# The Determinants of Hotel Room Rates in Beirut: A Hedonic Pricing Model

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*Abstract*—This work attempts to identify locational, structural and other attributes that have an effect on room rates in Beirut region. Therefore, a sample of 89 hotels were considered in this study. Data were collected from TripAdvisor website during March 2019, considered as a low season in Lebanon. An OLS regression analysis was used to identify significant variables. Results has shown a strong positive significance of star rating category and accessible rooms, and a strong negative significance of centrally located, business and safe labels. Hotel managers are advised to use current findings and analysis to adjust their pricing strategies and communicated image.

*Index Terms*—Beirut, brand image, hedonic model, hotel, pricing.

## I. INTRODUCTION

In general, the price of a product is the end result of different aspects characterizing the product itself. In the hotel industry, the price is determined by the internal characteristics of the product and the external factors that affect it. These features or attributes are divided into structural attributes, neighborhood and accessibility attributes. Thus, hedonic price models aim to separate the attributes of a product in order to estimate implicit prices. Lancaster (1966) and Rosen (1974) have developed their works using the hedonic point of view dating back to the early decades of the twentieth century. They were able to make one of the first contributions to the market equilibrium theory for differentiated products. Lancaster (1966-1971) developed a "new theory of consumer demand" based on the idea that consumers do not seek to acquire the goods themselves, but they seek to obtain the characteristics they contain. Later, Rosen (1974) established the relationship between the price of a differentiated product and the quantity of attributes and the implicit prices of the attributes that make up the product using the hedonic methodology. This hedonic function implies a balance between the quantities exchanged of a given product with a certain number of attributes and the exchanged quantities of each attribute. Thus, the hedonic pricing function highlights the relationship between demand and supply of each individual attribute of a given product [1]. The hedonic pricing method has been mainly applied to the real estate markets. However, many other industries, particularly the tourism sector, have started to apply this approach to analyze heterogeneous goods and services. In the tourism sector, hotels share certain characteristics with real estate markets. One of these features is that a hotel room is a set of attributes that are difficult to repackage. Therefore, the hedonic pricing analysis gives better results than any other technique if applied to hotel rooms [2]. Considering the particularity of hotels, many studies have applied the hedonic pricing method in order to analyze different types of characteristics related to the internal and external environment of the hotel in many regions. Soler & Gémar (2016) argue that results of a hedonic analysis may differ from one region to another because of the particular spatial homogeneity of a specific destination [3]. Thus, Soler *et al*. (2019) suggested the importance of conducting hedonic analysis in unexplored regions in order to help managers avoiding erroneous decisions about their offers and differentiating strategies [4]. Soler & Gemar (2018) propose that the best way for hotel managers is to identify the important attributes and services that affect customers' willingness to pay [5]. As a result, managers can compare the implicit prices and the associated cost of each characteristics, and therefore, forecast the potential benefits of any investment in a specific attribute.

In this context, this research has followed Soler *et al*. (2019) suggestions to evaluate the effect of different characteristics on hotel room rates in Beirut. We have collected all the available information from Tripadvisor website that help customers in their decisions to book a hotel room. This approach will help reveal the important features that must be considered when developing or adjusting pricing strategies.

The following paper is structured as follow: after presenting the introduction in section one, section two will describe briefly the studied area, followed by the literature review of the hedonic pricing models applied to hotels. In section four, we will present the method used to determine the studied variables. In section five, results are presented and discussed. Finally, the conclusion is presented in the last section.

## II. STUDIED AREA

Lebanon is one of the most attractive destinations in the Middle East. It stretches about 200 km from north to south and 50 km from east to west. It occupies a privileged position at the crossroads of the three continents of the old world: Europe, Asia and Africa. It shares borders with Syria to the north and east and Israel to the south. It is bordered on the west by the Mediterranean Sea, with 220 km of coastline. With a total area of 10,452 km², it offers visitors a very rich diversity of archaeological and historical sites, hospitality and world-renowned cuisine. It is the country of the first alphabet and one of the oldest inhabited cities in the world

(Byblos). Its current population is estimated at 4 to 5 million inhabitants according to the sources and is characterized by a strong religious and cultural diversity since 18 confessional communities cohabit on this small territory. Beirut, the capital, has been known as "Paris of the Middle East" or "the pearl of the Middle East". It is located on the coastline at equal distances from the borders to the North and South (Fig.1). The city was named world book capital 2009 by UNESCO. It was also cited in the New York Times as the first destination to visit in 2009 [6].

The city plays a central role in the Lebanese economy that is service-oriented with the main growth sectors being banking and tourism. Central Beirut locate almost 100 hotels. Ernst & Young's benchmark survey indicated that 4 and five star hotels in Beirut were amongst the best performers in the MENA region [7]. Because the country is too small, and visiting the main attractions during day trips is relatively easy, the majority of tourists book hotel rooms in the capital for their entire stay. Beirut has always received the largest share of tourists but also tourist spending. In 2004, 75% of visitors stayed in hotels in Beirut and their stay is on average about one week [8]. The capital captured 81% of total expenditures in 2018 [7].

On the program of tourists visiting Lebanon, there are many activities. For the day: beach, shopping and visits of the main historical sites (Baalbek, Byblos, Jeita caves, Cedars and Beit ed-Dine). In the evening: casinos, cabarets and festivals that make Lebanon an unusual opening area in the region [8]. The majority of these activities and part of the attractions are located in Beirut. The capital is mainly known for its shopping areas, waterfront marinas, seaside resorts, restaurants and nightlife. According to the Independent, Beirut is a mix of art, fashion, music, food and nightlife [9].

Beirut offers a wide variety of hotels, B&B and Inns, furnished apartments, and hostels in order to welcome tourists from all over the world. Managers have focused on diversifying the offer to meet the needs and preferences of Europeans, Americans, Arabs, Asians and others.

## III. HEDONIC PRICING LITERATURE

The hedonic pricing model assume that the price of a product is a linear function of its characteristics [10]. Thus, the hedonic pricing estimates the implicit prices of the attributes composing a specific product based on the real market value. The most used technique to estimate the model is the ordinary least squares regression (OLS). In the tourism and hospitality research, the hedonic pricing method was used to measure the value of different attributes composing packages and tours [11], [12], Hotel offers [4], [10], and vacation destinations [13], [14].

Focusing on the determinants of hotel room rates, the first study applied to hotels is authored by Carvell & Herrin, dates back to 1990. The first results has shown the importance of the hotel category and its location as important factors that affect the room rate [15].

After this application, many authors have applied the hedonic approach to the hotel sector in different destinations by exploring the effect of several characteristics on room rates. Some studies have confirmed the effect on hotel category on the room rate [3], [16], [17]. However, the majority of studies have associated room rates with hotel locations. Many studies have examined the relationship between room rates and the distance from the hotel to nearby attractions. While Lee and Jang (2011) have studied the proximity effects of airports and the Central Business District (CBD) on hotel room rates in some US cities [18], Alegre *et al.* (2013) studied the effect of location attributes on prices in three S destinations (Sea, Sun & Sand), namely the Balearic Islands. Both studies highlighted a relationship between the distance to the attraction studied and room rates. Also, Lee (2015) examined the differentiation of hotel quality and its effect on price competition in space [19]. The data from his study was obtained from an online website of all accommodation establishments in Texas. His discoveries added new knowledge to the literature. The location has been accepted as the dominant attribute for hotels. However, Lee's (2015) study showed that hotels compete with more distant neighbors of similar quality than those offering a different quality. This discovery suggests a new perspective on the relationship between quality differentiation and price competition between hotels. Furthermore, Alegre *et al.* (2013) showed that nationality influences certain motivations and preferences of tourists, including the location of the hotel [20]. While much research has proclaimed the benefits of the downtown location, Lee and Jang (2012) felt that the benefits of centrality may have been overestimated. They studied the effects of central location on hotel prices in high and low season, highlighting the potential negative effects of agglomeration that had been largely ignored in previous studies. This study was conducted on the Chicago hotel sector. The authors concluded that a location in the downtown area had a double effect on hotel rates. On the one hand, hotels located in the city center can benefit from high room rates in high season, while in low season they are forced to reduce their rates taking into account the activities of adjacent properties. These findings were reinforced by another study of hotels located in Madrid, Spain [21].

Many studies have examined the characteristics of hotels that have an impact on consumer willingness to pay, such as type of services, facilities and location [22]-[25]. Thrane (2007) results suggested that free parking and room amenities such as mini-bar and hair dryer have a significant effect on room rates in Oslo. However, surprisingly, the study has found that hotels offering a room service propose a lower rate than those hotel that don't. Moreover, results suggested that the distance to the city center does not have an effect on the price. Contrary to Thrane's results, Chen & Rothschild (2010) have found that room rates in Taipei are affected by their distance to the city center [26].

As the public is increasingly concerned about environmental issues, customers have increased their demand for green products in the hospitality industry. Many studies have confirmed that green initiatives have a positive impact on the behavioral intentions of clients. Research findings indicate that green practices have a positive impact on client satisfaction, willingness to revisit, willingness to pay, and positive word of mouth [18], [27]-[31]. Thus, green management has become a strategic tool that can enhance the competitive advantage of a hotel. Despite the emergence of ecological commitment and its importance to gain

competitive advantages, ecological attributes have rarely been included in studies to explain their impact on room prices [1]. Kuminoff *et al.* (2010) were the first to include an environmental attribute to justify room pricing using a hedonic function. Their results suggest that consumers are willing to pay a premium rate for eco-friendly accommodation [32]. These conclusions were reinforced by Garcia *et al*. (2013) who analyzed the impact of ecological practices on room pricing in hotels in Andalusia (southern Spain). Recently, in addition to traditional green practices and salient attributes, Kim *et al.* (2017) included recent amenities such as Wi-Fi, pet boarding, free self-parking and multilingual staff, with variables studied to examine their impacts on consumers' overall online assessment, their intentions to revisit the hotel and hotel performance. The results confirmed the additional predictive power of new attributes and emerging ecological practices on general customer attitudes and their willingness to pay a higher price [33].

Recently, some authors have emphasized the importance of combining hedonic pricing models with geographically-weighted regression analysis (GWR). Zhang *et al.* (2011) examined the influence of location and location factors on the price of hotel rooms in Beijing, China. The combination of models has proved more reasonable and explanatory results in different fields of study. Similarly, Latinopoulos (2018) explained that to clearly reveal the spatially variable relationship between dependent and explanatory variables, it is important to use the Ordinary Least Squres (OLS) model in combination with GWR analysis [34]. He studied the marginal effects of various hotel rooms and the characteristics of the location on the price of rooms, including the view of the sea, as well as the spatial heterogeneity on these effects. The use of a mixed spatial model has led to contradictory results with the results of previous studies conducted in the same area which reinforced the importance of combining both models for better results.

As mentioned earlier, the hedonic pricing model assume that the price of a product is a linear function of its characteristics [10]. Therefore, the hotel room rate is a bundle of various characteristics that form the overall proposed offer; it might include objective variables such as hotel facilities and costs or subjective variables like customer valuation and opinion [5]. The general specification for a hedonic price equation is given as:

$$Pi = f(Xi) \tag{1}$$

where *P* is the price and *Xi* are various, objective and subjective, attributes of the product/service.

Many authors [1], [5], [35] used the log-linear model to improve the model's explanatory power as suggested by Rosen (1974) and Wooldridge (2009). Consequently, we have used a log-linear model as given in Equation (2):

$$Ln\ Pi = \alpha + \beta i\ X_{1i} + \beta_2\ X_{2i} + \ldots + \beta_k\ X_{ki} + u_i \tag{2}$$

where $\alpha$ is the constant, $Xki$ is the hotel room attributes or characteristics (objective and subjective) and $\beta k$ is their associated coefficients.

The model was estimated using an Ordinary Least Squares (OLS) regression model.

To check for and control multicollinearity, variance inflation factors (VIFs) were calculated. Similarly to Chen and Rothschild (2010), S ánchez-Ollero *et al.* (2014), Schamel (2012) and Soler *et al.* (2016) among others, VIFs were checked, using as a reference the critical values suggested by Kennedy (2008) and Kutner, Nachtsheim, and Neter (2004).

## IV. MATERIAL AND METHODS

### A. Database and Considered Variables

The data for the study was collected from TripAdvisor Website in its English Version (Tripadvsiror.com). Hotel room rates change constantly due to yield management approach applied in the hospitality sector [36], thus considering time is very important when using the hedonic pricing method [37]. Many researches has shown that room rates vary between seasons [38], weekdays and weekends [26], [35] and even during events [39].

According to several interviews conducted with hotel managers working in 4 and 5 star properties in Beirut, conducted in march 2018, room prices are higher in summer and during holidays (high season) and lower the rest of the year. Moreover, room rates are adjusted based on occupancy percentage in high and low season. Furthermore, during low season, room rates are often not to be affected by weekdays and weekends.

Therefore, for avoiding problems related to seasonality and different days of the week, we have recorded prices for a full week (20-26 march 2019) in a low season period. We have noticed that prices are almost stable for the majority of hotels during the collection period. Thus, prices were collected for all accommodations located in Beirut Region that are classified under the "hotel" type, and the average daily price was then calculated (due to the stability of prices, we didn't consider prices for previous day as a variable). Data were collected for a double standard room. TripAdvisor website shows 121 properties classified as Hotel in Beirut area. However, some of the hotels doesn't show any information about the property, and others do not display prices; this might due to the fact that these properties are seasonal or closed. As a result, 89 hotels were included in this study.

For independent variables, first, number of rooms were considered to represent the size of the hotel [10]. Star rating, or hotel category, is agreed to be one of the most predictive variable for room rates [4], [16]. In Lebanon, as supposed to be in the majority of countries around the world, the Ministry of Tourism impose minimum standards to be met in order to obtain a specific star rating (related to tangible characteristics and services provided). Moreover, the higher the hotel category is, the higher is the level of the price range. Consequently, star rating is a very important variable to be tested in this study. Other variables that reflect customers' opinions are considered (overall value, Number of opinion, Ranking in region and Travel choice award). Moreover, in line with many studies that consider that tangible attributes affect the price, all available information on hotel facilities are considered in this study (affiliation to a

chain, type of accommodation, geographical positioning…).

Concerning environmental attributes, unfortunately, Lebanese hotel are faraway of being eco-friendly properties. Despite few hotels are trying to implement green activities (based on interviews conducted with many managers working in the hospitality field), none of them use green labels and activities in their marketing strategy, nor in hotel labels descriptions. Thus, environmental attributes were not found on TripAdvisor website to include them in this study.

Several researchers have suggested that the three most important elements of any property are "location, location and location" [40]-[41]. Many studies have found that location is one of the most important attributes for hotels [22], [42]. Therefore, considering the spatial dimension is important when studying room rates. Many methods of econometric analysis have been used to measure the spatial effect [43]. However, only recently, some studies in the tourism and hotel field have combine hedonic pricing model with geographical weighted regression [5], [10], [34].

Usually, in order to not consider the effect of spatial heterogeneity, some studies assume that the studied region is homogeneous and behaves as a single market. Other studies suggested that spatial effect may be controlled if enough spatial measurements are considered [4].

The main objective of this study is to provide a preliminary understanding of what influence hotel room rates in an undiscovered destination, Beirut, and compare results with previous studies in different areas. Accordingly, we will assume that the region is homogeneous and behaves as a single market. Also, following the majority of previous researches, we included locational characteristics related to the main city's attractions.

Finally, all the characteristics by which a customer can filter his search on TripAdvisor website, were included in this study such as amenities and property style.

### B. Descriptive Analysis

The descriptive analysis will help to gain an insight on the offer proposed by the hotels located in Beirut. Results in Table I (see appendix) show that the majority of hotels provide common facilities and services like room service (92.1%), restaurant (88.8%) and bar lounge (77.5%), free Wi-Fi (80.9%), airport transportation (85.4%), business center (79.8%), concierge (91%), Dry cleaning (95.5%) and laundry services (93.3%). Other facilities and services are much more exclusive like sauna (9%), indoor pool (4.5%), tennis court (4.5%), pets allowed (3.4%) and golf course (2.2%). Few hotels are centrally located (11.2%) and 10.1% are labeled as business hotels. Customers' rating is kind of acceptable (3.9) it is almost four out of five, and 44.9% of hotels have a certificate of excellence. These latter variables indicate a good average value of customers' perception.

### C. Variables Adjustment

One of the main problems associated with hedonic pricing models is the multicollinearity. After running the first linear regression, results has shown a strong multicollinearity between several independent variables. These variables were removed as suggested by Novales (1993). The majority of these variables were strongly collinear with the star category ((Room number, Affiliated to a chain, Ranking in region, Overall value, Number of opinion, Certificate of excellence,

Travel choice award, Number of photos, Budget hotel, Gym, Banquet room, Business center, Conference facilities, Laundry service, Multilingual staff, Wheelchair access, Kitchenette, Mini-bar, Non-smoking rooms, Refrigerator in room, Free parking, Hot tub, Pool, Spa). Papatheodorou (2002) and Thrane (2005) argued that a star category is an endogenous independent variable that might cause an error if used with other objective attributes. Hence, a star category will behave as the price variable and become a function of objective attributes. Moreover, this will cause a multicollinearity problem. Which is the case with this study. However, star rating and other attributes, especially the chain affiliation, travel choice award, overall value, certificate of excellence and ranking in region are strongly collinear with each other. So whatever variable is included, it will oblige the removal of all other variables. This may due to the specificity of the area studied, as almost the majority of 4 and 5 star hotels are affiliated to a chain and provide a high quality service in comparison with other hotels. Martin-Fuente (2016) has concluded that the category of the hotel, the price and the score obtained are positively related; high category hotels are priced higher and obtain higher scores [44]. Thus, author suggested that customers' evaluation of quality depend on price. Moreover, author has showed that there is a relation between hotel category and position in ranking by confirming that 5 star category occupies the higher positions followed by the 4 star category. This findings are especially true in the MEA region. Also, Martin-Fuente (2016) results have shown that higher priced hotels occupy the higher positions and low priced hotels appear in the worst positions. All these findings have confirmed that the star rating system is a predictor of room prices and quality of service provided [16]. This might explains the fact that higher category hotels have high overall value, have gained travel choice award and certificate of excellence and are better ranked in region. Therefore, considering the importance of the star category, and as the purpose of this study is comparing the obtained results with previous studies, we included only the star category in the model.

Moreover, all locational characteristics (distance to) that were considered showed a strong multicollinearity as well. This might due to the fact that the studied area is relatively small and all attractions are concentrated in a small zone. Thus, all locational characteristics were removed except the distance to the airport as the airport is the most isolated factor. In addition, some other variables were removed because of the problem of multicollinearity. All included variables are presented in Table II (see appendix).

Also, we have used the variance inflation factor (VIF) to detect if there was a severe multicollinearity between the considered variables in our model. All independent variables had a VIF value less than 2.6 (lower than 10), which means the absence of severe multicollinearity [45].

## V. RESULTS

Table II shows the OLS regression results and euro-values calculations. The euro value associated with each studied variable are calculated as suggested in many studies [4], [26]. Soler *et al.* (2019) explained that while continuous variables

may be calculated and interpreted in the conventional way, dummy variables must be calculated differently in order to obtain useful information when they are used in a log-linear regression. To do so, the estimated coefficient of the associated dummy variable must be transformed by calculating $(e^{\beta} - 1)$, noting that $\beta$ is the coefficient and e is the base of the natural logarithm. When multiplied by 100, the obtained value gives the percentage effect on prices. The monetary value can be obtained by multiplying this transformation by the average room rate of the studied hotels, which is 92.12€ for this sample [4], [38].

Table II shows five significant variables that are star category, centrally located, business, safe and accessible rooms.

## VI. DISCUSSION

Results in Table II show that the most important variable, in standardized terms, is the star category. This is in line with many studies that suggested that hotel category is found to be one of the most predictive variable for room rates [4], [16] and significant in many studies in the hedonic literature [1], [4], [16], [34], [35], and [46]. This finding shows that hotel category may be perceived as a quality indicator for hotels in Beirut, which is true because of the minimum requirements and standards imposed concerning facilities and services provided in these establishments. A study conducted by Martin-Fuente (2016) concluded that hotel category and customer's ranking are correlated in the MEA region (Middle East Africa); the higher the category of the hotel, the better is customers' ranking which reflects the perceived quality. Moreover, Fang *et al.* (2016) suggest that the star category is a referral to the overall quality of hotels [47]. In the case of hotels in Beirut, results show that an increase of one star represents an additional (€ 40.227) according to Table II.

However, this result is in contrast with some studies that have found that hotel category do not have a significant effect on hotel room rates. Chen & Rothschild (2010) have found that star category is insignificant. They suggested that customers are more attracted by the quality of the service provided despite the existence or not of the star category or the affiliation to a chain.

An interesting finding is the significance of accessible rooms. To our knowledge, there is no previous results suggesting its significance. It is the second most significant variable that has a positive impact on prices by € 26.4 (table 2). Not surprising that all hotels that have accessible rooms are 4-star and 5 star category hotels. The Society for Accessible Hospitality (SATH) estimate 859 million person with disabilities worldwide [48]. The "disability" term include people having difficulties with mobility, sight, or hearing, as well as learning difficulties and allergies [49]. The Americans with Disabilities Act (ADA) regulations were developed to protect disabled people by mandating some requirements to be met by hotels. One of the requirements is that 2% of the available rooms were accessible (ada.gov). There is no information about the regulations concerning this issue in Lebanon. However, supposing that hotels in Beirut are following ADA's regulations, the market is supposed to be offering about only

33 accessible rooms out of 8379.

While star category and accessible rooms have a positive effect on room rates, centrally located, business-related hotels and safe labels has a negative relation with hotel prices.

Centrally located label have a negative significance on room rates by about € 27. Central location was also found to have a negative or non-significance in many other studies [4], [26]. At first, this finding might appear to be peculiar. However, according to Lee and Jang (2012) the benefits of centrality may have been overestimated. In this work, the majority of the studied hotels are centrally located because the biggest part of the studied area is considered to be central Beirut. Moreover, all the hotels that use "centrally located" label are located in the most concentrated area of hotels in Beirut. Therefore, the negative relation between this variable and the price may be due to a severe competition between these hotels, thus, obliging them to lower the offered rates. Besides, the distance to the city center may not be perceived as a problem anymore, because an important number of hotels are offering free shuttle transfer to the city center, thus, avoiding the urge of lowering their rates.

Also, business related hotels have a negative significance on room rates by about € 25. Lebanon is a business and leisure destination. Based on many interviewed hotel managers, hotels in Beirut depend mostly on business travelers during winter and depend on leisure travelers during summer. Despite the country is more known as a destination for leisure travelers [50], the majority of the studied sample provide business facilities such as business center (71%), meeting rooms (70%) and conference facilities (52%). The negative relation between business-labeled hotels and room rates may due first to the competition to attract customers especially that, according to hotel managers, business travelers are emerging from only few Arab countries that are Jordan, Iraq and Egypt. And second, because the core market of Beirut hotels are leisure travelers. This finding is aligned with Soler *et al.* (2019) who have found that business related facilities have a negative effect on room rates. The explanation of this fact is due to the same reason related to the perception of Algarve as a holiday destination.

Safe-label was also found to have a negative impact on hotel prices by (€ 25.28). Lebanese tourism sector was heavily affected by the Syrian War; some terrorism attacks were executed during the first two years of the start of the crisis in the country which has led to a severe decline in the number of arrivals [7]. These events may have pushed some hotels, especially those located near the incidence zone, to use the "safe" label in order not to lose potential customers. However, Lee *et al.* (2010) have found that FIT guests value and expect in a 5 star hotels' location safety as the most important factor. In this study, none of the 5 star category hotels have used the "safe" label.

Location was recognized as a very important factor for the hotel as it can help increase market share and profitability [51]. Accessibility and convenience of hotel location are important criteria for customers' choice [52]. In the hedonic literature of hotel industry, location and the effect of distance were found to have an important impact on room

rates [1], [34]. However, in our study, sea distance have no significant effect on room rates. In contrast, distance to the airport is significant and affect negatively room rates by (€ 3.28). Aksoy & Ozbuk (2017) have studied the criteria that influence tourists' hotel location choice. They have found that the proximity to the airport do not have an effect on tourists' hotel location choice. This finding may be explained by the non-significant difference in distances between the studied hotels and the airport, in comparison with each other. The most isolated hotel is situated 20 min far away from the airport. Moreover, the more the hotel is close to the airport, the more it is distant from the center and main attractions.

Trendy label and free shuttle transfer were found to affect negatively room rates by approximately € 20 and € 17 respectively. Normally, hotels that offer a free transfer to the downtown are those located the farthest from the center. Thus, in reality, this variable is related to the location and it is used in order to mitigate the effect of non-attractive hotel localization. However, there is no logical explanation concerning the trendy label.

Contrary to Soler *et al.* (2019) that have found that "pets allowed" affect negatively room rates and golf course affect it positively, we have found that golf course has no significant effect while pets allowed has a positive significant effect on room rates in Beirut. The latter variable allow an increase of € 48.79 to room rates when it is available. This finding is aligned with Kim *et al*. (2015) results that have found that pet boarding is the most important attribute that affect customers' revisit intentions. Our positive finding may due to the fact that pets are rarely allowed in hotels in Lebanon. Among the sample considered only 3% of hotels offer the possibility to accept pets which may be considered as a factor of differentiation in the studied market. Many authors indicated that pets are considered nowadays part of the family, and many tourists prefer taking their pets with them during travel [53], [54], which is indicating the growing importance of allowing pet boarding in hotels.

However, despite the fact that only 2% of the studied hotel have a golf course, this variable has no significant effect on room rates. It may due to the fact that Lebanon is not a destination for golf activities, and definitely customers are not interested in this activity when choosing a hotel room in Beirut.

Regarding airport transportation, many studies have found that this variable is significant and affect positively room rates [4], [55]. However, this variable is found to be insignificant in this study. The reason behind this result may due to the fact that airport transportation is offered by the majority of hotels (85.39%). Moreover, this service is not free of charge, thus, not included in room rates. This finding is aligned with Chen & Rothschild (2010) who have explained that the availability of a variety of transport options has diminished the need of airport shuttle.

Finally, it is important to note that some variables that were found to be significant in many other studies like free Wi-Fi and room service [4], [26], [54], [56] where found not significant in this study. Thrane (2007) also found in his study that hotels offering a room service propose a lower rate than those hotel that don't. These findings indicate that

each destination differ from others concerning the importance given to some specific attributes. Moreover, these results may suggest that some facilities and services are perceived nowadays as basic attributes that must be present in the hotel, and are stopped to be considered a competitive advantage or an added value. However, managers should understand that these attributes that perceived as "basic services" must be present in a way not to disappoint customers. Many authors explained that customers are more affected by the dissatisfiers; if they were present and perceived as bad performers or in case of their absence [57], [58].

The findings of this study suggest that hotels in Beirut, similar to those in Algarve [4], do not show signs of differentiation. The majority of hotels are almost providing the same facilities and offers. Maybe the main differentiation aspect is the quality of service provided, especially that Lebanon is reputable for its hospitality. However, this factor is hard to be evaluated before the visit, especially for first time guests. Thus, hotel managers must rethink the presentation of their offer and its content. Moreover, they should give an important attention to customer star rating and reviews that are perceived as indicators of quality. Nevertheless, the most important effort must be done in order to find differentiation factors and introduce innovation to this field.

In this study, we couldn't analyze the effect of environmental attributes on room rates, because such information was not attached to any property studied. Lebanon was known to be an attraction for its beautiful nature and climate (four seasons). Unfortunately, air and water pollution, waste crisis and other ecological disasters have affected the image of Lebanon and the destination itself [59]. Hence, there is a real need of environmental awareness and education among all industries, especially the tourism industry and its components, in this case, hotels, as they are the most affected by ecological degradation. According to a study conducted by El-Nemr *et al.* (2018), the majority of the studied hotels in Beirut are not serious about the environmental practices included in their daily operation. These actions are mostly used to lower operating costs [60]. Moreover, none of them are using these practices in marketing campaigns. Therefore, environmental attributes may become a competitive advantage and a new positioning to be used within the market if implemented correctly, especially that many studies have confirmed that customers are attracted by eco-friendly hotels and are willing to pay more to encourage the action of these properties [18], [27]-[31]. Lastly, new entries in the market are advised to find more attractive locations than city center that appeared to not offer an advantage to hotels regarding pricing policies.

## VII. CONCLUSION

This research has evaluated the effect of different attributes, collected from TripAdvisor website, on room rates in Beirut by using the hedonic pricing model. This is the first study that was interested in Beirut region to analyze the particularity of this important tourism destination. Apart of Israeli (2002) study, this is also the only work to be interested in a region located in the Middle East, despite the

reliance of the majority of these countries on tourism activities. Thus, it is an interesting area to be discovered, in order to give managers insights of how to enhance and differentiate their offer to be able to price optimally their rooms.

Results has shown that the most important attributes that have a positive significant effect on room rates are star rating category and accessible rooms. The importance of star rating category find in this study is aligned with Israeli (2002) finding, however, the only difference is that the Ministry of Tourism in Lebanon controls hotels to give them the appropriate star rating category. Moreover, the value of this variable where also emphasized by being correlated with all customers' valuation and opinion. Thus, confirming again that star rating category is a quality index in the studied market. Therefore, managers should ensure that their hotel's physical environment, facilities and service are in accordance with the star rating category. Moreover, as mentioned above, they should give attention to customer rating and reviews that affect the perception of quality.

Results has also shown some important attributes that have a negative significant effect on room rates that are centrally located, business and safe labels. Consequently, managers may enhance their image in the eyes of consumers, at least on the websites where their hotels appear, by removing labels that affect negatively the room rates or by adding those labels that increase customers' willingness to pay if they are really related to the hotel. Because as it was stated by a chief executive of American Express *"Promise only what you can deliver and deliver more than you promise"[61],* hotel managers must always market the truth in order to not disappoint their customers.

As mentioned earlier, there is a real need of differentiation and innovation in the hotels market in Beirut, as results has shown almost a homogeneity of the proposed offer. Marketing is a very effective tool that helps changing the image perceived by customers. Thus, managers are invited to manipulate this perception by emphasizing on their competitive advantages and values in their marketing campaigns and market these factors on selling websites; for example, there are few studied resorts that offer water activities, however, these activities are not shown on TripAdvisor website, thus losing the possibility to add some value to their offer.

Furthermore, this study has shown the non-existence of eco-friendly hotels in the region despite some hotels were able to use this label as an added value at least to contribute to hotel's image. The lack of complete information about each hotel on TripAdvisor website, lead us to advise managers to rethink their presentation on such sites that may really affect the willingness to book of customers. Consequently, future works are invited to collect more information from different websites in order to study all possible attributes that may affect room rates. Moreover, they are invited to take into account seasonality factors, weekends and weekdays effect. Also, researchers may study hotels located outside Beirut to provide a comparison of what affect room rates inside and outside the capital.

APPENDIX

TABLE I: VARIABLES, BRIEF DESCRIPTIONS AND DESCRIPTIVE VALUES

| Type of Variable | Variable | Mean or % | Std. Deviation |
|---|---|---|---|
| **Price** | LNP | 43.749 | 0.5266679 |
| **Establishment Variables** | Stars | 4.213 | 0.6821 |
| | Affiliated to a Chain (Yes=1) | 38.20% | 0.4886 |
| **Locational Factors** | Sea View Distance | 0.95226 | 1.121747 |
| | Distance to Free Beach | 4.0753 | 2.9457 |
| | Distance to Shopping area | 3.0165 | 3.05354 |
| | Distance to nightlife | 3.921 | 2.11232 |
| | Distance to airport | 9.046 | 2.0901 |
| | Distance to Downtown | 4.1918 | 2.11603 |
| **Customers 'Valuation** | Ranking in region | 49.854 | 33.4149 |
| | Overall value | 3.933 | 0.7079 |
| | Number of opinion | 216.876 | 255.33 |
| | Certificate of excellence (Yes=1) | 44.90% | 0.5003 |
| | Travel Choice Award (Yes=1) | 14.60% | 0.3552 |
| | Number of photos | 152.18 | 181.5352 |
| **Style** | Park View (yes=1) | 2.20% | 0.1491 |
| | Ocean View (yes=1) | 2.20% | 0.1491 |
| | Great View (yes=1) | 7.90% | 0.2707 |
| | Budget Hotel (yes=1) | 14.60% | 0.3552 |
| | Centrally located (yes=1) | 11.20% | 0.3176 |
| | Residential Hotel | 2.20% | 0.1491 |
| | Hidden Gem (yes=1) | 1.10% | 0.106 |
| | Art Deco (yes=1) | 2.20% | 0.1491 |
| | Bay View (yes=1) | 2.20% | 0.1491 |
| | Harbor View (yes=1) | 5.60% | 0.2316 |
| | Charming (yes=1) | 5.60% | 0.2316 |
| | Mid-range (yes=1) | 18% | 0.3862 |
| | Value (yes=1) | 9% | 0.2876 |
| | Business (yes=1) | 10.10% | 0.3032 |
| | Classic (yes=1) | 1.10% | 0.106 |
| | Historic (yes=1) | 2.20% | 0.1491 |
| | Trendy (yes=1) | 10.10% | 0.3032 |
| | Boutique (yes=1) | 9% | 0.2876 |
| | Luxury (yes=1) | 7.90% | 0.2707 |
| | Quiet (yes=1) | 9% | 0.2876 |
| | Safe (yes=1) | 15.70% | 0.3661 |
| | Family- Friendly (yes=1) | 14.60% | 0.3552 |

| | | | |
|---|---|---|---|
| | Quaint (yes=1) | 12.40% | 0.331 |
| **Amenities & Facilities** | Room Service available (yes=1) | 92.10% | 0.2707 |
| | Restaurant available (yes=1) | 88.80% | 0.3176 |
| | Bar/Lounge available (yes=1) | 77.50% | 0.4198 |
| | Free High Speed Internet (Wi-Fi) available (yes=1) | 80.90% | 0.3953 |
| | Fitness Center with Gym available  (yes=1) | 56.20% | 0.499 |
| | Breakfast included (yes=1) | 38.20% | 0.4886 |
| | Airport Transportation provided (yes=1) | 85.40% | 0.3552 |
| | Babysitting service provided (yes=1) | 61.80% | 0.4886 |
| | Banquet Room available (yes=1) | 46.10% | 0.5013 |
| | Business Center with Internet Access available (yes=1) | 79.80% | 0.404 |
| | Concierge service available (yes=1) | 91% | 0.2876 |
| | Conference Facilities available (yes=1) | 58.40% | 0.4956 |
| | Dry Cleaning service available (yes=1) | 95.50% | 0.2084 |
| | Laundry Service available (yes=1) | 93.30% | 0.2522 |
| | Meeting Rooms available (yes=1) | 78.70% | 0.4121 |
| | Multilingual Staff available (yes=1) | 75.30% | 0.4338 |
| | Public Wi-Fi provided (yes=1) | 53.90% | 0.5013 |
| | Wheelchair access (yes=1) | 52.80% | 0.502 |
| | Accessible rooms available (yes=1) | 20.20% | 0.404 |
| | Air Conditioning available (yes=1) | 94.40% | 0.2316 |
| | Family Rooms available (yes=1) | 84.30% | 0.3661 |
| | Kitchenette available in room(yes=1) | 37.10% | 0.4858 |
| | Microwave available in room (yes=1) | 21.30% | 0.4121 |
| | Minibar available in room (yes=1) | 70.80% | 0.4573 |
| | Non-Smoking Rooms available (yes=1) | 88.80% | 0.3176 |
| | Smoking rooms available (yes=1) | 51.70% | 0.5025 |
| | Refrigerator in room available (yes=1) | 43.80% | 0.499 |
| | Suites available (yes=1) | 87.60% | 0.331 |
| | Free parking available (yes=1) | 30.30% | 0.4623 |
| | Children Activities (Kid / Family Friendly) available (yes=1) | 12.40% | 0.331 |
| | Heated pool available (yes=1) | 10.10% | 0.3032 |
| | Free Shuttle Transfer to Downtown provided (yes=1) | 24.70% | 0.4338 |
| | Hot-tub available (yes=1) | 21.30% | 0.4121 |
| | Pool available (yes=1) | 40.40% | 0.4936 |
| | Spa available (yes=1) | 29.20% | 0.4573 |
| | Sauna available (yes=1) | 9% | 0.2876 |
| | Tennis court available (yes=1) | 4.50% | 0.2084 |
| | Indoor pool available (yes=1) | 4.50% | 0.2084 |
| | Pets are allowed in hotel rooms (yes=1) | 3.40% | 0.1815 |
| | Golf course available (yes=1) | 2.20% | 0.1491 |
| | Self-Serve Laundry service available (yes=1) | 4.50% | 0.2084 |

TABLE II: ESTIMATED REGRESSION AND EURO VALUES

| Type of Variable | Variable | Coefficient | Beta Standard | t-Stat. | Sig. | VIF |
|---|---|---|---|---|---|---|
| | (Constant) | 2.709*** | | 7.486 | 0 | |
| **Establishment Variables** | Stars | .437*** | 0.566 | 5.618 | 0 | 2.525 |
| **Locational Factors** | Sea View Distance | 0.027 | 0.057 | 0.721 | 0.474 | 1.553 |
| | Distance to airport | -.036* | -0.142 | -1.805 | 0.077 | 1.532 |
| **Style** | Ocean View | -0.047 | -0.013 | -0.173 | 0.863 | 1.437 |
| | Great View | -0.137 | -0.07 | -0.822 | 0.415 | 1.825 |
| | Centrally located | -.329** | -0.198 | -2.296 | 0.026 | 1.853 |
| | Hidden Gem | -0.243 | -0.049 | -0.633 | 0.53 | 1.481 |
| | Art Deco | 0.427 | 0.121 | 1.539 | 0.13 | 1.533 |
| | Harbor View | -0.057 | -0.025 | -0.285 | 0.777 | 1.926 |
| | Charming | -0.08 | -0.035 | -0.446 | 0.657 | 1.557 |
| | Mid-range | -0.104 | -0.076 | -0.92 | 0.362 | 1.693 |
| | Value | -0.082 | -0.045 | -0.55 | 0.585 | 1.63 |
| | Business | -.316** | -0.182 | -2.288 | 0.026 | 1.576 |
| | Historic | 0.455 | 0.129 | 1.652 | 0.105 | 1.511 |
| | Trendy | -.239* | -0.138 | -1.684 | 0.098 | 1.66 |
| | Boutique | 0.051 | 0.028 | 0.333 | 0.74 | 1.767 |
| | Luxury | -0.007 | -0.004 | -0.041 | 0.967 | 1.82 |
| | Quiet | -0.02 | -0.011 | -0.13 | 0.897 | 1.79 |
| | Safe | -.321** | -0.223 | -2.864 | 0.006 | 1.507 |
| | Family- Friendly | -0.17 | -0.115 | -1.283 | 0.205 | 1.994 |
| **Amenities & Facilities** | Room Service | 0.076 | 0.039 | 0.496 | 0.622 | 1.555 |
| | Free High Speed Internet (Wi-Fi) | 0.168 | 0.126 | 1.63 | 0.109 | 1.486 |
| | Breakfast included | -0.003 | -0.003 | -0.035 | 0.972 | 1.678 |
| | Airport Transportation | 0.048 | 0.033 | 0.409 | 0.684 | 1.57 |
| | Babysitting service | 0.039 | 0.036 | 0.415 | 0.68 | 1.906 |
| | Accessible rooms | .252** | 0.193 | 2.285 | 0.026 | 1.782 |
| | Family Rooms | -0.09 | -0.062 | -0.755 | 0.454 | 1.7 |
| | Microwave available in room | 0.184 | 0.144 | 1.575 | 0.121 | 2.068 |
| | Smoking rooms | -0.028 | -0.027 | -0.307 | 0.76 | 1.877 |
| | Suites | 0.046 | 0.029 | 0.338 | 0.736 | 1.813 |
| | Children Activities (Kid / Family Friendly) | 0.099 | 0.062 | 0.77 | 0.445 | 1.615 |

| | | | | | |
|---|---|---|---|---|---|
| | Free Shuttle Transfer to Downtown | -.206* | -0.17 | -1.907 | 0.062 | 1.968 |
| | Tennis court available | 0.238 | 0.094 | 1.2 | 0.236 | 1.526 |
| | Pets are allowed | .425* | 0.146 | 1.847 | 0.071 | 1.564 |
| | Golf course | 0.471 | 0.133 | 1.599 | 0.116 | 1.729 |
| | Self-Serve Laundry service | 0.189 | 0.075 | 0.969 | 0.337 | 1.472 |

R2 = 1.687 (Durbin –Watson coefficient),
Dependent variable: LNPRICE
**\* Statistical significance at the 90% level \*\*Statistical significance at the 95% level\*\*\* Statistical significance at the 99% level**

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## AUTHOR CONTRIBUTIONS

In this paper, Shynar Murat and Panpan Huang conducted the research; Atour Taghipour supervised the research. All authors had approved the final version.

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