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ABSTRACT
The hotel industry is one of many industries that offer fixed perishable products that should be sold over a finite time horizon to heterogeneous customers. Because of its particularity, the hotel industry faces many challenges to decide the convenient room rate to offer. In order to understand price formation, we have studied pricing information assumed for the suggested dynamic pricing models for hotel rooms. In addition, we identified some factors that may influence the rate. We compared the results and suggested a list of information that might be useful to consider for price formation to optimize the revenue.
Key words: *dynamic pricing, pricing information, price determinants and hotel industry,*

INTRODUCTION

The hotel industry is one of many industries that face the problem of selling a perishable product over a finite time horizon (Weatherford & Bodily, 1992). Rooms are the most important asset of the hotel. It is perishable because its revenue-generating capabilities drop to zero right when the sales period ends. For example, at the end of the night, the loss of an empty room is lost forever (Baker & Collier, 2003), Like other industries, the aim of hotels is to achieve the highest possible revenue. To accomplish this goal, many methods during the history were applied in order to influence customer purchase decisions such as market segmentation, product differentiation, promotions and loyalty programs. However, many authors had emphasized on the importance of pricing for firm's survival and profitability (Nagle & Holden, 1995; Finch et al.1998; Potter, 2000; and O'Connor, 2003). Pricing is one of the 4P's forming the marketing mix in addition to product, promotion and place (Kotler & Armstrong, 2006). A firm needs to create a successful mix of the right product, sold at the right price, in the right place and using the most suitable promotion to influence consumer decision-making and lead to profitable exchange (Borden, 1984; Peter & Donnelly, 2007; Munusamy & Hoo, 2008). Despite the importance of all the factors composing this mix, authors claimed the importance of pricing to be the only element of the marketing mix to generate revenues (Nagle & Holden, 1995; Finch et al.1998; Potter, 2000; and O'Connor, 2003; Avlonitis et al. 2006). Hoffman et al. (2002) suggests that developing an effective pricing strategy remains the most difficult variable of the traditional marketing mix. During decades, researchers were trying to develop pricing models to maximize revenue. The first tentative to develop a pricing strategy for hotel rooms was the rule of thumb or 1$ per 1000$ investment. This cost based strategy suggests that for each 1000$ investment, the hotel room price should increase by 1$. For example, if the capital of hotel construction composed of 100 rooms was 100 000$, the room rate should be 100$. Another well-known method is the Hubbart formula that was developed for the American Hotel and Motel Association (AHMA) in 1952. It is consisted of eight steps: calculating _desired profit(1), pre-tax profits(2), fixed charges and management fees(3), undistributed operating expenses(4), estimated non-room operated department profit \loss(5), required rooms department income(6), determine rooms department revenue(7), calculating average room rate(8) (Harris & Brown, 1998). Based on this approach, the room rate is determined by costs, desired profits and expected rooms sold (Zheng Gu, 1997). However, these approaches don't take into consideration the market conditions and they represent static pricing. Drucker (1993) claimed that customers are not responsible of the costs and profits of the investors. By observing the downfall of one once dominant business after another like General Motors, Sears and IBM, Drucker (1993) suggested that cost based approach for pricing is one of five deadly business sins that must be avoided for the survival of any company. In addition, static pricing are not the best solution for hotel industry.

Later, the "Perishable-asset revenue management" (PARM) become the used term to denote a process that deal with yield management and dynamic pricing for perishable assets (Weatherford and Bodily, 1992). The yield management approach deal with cases when a limited number of products (goods or services) are available for limited time and after this limit the product perishes or ages. In such cases customers are price sensitive to the time and the quantity purchased (Finch, 1998). In contrast to static pricing, dynamic pricing can achieve a finite markets seller's goal of selling its entire inventory. "Dynamic pricing" term refers to the change of prices in a marketplace based on two perspectives that are different prices for different market segments, and change prices over time by taking advantage of the fluctuation in cumulative buyer demand considering a finite time horizon (DiMicco et al. 2003). Recently, many researchers are trying to develop dynamic pricing models based on different market conditions. The technological innovations have made it possible to gather more information on customers' behavior and preferences (Grewal et al. 2011). In addition, thanks to the digital market, the cost associated with frequent price changes are greatly diminished leading the dynamic pricing to become a common competitive maneuver particularly in markets under a finite time horizon. (DiMicco et al. 2003)

This paper is presenting the literature review papers of hotel pricing classification in the section 2. In section 3, we are presenting the context and methodology of the work. The results are presented in section 4. At section 5, we conclude and suggest future directions.

LITERATURE REVIEW

By studying the literature review papers of hotels related to pricing, we have noticed that the only existing literature is related to models' classifications. Hotel price determinants were not addressed as a literature review paper. Previously, two literature review papers were published examining the issue of "an examination of hotel room pricing methods: practiced and proposed" (Gu and Steed, 2004) and "dynamic pricing in hospitality: overview and opportunities" (Anderson and Xie, 2016). The first paper presents a classification of hotel room pricing approaches. Authors examined articles that are directly related to their study. All the studied articles are pricing strategies applied for hotel rooms. They classified the pricing strategies based on the simple approach known for pricing that are: cost based pricing, market based pricing, combined cost and market based pricing and best practice pricing. In this article they described each approach by giving information about the steps to follow to obtain the desired price. Some critics of approaches were presented as well. At the end authors has recommended some ideas for the best choice and implementation of the pricing strategy. Similarly, Anderson & Xie (2016) presented the dynamic pricing models developed for the hospitality industry. They discussed the works presented in this context. Next, they presented some choice based models works as distinct room types offered by hotels make hospitality related dynamic pricing very amenable to the application of choice-based approaches. At the end, they suggested unique research opportunities to be studied in the hospitality industry.

These two papers presents a classification of different pricing models existing in the literature by giving some critics and advantages of the works exposed. By examining these works, hotel managers can't understand which model is best to be used or how to choose the pricing strategy that suits the most their property. Therefore, in this work, we tried to understand the formation of pricing models for hotel rooms, then we studied the elements that may affect the price. By gathering this information, we have proposed a list of elements that should be considered when taking a pricing decision. In addition, we have shown the distribution of the existing pricing works into a pricing information matrix. Therefore, we believe that in this way, we will be able to identify the gaps in the literature and provide guidance for future researchers and help managers improve their pricing decisions.

CONTEXT AND METHODOLOGY

Today, hotel revenue management is shifting toward price optimization solutions to generate optimal revenue and compete in today's market with the ease of accessibility to customers' and competitors' information. (Kimes, 2016; Noone, 2015). In 2002, Hoffman stated "today, price remains one of the least researched and mastered areas of marketing . . . Marketers have only recently begun to focus on effective pricing. . . Although the need for effective pricing is frequently voiced at conference sessions focusing on services marketing strategy, an overview of specific topics of potential interest has yet to be developed". (Hoffman et al., 2002)

Few empirical studies were conducted in service industry and its branches (Hoffman et al., 2002). Chung (2000) studied hotel room rate pricing strategy based on real world empirical data. His study was focused on oligopolistic market of super deluxe hotels. Avlonitis and Indounas (2006) examined pricing practices of service organizations. They tried to understand the relationship between pricing policies adopted and pricing information collected. Oxenfeldt (1983) claimed that to reach the final price needed, specific pricing policies should be considered. According to him, when setting prices, firms must take into consideration pricing information that represents the organizational and environmental conditions. Tzokas et al. (2000) confirmed that some factors influence pricing decisions of which some of them can be controlled by firms more easily than others. They emphasized on the

importance of collecting the appropriate type of information when setting prices to be able to assess and control those factors. Therefore, collected information might help the firm to control more effectively the conditions surrounding its environment.

Based on what is presented above and after analyzing the literature review papers presented by Gu and Steed (2004) and Anderson and Xie (2016), our work presents an analysis of pricing models developed for hotel room pricing. We are trying to examine the conditions (pricing information) under which these methods were developed. Moreover, we studied the literature addressing attributes that influence hotel room pricing to be able to give some hints for managers when making pricing decisions. Many authors consider airlines models when studying hotel pricing practices. We believe that the hotel industry is particular and the dynamic pricing models found in the literature are not appropriate for the hotel industry due to two main reasons. First, the hotel must determine and reveal the booking price for rooms on each individual day. The reason behind is that any extension or reduction in the length of stay may require an adjustment in the payment. Secondly, explicit constraints are required to ensure that customers do not make a reservation if the hotel is out of rooms for any day during their interval of stay (Lim et al. 2015). Moreover, customer relationship management play an important role in the hotel's decisions.

RESULTS

We have studied dynamic pricing models for hotel rooms and have collected the assumptions based on which the models were developed. We have noticed that almost all models share similar assumptions used to develop the pricing model.

Information used	Costs (Variable and/or fixed)	Demand	Market structure		seasonality	Market segments	Product number		
			monopole	competition			one	multiple	
Number of articles	8	13	14	2	2	1	15	1	
Total number of articles									16

**Table 1: Information used by different studies to develop pricing models for hotel rooms**

One of the earlier studies on hotel pricing was presented by Gu (1997) who proposed an optimal room rate model that incorporated both variable costs and two basic features of market demand. Using similar assumptions, Ladany (1995) proposed an optimal market segmentation of hotel rooms to optimize revenue. Van Dijk & Van Der Stelt-Scheele (1993) studied price formation in tourism industry branches. They showed that cost factors and demand factors play an important role in pricing decisions. Howard Finch et al. (1998) presented an option-based approach for pricing perishable service assets. They proposed that selling a service at a discounted price at least makes a positive contribution to fixed coverage. Authors suggest that cutting price (discounting) in the event of less than expected demand should have positive value for the firm. The problem of this model is that the best result is just obtained when it's used to special cases: when the perishable product priced is unique and expensive; the purchase process can start well in advance of the service offering and the pool of customers is sensitive to price. Inspired by Gu (1997), Pan (2007) developed an optimal hotel room rate model incorporating costs, market demand variations and hotel limited room capacity. This model is developed to operate in high and low seasons (Pan, 2007). Bayoumi et al. (2013) presented a dynamic pricing for hotel revenue management using price multipliers. They used four variables that is known to have an influencing effect on pricing decisions: time from reservation until arrival date, the hotels remaining capacity at the

time of reservation, the length of stay, and the number of room to be reserved (Bayoumi, Saleh, Atiya, & Aziz, 2013). Aziz et al. (2011) addressed the problem of optimally setting the price of the hotel rooms in order to maximize revenue by incorporating price elasticity of demand. Their proposed framework overcomes the limitations associated with the research gaps in dynamic pricing literature and can contribute in increasing the revenue of a hotel. Authors didn't consider in their work group reservations which is a typical case in the hotel industry. In addition, they didn't consider overbookings and cancellations. Ellerbrock et al. (1984) presented an empirical model of pricing hotel rooms based on traditional microeconomic price theory. Their model incorporated: fixed costs, variable costs, advertising expenditures, location, amenities, percent occupancy rate, season and amount of competition. Despite the simplicity of the presented work, it emphasized on the importance of competition factor in pricing decisions. Also, Masruroh & Putri (2012) developed a pricing policy for two hotels competing for the same market. Their model is applied for deterministic and uncertain demand and it considers the seasonal factor. Arenoe et al. (2015) explored a game theoretic pricing model that determines equilibrium room rates under differentiated price competition in an oligopolistic hotel market. In this model, authors considered non-price attributes to analyze consumer choice. Concentrated on the particularity of hotel industry Lim et al. (2015) considered the length of stay in hotels to develop their model. They formulated the dynamic pricing problem as a finite-horizon and discrete-time Markov decision process and approach its solution using stochastic dynamic programming. They determined the optimal booking price of rooms for each individual day, while considering the availability of room capacity throughout the multiple-day stays requested by customers. Recently, more studies become concerned with pricing strategies online or by coordination with web parties as the internet represent an extremely efficient medium for accessing, organizing and communicating information (Yelkur et al. 2001). Guo et al. (2012) studied the optimal pricing strategy for hotels when they operate with online distribution channel by cooperating with a third party website. At first, authors assumed that all participants are integrated in a centralized system and gave the best optimum solution. Then, they gave the best solution under a decentralized scenario through a non-cooperative game model composed by Stackelberg game between hotels and the website and a Nash game among hotels. Authors showed that even under the decentralized scenario, the cooperation contract provide a high operational performance. Later, Guo et al. (2013) were the first to determine the optimal dynamic pricing strategy in using of ORS (online reservation system) of the service industries. Ling et al. (2011, 2009) has investigated the optimal pricing strategies of the hotel with a second party (website and travel agency). These studies confirmed that cooperating with a third party contributes to a win-win situation. In addition, they confirmed that higher level hotels gain more revenue from cooperation. (Ling, Guo, & Liang, 2011) (Ling, Guo, & Liang, 2009). Anderson (2009) showed how a firm can use Priceline to improve its inventory allocation and prices.

Each of these papers are suggesting a pricing model for hotel rooms, but they are presenting different cases and different methods to develop the model. By gathering the information used, we notice that different works share some similar assumptions like demand and market structure. While some works incorporate costs, seasonality and competition, others don't.

Therefore, the information assumed to develop a pricing model for hotel rooms are: demand (deterministic \ stochastic), market structure (monopolistic\ competition), product number (one or multiple), costs (variable and fixed costs), market segments and seasonality.

In addition to demand type, market structure, product number and product shelf life, there are many other factors that affect pricing decision of which hotels must be aware to charge right price to the right segment. We have studied the works that analyze the effect of some attributes on hotel room pricing. We will present the attributes that allow an increase of room prices, the enhancement of hotel rating and customers 'perception of the fairness of room rates.
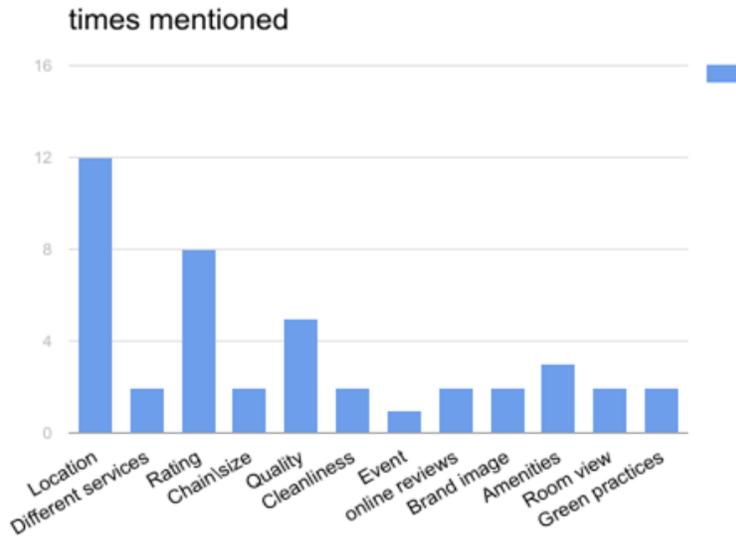
Figure 1: The number of times of mentioning each attribute in the studied literature

Many studies have addressed location as a competitive advantage for firms. Bull (1994) suggested that the three most important attributes that a hotel can offer are "location, location and location". Among the many forms of segmented pricing strategy, location pricing suggests that firms charge different prices for different locations (Enz et al. 2008). The following works emphasized that location play a key role in hotel room pricing. (Zhang, Ye, & Law, 2011); (Carvell & Herrin, 1990); (Zhang, Zhang, Lu, Cheng, & Zhang, 2011); (Costa, 2013); (Enz, Canina, & Liu, 2008); (Herrmann & Herrmann, 2014); (Schamel, 2012); (Abrate, Capriello, & Fraquelli, 2011); (White & Mulligan, 2002); (Jang, Kim, Hwang, & Lee, 2011) (Rigall-I-Torrent, et al., 2011); (Stringam & Gerdes Jr, 2010). In addition co-location with other similar firms (in competition) leads to pricing benefits and detriments. A study conducted by Enz et al. (2008), showed that hotels that locate in close proximity to higher segmented hotels benefit without making similar product and service investments themselves. In contrary, co-locating with a high percentage of hotels in lower product segments erodes the prices of higher segmented properties.

Yeoman& McMahon-Beattie (2006) addressed the issue of luxuryfication of society and how organizations are using premium prices effectively by offering luxury products and services. Authors concluded that consumers are willing to pay a higher price for value and brand equity. They suggested that offering high quality and a flawless experience are key factors for customer willingness to pay higher prices. Lien et al. (2015) concluded that brand image and value are the most important determinant of customer purchase intentions. Abrate et al. (2011) confirmed the conclusion of Yeoman& McMahon-Beattie (2006) by analyzing the relationship between quality signals and price setting through the application of hedonic price functions. They proved that star category, quality and location explain price differences. Also, Chiu & Chen (2014) confirmed that customers are willing to pay for higher service quality when they chose travel destinations and accommodation.

In addition to location and quality, researches have shown that star rate, size of hotels, age of hotels, presence of hotel safe and association to hotel chain influence formation of hotel room rates (Zhang, 2011; Schamel 2012; Costa, 2013; Carvell & Herrin, 1990). Also, special events, festivals and concerts permit optimal pricing of room rates (Herrmann, 2012). Fleischer (2012) and Masiero et al. (2015) suggested that customers are willing to pay higher prices for rooms with a view. White & Mulligan (2002) examined geographic variation in hotel room rates during both summer and winter seasons at the broad regional scale using the hedonic approach. Authors found that recreational amenities such as spas and pools, location, urban setting, and economic features of the surrounding county are predictors of hotel prices in both seasons. Moreover, Studies addressed the different perception of prices and

willingness to pay of consumers from different segments (business and leisure travelers) (Schamel, 2012).

Nowadays most of customers check online reviews of each property before making a reservation. Highly rated hotels are perceived of better quality. Ye.Q et al. (2014) emphasized on the importance of star rating given by customer perception. They advised managers to consider online traveler reviews when developing pricing strategies. Schamel (2012) also emphasized the importance of online reviews. The results of this study show that business travelers are willing to pay higher premium price for another point obtained in online ratings. He also proved that hotel star rating and distance to the center also contributes to the willingness to pay higher rates for hotel rooms. Bulchand-Gidumal et al. (2011) suggested that hotel can improve its star rating by offering free Wi-Fi service. Heo & Hyun (2015) suggested that Wi-Fi internet access in the room is considered the most important item by customers. They also showed that customers are willing to pay higher prices for luxury amenities and the presence of Gyms, pools and spas within the hotel facility. Stringam & Gerdes Jr (2010) explored over 60,000 comments and ratings made by travelers on an online distribution site in an attempt to find which factors influence consumer ratings of hotels. The results show that location, cleanliness and service are the most important hotel attributes. Kim et al. (2016) have found that the availability of recently-added amenities such as free Wi-Fi, pet boarding, free self-parking, multilingual staff, and airport transportation, as well as green practice initiatives have a positive impact on online review ratings and willingness to pay high prices in addition to the revisit intention.

With the rise of green practices and environmental concerns and awareness, some hotels started the application of these practices within their organizations. Sánchez-Ollero et al. (2014) studied the influence of environment respect on final prices in the hospitality sector. The result show that customers positively value the implementation of green practices and are willing to pay higher prices for the service provided. This fact may encourage hotels to implement environmental practice measures and gain more customers valuing this practice and willing to pay higher prices.

In a study conducted by Chen et al. (2014), results suggest a mass-marketing strategy to be adopted by medium quality hotels. For high quality hotels, promotions with price discounts, customer relationship management and customized packages are more favorable to be used as marketing strategies. Also, it is important to mention that firms applying yield management should take into consideration price perceptions of customers and that pricing decisions should be made by properly communicating changes in prices and the reasons behind them (Rosa-Diaz et al. 2012). A final suggestions for hoteliers is to make attention to the importance of the price ending strategy that may send a message of value and quality as it's explained by Collins & Parsa (2006), not to forget that 0.001$\room might make a big difference for the revenue of the company.

Therefore, we can resume what was presented above by suggesting that location, services, rating and online reviews, hotel size, quality, cleanliness, brand image, room view and green practices are important attributes that may affect the price of the hotel room and the perception of customers.

As mentioned above, many authors have emphasized on the importance of many attributes that may affect the price of the room rate. Despite their importance, none of these attributes was considered for the development of a pricing model.

The matrix below represent four parts representing the different information that must be used for an optimal price decision and the distribution of studies based on the consideration of this information.

We notice that none of the studies considered customers behavior and just one study considered the supplement of existing attributes that may be useful to enhance the price and therefore the revenue.
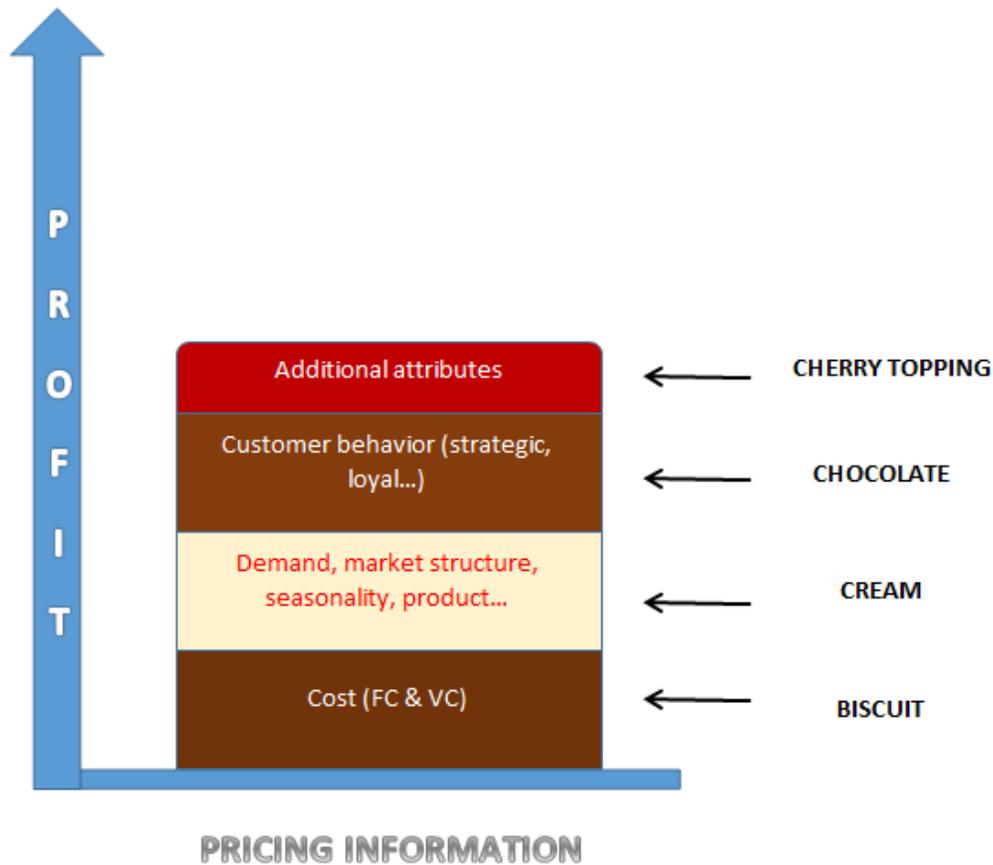
Figure 2: Piece of Cake Matrix: Matrix showing the importance of information used to enhance hotel profit

The complete piece of cake represents the optimal profit that manager can generate in case of using complete information in order to decide room rates. The cake is formed of different layers representing different kind of information that may be used for pricing. The first layer represents the basic costs that each property tries to cover before thinking of generating profit. The second one is the information used by researchers to propose pricing models that were presented in the study. The third layer is the customer who is the most important player of any business. Many studies started to include different type of customers into their studies to make the most convenient decisions about the price (Levin et al. 2010; Zhao et al.2012). And the profit cake is topped by the attributes that may increase slightly the price but can make a big difference on the overall profit.

The table below represents the information that must be considered for room rates decisions. The more managers consider details; the optimal is the price obtained resulting in better profitability.

Costs and expenses	Available Data and Predictions	Hotel attributes
– Fixe charges and management fees – Undistributed operating expenses	– Demand – Market structure – Market share – Market segments – Seasonality – Room types – Customer types (strategic)	– Location – Services available – Online reviews – Rating – Hotel size (chain) – Quality – Cleanliness – Room view – Green practices – Amenities (quality & diversity) – Events

Table 2: List of information that must be considered when pricing for optimal profit

CONCLUSION AND FUTURE DIRECTIONS

This paper has presented different pricing information that affects the pricing decisions in hotel industry. In order to suggest all useful information that may help increase the profit, we have studied pricing models, room price determinants and what influence room prices in general. Our suggested matrix has shown that a limited number of existing information is used for developing pricing models. These information are limited to demand, market structure, product nature and number, costs, market segments and seasonality. Despite the use of this information, most of studies are simplifying the assumptions. Most of works are considering monopolistic market or oligopolistic competition which doesn't reflect the reality. Market segments are almost always considered as one segment and seasonality are often neglected. In addition, consumer behavior is an important factor to consider when pricing, but it was not considered for hotel pricing. Nowadays, consumers are acting more strategically with the high availability of pricing data accessible on the internet (Schutze, 2008). Technological innovations, media and firms 'availability online made the access to information easy for all customers at any time and place. Similarly, firms are able to collect information about customers that use online platforms. By distributing the different studies within the matrix, we have noticed that some factors such as costs were considered earlier but no more in new studies. Costs should not be the most important factor based on which the price should be determined, but it should be considered as well when pricing to ensure covering the basic expenditures of the hotel.

Many studies have emphasized on the importance of many attributes appreciated by customers that affect pricing, and that can help managers increase room rates. We noticed that none of these attributes were mentioned in any work suggesting a pricing model for hotels. Not just that the existence of these factors may improve the price, but managers may enhance the use of these attributes and improve them as well. For example, location is one of the most important attributes that may enhance the price. But not each segment values the same location similarly. Hotel managers must understand which segment values most their hotel location to incorporate it correctly into room rates. Another example for rating that plays an important role as an indicator of customers' satisfaction from previous experiences may be enhanced by offering free Wi-Fi service and thus capturing more customers through online bookings (Bulchand-Gidumal et al. 2011). These are two examples of how to enhance the profitability of the hotel by implementing simple thing. All attributes may be profitable and can be enhanced within the property. In general, we can suggest for an optimal pricing, better performance and long-term customer retention, managers should try to offer in their hotels a higher quality service merged by high quality tangible products. Also, they should understand how to assess each of the existing attributes to take

advantage of them and make accurate pricing decisions. Finally, it is important to remind managers that long-term profitability is assured by customer satisfaction. Customer satisfaction is the salient driver of hotel performance and it has a positive influence on all of the hotel performance indexes including ADR, RevPAR, TrevPAR, restaurant F&B revenue and banquet F&B revenue (Kim et al. 2013; Tajeddini & Trueman, 2012; O'Neill & Mattila, 2004).

Future researches are directed to take the maximum number of information and attributes into consideration to develop more realistic and contemporary pricing models. Research are also directed to study the percentage of price increase related to each attribute represented in this work that may lead hotels to a remarkable increase in their profits.

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