reservation availability and finally low variable costs and high fixed costs. Gothesson & Riman (2004) say that revenue management can be used to find out the allocation of optimal inventory and putting strategies along with price for assets perishable in nature to maximize the revenue within the planning terms.

As per Willie, Clarke & Chandra (2015) revenue management can be defined as the process of allocating the right type of inventory to the right type of guest at a price which will assist in maximizing the revenue or yield. They consider it as a science and art which mainly focus in detail on market conditions with regards to customers which include demand levels monitoring so as access the application of various price bundling, packaging, capacity allocation, pricing, forecasting, channel tactics & strategies and finally market distribution. Revenue management is also considered as an administrative science which recognizes the utility of market segmentation. Almost all organizations adopting revenue management give credit to revenue management for increase in growth of revenue between 3 to 7% without any increase in the cost levels. Simply it is said, the hospitality organization attempts to sell the right room at an appropriate price and the guest tries to book it at the right time. So, hotels must embrace revenue management culture and make it a discipline as a strategy for the firm so as to gain an advantage over the various competitors. Kimes (1999) mentions that revenue management as a part of hotel and airline industry helps in increasing the revenue by 2 to 5 percent.
As per Kimes (2017) revenue management is more of strategic and is a continuous process which will always go on and on towards progress. The focus will be more on understanding the demand segment wise and on basis of who does the booking. Compared to the past nowadays the revenue management functions are centralized to a specific organization. Revenue management goals can be defined as focusing more on profitability compared to revenue, data analytics to be considered the most important element to enhance profits and also considering non-room revenue areas as a source for enhancing the profit.

Mayer (2014) enlists the five main pillars of revenue management as segmentation and customer knowledge, capacity management, forecasting and overbooking, pricing strategies and finally channel management and distribution. According to him, revenue management can be considered as an application which is derived from information systems and pricing strategies in order to allocate the right inventory at the right time to the right customer at the right price. The focus should be on customer behavior at an individual level considering the factors of price and availability of resources to optimize your profits. Incremental revenues are earned by use of revenue management by accepting or denying reservations depending upon of the value of their reservation. If we see the components of revenue management we can consider those as understanding demand and market segmentation, customer reaction, performance indicators, pricing strategy, restrictions and controls, overbooking, duration control and distribution channels.

Revenue management can be defined as tactics and strategies adopted by enormous organizations in order to manage the capacity to various set of people having different attitude to willingness of pay over a certain time frame in order to maximize the revenue (Padhi, Aggarwal 2011). They also consider it as a systematic and holistic approach to maximize room revenue by providing a variety of rates to the customers considering the principles of demand and supply. Revenue management is applicable when the service provider has a fixed quantity perishable in nature, customers can prior book the service, the provider as a varied range of pricing and finally the provider can change pricing over the period of time. According to the authors, demand and supply management, market segmentation and pricing are the three cornerstones of revenue management.

Heo (2013) mentions that the basic rationale of revenue management is the efficient use of fixed and perishable inventories by applying various prices to different customers for the same services in order to balance the revenue per inventory unit and the demand. Revenue management generally sustains in that industry which has perishable inventories, variable demands, fixed capacity, high fixed costs and low variables costs and finally a market which can be broken down into sub segments. Revenue management generally involves segmenting of market, identifying pricing strategies, inventory control and allocating inventories in such a way that the maximum revenue is earned from a fixed capacity. Fixed service capacity can be a considered a key characteristic for the successful application of revenue management. This characteristic assists in variable pricing strategies and appropriate rate fencing.

Kimes (2013) suggests that revenue management can be viewed as a building consisting of five pillars. This building has a foundation of organization’s internal infrastructure and the pillars can be considered as traditional 4 P’s of marketing namely product, promotion, price and placement along with people which can be the fifth P. As per Erdem & Jiang (2016) revenue management is defined traditionally as a science and an art of demand forecasting while at the same time
adjusting the price and availability of inventory to match the demand levels. Beneder (2015) concludes that revenue management is the best technique which will assist the hospitality professionals to achieve the maximum profits by correct identification of the right target customer group, establishing the right products and services along with setting up the optimal prices which can be offered to the customers.

Mahesh (2015) mentions that hotels using revenue management have a higher probability of having the characteristics of ownership, a number of market segments and seasonal variation. Hotels in today’s date whether brands or independent properties adopt various revenue management practices like price manipulation and capacity management to optimize the room revenue. So, it can also be defined as a sophisticated form of demand and supply management which help in enhancing revenue for the organization by balancing pricing as well as duration controls. Revenue management can be a part of the service industry which can satisfy the conditions as- volatile demand, limited inventory, perishable nature of service, market segmentation and finally low variable and high fixed costs. Mahesh also discusses the concept of business intelligence which is converting data into information and then into knowledge.

Kimes & Wirtz (2015) consider revenue management as an application of information systems and pricing strategies which help in allocation of right inventory to the right customer at the right time at the right place. Saleh, Atiya & Habib (2013) describe revenue management as a science which is used for managing a limited inventory using dynamic pricing strategies to maximize revenue. This principle of revenue management thus has led to increase in its significance amongst hoteliers and high rated hotels. Thus, revenue management goes across a long way towards making sense out of the data gathered and dynamically pricing rooms to ensure maximum occupancy and optimal room revenue.

As per Himanka (2014) revenue management is a set of strategies and techniques to gain upper hand in revenue as well as operating profits. Revenue management is a set of strategic and tactical decisions that any hotel takes in order to maximize revenue and profits. It is an art of selling the right product at the right time to the right customer at the right price. In simple words it is managing capacity in a profitable manner.

Landman (2018) describes revenue management in many small ways. Firstly, it is selling the right room to the right client at right moment at a right price. Revenue management is a simple art of turning away business. Also simplified form revenue management is matching supply and demand. Revenue management is overall strategy which includes forecasting and in-depth analysis. It can also be considered as a part of price optimization.

As per Sharma (2015) revenue management was used by hotels majorly to understand the various trends and maximization of the revenue. Considering the appropriate meaning of trade, revenue management can be considered as providing the correct commodity to the appropriate customer at the most suitable time and price in order to generate the best value for money. Revenue management emphasizes on improvements in business plans, market segmentation, forecasting elasticity of demand and use of various strategic pricing methods. So, revenue management is a key tool which will help the organization to develop and understand both internally as well as externally in order to survive the competition as be an aggressor in providing the best value for money.
Li (2010) infers that revenue management is concerned more with optimum use of the resources. The main aim of revenue management is to maximize the business profits by pricing management, sales volumes, room capacity and operating costs. So, from the context of a hotel, revenue management is a technique of maximizing revenue which aims at increasing the net yield by predictions to allocate rooms to various pre-determined market segments at an optimal price. Jones (2013) on the other hand concludes that 5 to 10% increase in sales can generated by use of revenue management systems. Kimes (2010) that while he studied respondent responses, he found out that the perception of many individuals was revenue management over the years is going to be more strategic and driven by technology. The perception is also that revenue management will evolve over a period of time from a discipline used to maximize room revenue to a strategic concept aiming at interaction of various revenue streams.

Ivanov (2014) defines revenue management as an evolution of yield management helps in matching supply and demand by dividing customers into various segments depending on purchase intentions and the allocation of inventory in such a way which will optimize the revenue of the organization. Hotel revenue management can be defined as a set of actions and tools whose main aim is achieving set levels of hotel net revenue and gross operating profit by offering the right product or service at the right time to the right customer using an appropriate distribution channel with effective communication.

As per Gayar & Hendawi (2014) revenue management implies principles of economics to various variable of the system to maximize revenue. Hotels focus on maximization of room revenue. So, hotel revenue management is considered as a managerial tool which will enable room revenue maximization which includes selling of each room to customer who is willing to pay the most so as to achieve maximum revenue. Hotels have to sell rooms to highest profit generating guests but also to low profit generating guests in order to ensure that rooms do not go vacant. Optimization of room revenue by having a mix of customers is one of the main aims of revenue management. So, hotel revenue management can be defined as a process of selectively accepting or denying guests by price, length of stay and arrival date to maximize revenue and also optimally matching demand and supply of rooms to ensure hotel gets a mix of profitable guests.

As per Bayoumi, Saleh, Atiya & Aziz (2014) revenue management can be considered as a science of managing a fixed quantity of supply to maximize revenue by using the dynamics of price and quantity offered. Rutherford (2002) mentions that the three main revenue management concepts which hotels can utilize easily are simplification of revenue management systems, adjust rate controls to give the strongest return revenue in the business and application of duration controls in order to shift demands from sold out period to shoulder period. Nadarajah, Lim & Ding (2015) conclude that revenue management developed from airlines but all the features are not applicable considering the hotel industry like multiple stay dates. For hotels the problem is with a fixed capacity it is difficult to lay down the revenue optimizing strategies considering the different market segments and the different situations and conditions.

Revenue management can be considered as revenue enhancement technique which is most suitable for service-oriented industry (Baker, Huyton, Bradley, 2002). Wang, Heo, Schwartz, Legoherel & Specklin (2008) consider revenue management as a mature field of study in the area of operations management research. Further, this leads to revenue integrity which in turn having price consistency over various channels till the time the final invoice is generated. The use of web
technologies and smartphones is also helping revenue management organizations to control demand as well as enhance revenue compared to the past times. Revenue management can also be simply a list of procedures and techniques which can be used to change occupancy, average room rate or both together to optimize the room revenue (Woods, Ninemier, Hayes, Austin, 2007). As per Bardi (2007) revenue management has a goal with two perspectives namely-maximizing profit from guest room sales and maximizing profit from services of the hotel.

Revenue management also speaks of right customer which according to Ivanov (2014) is those guests who are profitable to hotel and should be attracted using the correct marketing techniques. Ivanov (2014) also mentions the right product or service can be determined by perspective of both guests as well the hotelier considering the ones which deliver value to the appropriate customers by satisfying their needs and requirements, which compel customers to pay and leads to profitability for the hotelier. In context of right communication, it is said that, product and prices are perceived by how the market communications influence the guest. The method by which hotels provide information, presentation of prices influences the customer perception about the value they think they will receive from the said product or service. The concept of product perishability means that customer will always check for tangible clues which will try to describe product quality like hotel description, guest reviews, photos which in turn enhances the role of marketing communication in describing the hotel’s product value.

Li & Ma (2015) in their paper have mentioned that in hostel industry, Marriott corporation was the pioneer of revenue management system. As per the relevant data studied by them, Marriott hotel group achieved a huge success by use of revenue management technology in the year 1991. Hotel revenue management aims at maximizing room revenue with help of overall development strategy and is completely dependent on IT technology, at the right time to sell the appropriate product or service at the right time to the selected customer through the most effective channel. It is also found that hotel performance has an economic environment for a closed section of time. The external factors like politics, culture, society, technology, environment, competition and internal factors like influence, behavior, technology and organization together impact revenue management of the hotel. The most influential factors in term of hotel revenue management from aspect of society and technology are focusing on revenue management behavior. Revenue management behavior includes generally demand forecasting, reservation system, overbooking policy, income details and performance evaluation measures. The basic factors for revenue management success are market segmentation, inventory management, demand forecasting and performance evaluation. The financials are generally a combination of revenue per available room and revenue generation index which in turn shows the contribution of revenue management more correctly taking into consideration the quantitative research of customer satisfaction and competitive environment.

As per Noone, Enz & Glassmire (2017) the success of revenue management for Marriott largely was due to the centralized attitude of guest being the key and also helped in developing revenue management function to a more evolved customer strategy and revenue maximization team. The external environment comprises of socio-cultural, trends, economic influence, technological influence, legal, competitive, partner and vendor influence. Internal environment consists of creating and implementing certain revenue management strategies, controlling organizational processes, managing of resources as well as stakeholder relationships in order to develop competitive advantage. Hotels now a day’s focus on total hotel profit optimization which reflects
a movement towards future of revenue management considering the comprehensive and strategic role.

Furthermore, as per Mockerman (2018) total hotel revenue management is process of optimization of revenue taking into consideration hotel’s available space, functionality, assets and products using the concept of time perishable inventory. Total hotel revenue management strategy can be devised by using the unconstrained demand for rooms, meeting rooms, restaurant reservations, spa appointments which in turn provide the advantage in the various above said sections of the hotel. It also speaks of interconnecting various revenue generation points to get a superior revenue. Kimes (2017) in his survey with revenue managers of the hotels mentions that he got 63% of responses mentioning that focus on all departments on generating revenue needs to be applied. Ivanov & Zhechev (2011) mention that various revenue centers in hotels namely-room division, function rooms, F&B, spa, wellness centers, casinos, golf courses etc are potential sources of earning revenue and they also play a key role in determining the hotel capacity to use pricing strategy as a major revenue generation tool.

If we consider the term revenue management it is selling the right product or service to the right customer at the right price at the right time at the right place using the right distribution channel to optimize the revenue. As per Oxford dictionary, the word technique is a skillful and efficient way of doing or achieving something. So, if we combine the two we can define revenue management techniques as skillful and efficient ways of optimizing revenue considering the characteristics of product or service, customer, price, time, place and distribution channel

Revenue management techniques cannot be judged under one parameter and so they need to be classified. Ivanov (2014) helps distinguishing them in three types namely- pricing revenue management techniques, non-pricing revenue management techniques and combination revenue management techniques. Pricing techniques have price as a main factor and Ivanov has mentioned them as price discrimination, dynamic pricing, lowest price guarantee and price framing. Non-pricing techniques will consider other factors like inventory and demand supply pattern and will not be affected by price. Ivanov (2014) again has mentioned those as capacity management, overbooking and room availability guarantee.

As per Hereter (2017) pricing is the placement and mental perception of the customer of the hotel brand and what differentiates one from the competitors. As per Jones (2013) pricing strategy is highly impacted due to various different channels of distribution like online travel agents, meta search engines and so price consistency begin affecting hotels as to how they target customers. Discounting today is not the key as guests want premium service for which they are ready to pay a price.

Mayer (2014) describes value-based pricing as customer focused approach for pricing and mentions that the relation of pricing policies is directly related to purchasing behavior and attitude of customer. Kimes (2010) further mentions that hotels are using analytical pricing models which provide permission to hotel to price various small segments, distribution channels and also individual customers making revenue management more optimistic.

Kimes (2010) also mentions pricing is used generally in two ways. Firstly, determining the optimal pricing and then find out which price is suitable or to be applied to which segment. The principle of price discrimination focusses on the point that multiple price points give an increased amount of revenue. Another approach can be used called marketing approach where
we can study the characteristics of the distinct market segments and to design a product bundle
which will best suit that specific market segment with a suitable price. Also, it is mentioned that
price increases are considered acceptable when cost increases but is considered unacceptable
when cost do not increase. Similarly, it is accepted if we maintain the same price even if the
costs are decreased. Pricing is crucial for hotels which have excess room inventory because hotel
tries to sell rooms at lower price the quality levels are doubted generally by future and potential
guests. Also, hotels have to compete on basis of customer value because competing solely on
price will lead to competition hotels to undercut the prices and hotel will lose the advantage.
Hotels have to gain a competitive advantage over competitors and hence have to use price as a
strategic weapon and not as a tactical weapon. Hotels can achieve sustainable and long-term
revenue hikes by using price as a discriminant for various market segments and focusing on
delivering superior value to the customers.

Varini & Sirsi (2012) define price differentiation as giving different prices during different
demand periods. The main aim of price differentiation is attracting and retaining the most
profitable customers with help of different levels of price. Pricing and revenue management are
functions data-intensive in nature and their integration to derive out strategies will help in
development of extensive databases. This data in turn helps in deriving out the best decisions.
Finally, conclusion comes out that online identity helps in implementing strategies which help in
accomplishing goals in a long run.

Himanka (2014) describes tactical pricing as a short-term pricing related generally to daily and
weekly pricing decisions. Strategic planning takes in consideration long term prospects of rate
management in order to enhance revenue by having a bigger share in the target market. He
defines price as a concept as the value an organization puts forth for its products and services. He
also mentions price transparency which means having the same price along various channel of
distribution majorly the online channels.

As per Landman (2018) open pricing is considered as an ability to price various different
distribution channels, segments, room types and packages independent of each other in order to
maximize the revenue without closing out on any channels. The major fault for losing out
revenue is not changing rates periodically and these static rates do not help in reaching the true
profit levels. Rates to be changed considering the rule of demand and supply and thus have a
steady pace of booking pick ups on a daily basis. Room revenue can be maximized by analyzing
sales trends, forecasting results, using historical data and application of appropriate pricing
strategies.

Ivanov (2014) infers that by changing the price points over time, the ratio between different
prices for distinct market segments and applicable condition for each price point hotels can
attract the right customers to generate high revenues. Right price is considered as a consensus
between the hotel and guest on a certain price. By application of revenue management
techniques like price discrimination in particular requires a heterogenous market. This enables
hotel to apply differentiated market strategy and prepare different marketing mixes for the target
market segments. If product price is above customer ability or willingness to pay he will not buy
it. If price is lower than the ability to pay there will be a creation of surplus customer market base
but hotel will lose out on revenue. There is this approach of customer perceived value which is
the difference what he perceives and what he gets. So, price discrimination is simply hotel
charges variety of prices for the same room to different guests. The main purpose for doing this
is the economic rationale of difference in price elasticity of hotel market segments. Hotels make sure to avoid transition from high to low products, they apply price fences which are terms and conditions which define specify rates offered in the market. The term price integrity also plays a major role which means setting up the logic behind the prices which are set and booking terms. This involves providing right booking terms to customer, compelling customers to book in advance, encouraging guest to stay longer in hotels, stimulating guest to spend more in the hotel, stimulating regular guests and having a price parity across various channels of distribution. The hotel can maximize its revenue per available room and yield by changing price with regards to demand and occupancy pattern.

Wang, Heo, Schwartz, Legoherel, Specklin (2008) say that customer value-based pricing is more suitable than the transaction-based pricing which helps in developing profitable customer relationships. This approach is not being up to full potential basically due to management goals, timeframes, perceived business assets, performance indicators and manager’s approach to only achieving individual goals. As per Engels (2018) by comparison of different length of stay, specific room types and amenities and anything included in the package the price points can be put forth.

Hades & Ninemier have considered four major pricing strategies when hotels are considered. First competitive pricing where the entire focus is on what competitors are charging. Next is follow the leader price where the hotel with the best market share is followed by others in terms of pricing. Prestige pricing where prices are charged on a higher side and the price is justified by better product and service. Finally, discount pricing which involves reducing prices to get an advantage in the market without considering the operational costs.

As per Green & Lomanno (2012) at an individual level, hotel can reduce prices to certain extent in certain situations to generate high demand within the competitors to get a net positive income. But the digitalization now a days leads to rates being so transparent that the competitors also reduce the rate immediately and so the first hotel also does not get a competitive advantage. Also, it leads to the entire competitive set of hotels losing the opportunity for optimal revenue and again have to tackle with ever increasing operation costs. If any hotel does not take any precautions and execute proper planning and control for the last-minute pricing strategies it will lead to more difficulty in forecasting, low room rates, reduce volume of high rated business, make it difficult to differentiate between various hotel brands and finally degrading the value of the hotel brand.

As per Li (2010) every pricing strategy has some rational rules and restrictions which enable to distinguish between guests who are willing and able to pay for higher prices and those who change the buying behavior in case of a low price. This segmentation helps in hotel selling discounted rooms to a particular segment without touching or losing out revenue from another segment. Li & Ma (2015) mention that apart from room situation, location plays a key role in pricing of a room. The superior location and easy accessibility have a high premium price. Hotels in city centers or business districts tend to have higher prices with regards to the urbanization these days. Revenue management thus help in not only predicting our own pricing levels but also that of opponents in the same competitive set.

Beck, Kim & Schmidgall (2018) consider effective hotel room pricing is the major factor in hotel’s potential to maximize revenue. Hotels have varied unique characteristics like perishable inventory, relatively fixed capacity, time shifting demand and high fixed costs. In order to tackle
all these together the use of rational pricing can be done which means determining a price based
on physical characteristics like room type, location, view and amenities and non-physical
characteristics like customer preferences, memberships and affiliations. As per Mockerman
(2018) hotels having different room types will have unique selling features and hotels can go
deep ahead in these features to determine actual perceived value of the selling features. By doing
some tests of a variety of features across various patterns, seasons and room types, hotels can
measure elasticity of demand based on price points for each and every room type thus making
each room type an individual entity. Bhandari (2018) mentions that when people stay in hotels
they have varied reasons and so have different set of prices in the mind which they are willing to
pay.

Revenue management techniques cannot be judged under one parameter and so they need to be
classified. Ivanov (2014) helps distinguishing them in three types namely- pricing revenue
management techniques, non-pricing revenue management techniques and combination revenue
management techniques. Pricing techniques have price as a main factor and Ivanov has
mentioned them as price discrimination, dynamic pricing, lowest price guarantee and price
framing.

Mayer (2014) states that dynamic pricing is to relate the strategies and tactics of modifying
prices with regards to the demand for a certain time period. The main aim of dynamic pricing is
to capture the diversified willingness to pay to customers. As per Saleh, Atiya, Habib (2013)
dynamic pricing is a process to get maximum revenue considering the current and expected
demand. Dynamic pricing is generally prevalent in hotel online reservations.

Beck, Kim, Schmidgall (2018) describe dynamic pricing as similar to demand-based pricing but
more sophisticated version of it. In order to achieve the goal of maximization of profit, dynamic
pricing approaches price discrimination to find out the maximum price a certain specific
customer can pay for a said period of time. As per Li & Ma (2015) dynamic pricing is a business
strategy where price will vary according to different channels, customers, products and time.

As per Ivanov & Zhechev (2011) the most integral part of pricing today is dynamic pricing. It
assists hotels to maximize the revenue per available room and yield by providing a price which
determines current level of occupancy and demand and amend it according to changes in demand
and occupancy percentage. Dynamic pricing has a high significance from a financial point of
view with regards to high profitability but should have a careful application of the same and
should be accompanied with ample information about terms and conditions of the booking.

As per Nadarajah, Lim, Ding (2015) the main problem for hotels is fixed inventory. Hotels price
rooms in such a way that booking prices across different days are different. High demand has
high rates but customer booking for multiple dates also get an average booking price. In order to
maximize revenue around peak season, hotels not only raise the booking prices but at the same
time reduce it drastically in seasons of low demand which are in conjunction with the high
demand dates.

Meerendook (2014) considers the concept of rate optimization which is selecting the room rate
from a list of price points depending on historical price sensitivity of demand. The goal of
revenue optimization is to understand the demand characteristics and price sensitivity to
conclude to some data which will assist in defining prices which in turn will help in maximizing
room revenue in a long term. The optimal prices are determined based on the pattern of price
sensitivity as per the historical records. Various markets segments are affecting in varied ways with regards to demand pattern and price sensitivity. So, a careful analysis of the past records is necessary in order to adjust the rates and price points accordingly. When hotels will consider price sensitivity as a primary factor the room rates published will be more productive compared to those which are derived from the gut feeling or rule of thumb. So, Fuller (2015) concludes that as hotel room nights being a perishable good with just a shelf life of a day, the aim is to maximize the value.

**Research methodology**

The paper is based on a pilot survey which is part of the study of revenue management techniques used in rooms division in star rated hotels. A questionnaire was formed and survey was done with twenty, star rated hotels in Pune district of Maharashtra state in India. The hotels considered were three-star hotels, four hotels and five-star hotels. The ministry of tourism of India has published a document on their official website which describes the norms and parameters for various star categorization of hotels in India. The hotels who fulfill all these norms in Pune district form part of the target population.

The sampling method used was a non-probability quota sampling. The purpose of sampling was to consider the various hotels in the entire Pune district. Pune district has various areas which have a number of stars rated hotels. The district was sub divided in these areas and a quota of samples was taken from each area in order to justify the results achieved to the entire Pune district.

The sampling for resource person to fill up the questionnaire was done on judgement basis. So, non-probability judgement sampling was used to determine who will fill up the questionnaire. In hotels generally revenue management is handled by the revenue manager. Some hotels fail to have a revenue manager, so in his absence a front office manager, a sales manager or the general manager handles hotel revenue management. On basis of this judgement, the hotel used to be approached and the person in charge for hotel revenue management used to be asked to fill up the questionnaire.

Primary data consists of total of twenty star rated hotels who were approached and questionnaire were filled up. Secondary data consists of the various articles, journals, research papers, reports and articles on the internet on hotel revenue management. On basis of these total things, data was collected and a detailed analysis put forth.

**Hypothesis**

H₀- Null hypothesis

There is no relationship between dynamic pricing and incremental room revenue

H₁- Alternative hypothesis

There is a relationship between dynamic pricing and incremental room revenue
**Data analysis**

The study included twenty star rated hotels in Pune district which included 3-star, 4-star and 5-star hotels.

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<th>Type</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-star hotel</td>
<td>40%</td>
</tr>
<tr>
<td>4-star hotel</td>
<td>20%</td>
</tr>
<tr>
<td>5-star hotel</td>
<td>40%</td>
</tr>
</tbody>
</table>

Table no 1 - Sample categorization of star rating of hotels

The occupancy percentage is the number of rooms occupied divided by total number of rooms in the hotel for sale multiplied by hundred. The hotel average occupancy statistics include-

<table>
<thead>
<tr>
<th>Type</th>
<th>Average occupancy percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-25%</td>
</tr>
<tr>
<td>3-star hotel</td>
<td>0</td>
</tr>
<tr>
<td>4-star hotel</td>
<td>0</td>
</tr>
<tr>
<td>5-star hotel</td>
<td>0</td>
</tr>
</tbody>
</table>

Table no 2 - Sample categorization with regards to average occupancy percentage

Hotels in Pune generally cater to three types of guests namely- business guests, leisure guests and groups. The statistics of hotel serving various categories of guests include-

<table>
<thead>
<tr>
<th>Type</th>
<th>Type of guests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Business Guest</td>
</tr>
<tr>
<td>3-star hotel</td>
<td>8</td>
</tr>
<tr>
<td>4-star hotel</td>
<td>4</td>
</tr>
<tr>
<td>5-star hotel</td>
<td>8</td>
</tr>
</tbody>
</table>

| %          | 100 | 75  | 80  |

Table No 3- Sample categorization with regards to catering to various types of guests

Average length of stay is defined as the average number of days any guest stays in a star category hotel. The statistics include-

<table>
<thead>
<tr>
<th>Type</th>
<th>Average length of stay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-3 days</td>
</tr>
<tr>
<td>3-star hotel</td>
<td>6</td>
</tr>
<tr>
<td>4-star hotel</td>
<td>2</td>
</tr>
</tbody>
</table>
Test of reliability

We consider the two variables- independent variable which is dynamic pricing and dependent variable which is incremental room revenue. First, we have to see if the data is reliable or not and hence, we have put forth the test of reliability. Test of reliability is how consistently a characteristic is measured by any test put forth. Reliability can be considered as a degree to which any assessment tool can give consistent and stable results.

Independent variable- Dynamic pricing

Case Processing Summary

<table>
<thead>
<tr>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>20</td>
</tr>
<tr>
<td>Excludeda</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
</tr>
</tbody>
</table>

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>.712</td>
<td>5</td>
</tr>
</tbody>
</table>

Table no 5- Reliability test for independent variable

Dependent variable- Incremental room revenue

Case Processing Summary

<table>
<thead>
<tr>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>20</td>
</tr>
<tr>
<td>Excludeda</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
</tr>
</tbody>
</table>

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>.842</td>
<td>9</td>
</tr>
</tbody>
</table>

Table no 6- Reliability test for dependent variable
In case of both variable the Cronbach alpha value is greater than 0.7. Considering this we can say that the data collected is highly reliable for analysis.

**Hypothesis testing**

For hypothesis testing we have to consider a two tailed test of significance as we to the sample is greater than or less than a certain range of values. Also, the hypothesis proposes that the relation between the independent and dependent variable should be tested. In order to study this correlation, the Karl Pearson’s Correlation coefficient needs to be calculated.

<table>
<thead>
<tr>
<th></th>
<th>Dynamic Pricing</th>
<th>Incremental room revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Pricing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.717**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.00</td>
</tr>
<tr>
<td>N</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Incremental room revenue</td>
<td>.717**</td>
<td>1</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2 tailed)**

Table no 7- Correlation between both the variables

The significant value of the correlation analysis between dynamic pricing and incremental room revenue is 0.00 which is less than 0.01. So, null hypothesis is rejected and alternative hypothesis is accepted. It means that there is a relationship between dynamic pricing and incremental room revenue. The Karl Pearson’s correlation coefficient is 0.717, is greater than 0.7, so there is a strong positive relationship between dynamic pricing and incremental room revenue.

**Inferences**

The data analysis shows that there is a direct relationship between dynamic pricing and incremental room revenue so the result that can be drawn is that, implementation of dynamic pricing leads to increase in the incremental room revenue. On the other hand, absence of dynamic pricing will lead to less amount of incremental room revenue and will hence directly hamper the profitability of the organization. Almost 90% hotels have an average occupancy of above 50% which shows that the hotel occupancy is helping in implementing dynamic pricing in rooms division. All hotels cater to business guests and majority of them cater to leisure guests and group segments. Considering that dynamic pricing is used proactively by hotels, leads us to the inference that hotels have developed various plans of dynamic pricing for the various segments of guests which are being implemented successfully. The average length of stay is not beyond 3 days for 70% of the hotels. So, the guests staying in the hotels prefer short stays rather than long stays. This short span of duration is also acting as an important factor in dynamic pricing. The price is defined by the demand and supply for the short period and hence guest get
the best deal which according to them is value for money. This also leads to hotel getting additional revenue and hence incremental revenue which enhances profitability.

**Conclusion**

We thus conclude that dynamic pricing which is a pricing revenue management technique has a direct effect or impact on the incremental room revenue. The picture is clear which states that use of dynamic pricing will lead to high incremental room revenue which in turn will enhance the hotel profitability. The current study also gives a boost for some future research in terms of revenue management techniques. The further research in the area can be study of all pricing revenue management techniques together on hotel room revenue.

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