

Hedonic Price Attributes of Airbnb Listings in Split

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Abstract

As the sharing economy concepts such as Airbnb are new to Split, Croatia, the market is still unsettled and how to determine the appropriate rates is a question. The focus of this research was to find out the current price determinants (hedonic attributes) and provide a model of analysis so that sensible recommendations could be given on how the quality of hedonic attributes effects rates and occupancy. Using observation method and statistical analysis, the research showed that hedonic attributes of listings in Split provide practically no differentiation in rates or occupancy of listings. The main deciding factor seems to be the destination's popularity.

Key words: Private accommodation, Airbnb, price determinants, hedonic attributes, pricing, Split

INTRODUCTION

Airbnb: Shaping the Travel Industry

The emergence of Airbnb, Booking.com and similar peer-to-peer accommodation platforms had a transformative effect on the travel and lodging industry (Guttentag, Smith, Potwarka, & Havitz, 2018). Although the renting practice of privately-owned lodging is perennial, the internet technologies have made such services easily accessible and transparent by establishing relationships of trusts between hosts and guests (Guttentag, 2013). Up to 2013, within 5 years of operations, Airbnb reached 11 million guest users and was operating in more than 160 countries, while future predictions estimated exponential growth (Konrad & Mac, 2014). Airbnb users spent \$2.4 B on lodging only in the U.S. in 2015 (Lame & Woodworth, 2016). In March 2017, the company had a market value of \$31 B and was recognized by hotel industry as the market leader in accommodation services (Pettit, et

al., 2019). This growth is not accidental, since Airbnb is part of a rapidly growing phenomenon called sharing economy, predicted to make a turnover of \$335 B by 2025 (Fagerstrøm, Pawar, Sigurdsson, Foxall, & Yani-de-Soriano, 2017). Airbnb became a formidable competitor which can no longer be discounted by hoteliers as a supplemental lodging product (Blal, Singal, & Templin, 2018).

In 2015, Airbnb introduced a machine learning pricing algorithm offering pricing suggestions to hosts for each date that the property is available to rent (Kwok & Xie, 2018). The algorithm is extremely complex taking into the account demand factors, i.e. seasonality, local happenings and general destination attributes as well as unique hedonic characteristics of the specific accommodation unit. However, unlike Lyft and Uber whose algorithms control prices, Airbnb leaves the host a choice to accept or refuse the pricing advice (Gibbs, Guttentag, Gretzel, Yao, & Morton, 2018). This means that hosts' pricing skills are at least as important as the property attributes and market characteristics in determining the price. The problem is that hosts often lack the pricing know-how: automated price suggestions partly came in response to users' complaints that they lack skills allowing them to maximize revenue from their listing (Hill, 2015).

Pricing in lodging industry and price sensitivity of customers

Pricing and revenue management are important strategic issues in lodging industry (Avlonitis & Indounas, 2005; Denizci Guillet & Mohammed, 2015; Kimes & Singh, 2009; Rao & Kartono, 2009; Shoemaker & Matilla, 2009; Pohland & Kesgin, 2018) and are tailored to represent value or quality, although it is not entirely clear how consumers interpret different strategies (Collins & Parsa, 2006). Since value-based hotel-pricing was investigated by different authors (Skugge, 2010; Van Der Rest, 2007), it would be interesting to see how the concept of value represented by price attributes applies to private accommodation. In the traditional pricing model, pricing was determined on the cost of production with added profit margin, but recent online models introduced new flexible price setting mechanisms differentiating prices not only between products, but also customers and their transactions (Kasavana & Singh, 2001). Modern travellers are more sensitive to price due to technological advances, increase of tourist offer and information sharing. The price therefore must be set carefully, since the guests is looking to pay less and the owner to charge more (Raju & Zhang, 2010). The finding of equilibrium between the market supply and demand leads to the maximization of the profit which is often the main objective of private accommodation owners (Babić, 2011). Another important aspect of pricing to factor in is strategic location of the lodging operation, which is deemed crucial for its success, since clear connections exist between hotels and their destination (Yang, Wong, & Wang, 2012) in the sense that they heavily depend on the market structure and popularity of their specific destination (Lado-Sestayo, Vivel-Búa, & Otero-González, 2016). And finally, a positive correlation was established between ratings on major travel review websites and prices of accommodation (Agušaj, Bazdan, & Lujak, 2017).

Dynamic pricing strategy in tourism

Matching the price with market supply and demand means that the pricing mechanism needs to be elastic and dynamic. The majority of lodging operations use some form of dynamic pricing as part of

their routine revenue management practices. Some forms of dynamic pricing are: increasing the price at times of high occupancy and opposite, adjusting the price to competition and demand rates, time-sensitive pricing (lower prices for last-minute check ins for leisure guests during weekdays and on weekends lower prices for booking in advance), etc. Dynamic pricing is used in response to perishability of accommodation which, like any service, cannot be stored for later use. Research shows that the more stars the hotel has, the less dynamic pricing will be. Research also suggests that dynamic pricing is more common in the low-stars hotels, camps and private accommodation. Finally, it is also suggests that dynamic pricing can be used as a strategy to increase occupancy in high season, thus increasing the utilization rate. (Abrate, Fraquelli, & Viglia, 2012)

Attributes of private accommodation and their impact on pricing

Pricing has been the most critical factor for success of the hospitality accommodation business, or at least one of most critical factors in some researches (Hung, Shang, & Wang, 2010). According to Portolan (2013), the prices of private accommodation are set in majority based on intuition of the owner and their personal competition observation. Her research conducted in Dubrovnik, Croatia, established that prices of private accommodations are in a close relationship with attributes of their offers, the most important being those of hedonic nature, such as balcony, garden, peaceful area and parking. In the order to achieve better occupancy and higher profit, owners should set prices based on their valuation of the hedonic attributes of their offer.

On the other hand, research done by Wang and Nicolau (2017) comparing price determinants (attributes) of hotels and private accommodation on Airbnb in 33 different cities, showed that the most important ones for private accommodation are host attributes (i.e. being ranked as “super host” on Airbnb allows price increase). For hotel industry, the most important price determinants are the stars ranking and chain affiliation. Price determinants common to both hotels and private accommodation are location, amenities, customer reviews and services offered. The most important services offered at private accommodations, which make tourists willing to pay higher prices are pets allowed, smoking allowed and wireless internet.

Private Accommodation in Croatia: Characteristics, Growth and Trends

In Croatia, from 2000 to 2017, the number of tourist beds in private accommodation has almost tripled, taking 61.4% of all tourist beds offer in Croatia in 2017. Private accommodation today is the most dominant accommodation offer in Croatia, having 47.4% of tourist overnights in 2017, while hotels had 22.8% (Croatian Ministry of Tourism, 2018). Increased popularity of private accommodation is not only due to sharing economy phenomena such as Airbnb, but also because there is a considerable shortage of quality hotels in Croatia, which is specifically acute in the Split region (Mikačić, 2018). According to the website AirDNA.co providing insights into the performance of vacation rentals, in August 2019 there were 9,911 Airbnb listings in Split, with average revenue of USD 2,162.00, yielding the total revenue of \$21,427,582.00 only on Airbnb and Vrbo, not counting booking.com, other renting platforms and tourist agencies notwithstanding (AirDNA Grad Split Overview, 2019). According to the Tourist Board of Split Official Website (2019), in August 2019 there were 193,305 tourist arrivals and 659,366 overnight stays in Split. However, the problem with

the dominance of private accommodation is the low utilization rate; the peak of the season is busy, but the shoulders of the season are slow. According to the Institute of Tourism Croatia (2016), which defines off-season tourism as the period from October to April, hotels in Croatia in that part of the year provide approximately 50% of their total annual offer of beds. On the other hand, private accommodation offers in the off-season only 11% of its total annual tourist bed offer. This effectively means that private accommodations, particularly those in the small coastal towns, practically shut down when the high-season dries up. Although Split offers city tourism, a different type of tourist experience, the situation is not vastly different: 45% listings are available 1-90 days, 33% 91-180 days, 14% 181-270 days and only 8 % 271-355 days (AirDNA Grad Split Overview, 2019).

Socio-Demographics of Private Accommodation Owners in Croatia

In terms of socio-demographic characteristics of the private accommodation owners, 78% of rent permit holders are women, 39.1% of whom are between 36-55 years old. There is an almost identical percentage of 38.9% of women in the age from 56 to 65 with this permit. The majority of private accommodation providers have a medium-level professional qualifications (55.6%), while 37.7% have a university degree or higher qualification, and 6.7% only completed elementary school (Cerovic, 2012). Petric and Mimica (2011) showed that a half of permit holders are currently employed, while a third are retired, and concluded that this kind of lodging service is provided by relatively older people, serving for them mostly as a supplemental source of income. This demographic points to a realistic possibility that internet lodging pricing may be a very opaque process to the renters who may not have the relevant experience or education to manage complexities required to form the right pricing strategies.

Research aim

Since the sharing economy concepts such as Airbnb are new to the majority of renters in Split, who are, by and large, relatively limited in their scope of skill sets, experience and education, there may be a lot of confusion in the renting population as to how to maximize the occupancy/revenue ratio. The main focus of this research is to find out the current price attributes (determinants) with the aim of providing a model of analysis so that sensible general recommendations can be given to help those lacking pricing skills. The main outcome of this analysis would be a model to manage occupancy/revenue ratio based on the sensible manipulation of the private accommodations' attributes.

METHOD

The data used in this descriptive-relational research attempting to discover relationships between attributes of private accommodation in Split was acquired through the observation of the official Airbnb website. The sampling was targeted to 111 of around 900 private accommodations from the Split city centre listed on Airbnb. Only those offering 2 bedrooms and 1 bathroom were included in order to ensure the uniformity of the sample. All 111 samples had all data necessary for the research.

Data used for the research was the rating of the property, number of amenities offered, superhost status, rating of communication, cleanliness and check-in experience, house rules (smoking and pets policy), price for one night and occupancy between dates 20th of July and 20th of August, 2019. This

period was chosen because it best represents the industry since it is the high season. It is also a limitation of this research, because the data was observed in early April of 2019, which meant that the ending occupancy and final price could not be known, due to dynamic pricing employed at Airbnb. Other limitations of the research are its relatively narrow focus (one specific location - Split town center) and the sample size, which provides the confidence level of 95%, with the possible margin of error of cca 9%.

The instrument used to gather data was Excel spreadsheet, where all the participative accommodations and their attributes were entered into a table. The method of research was descriptive statistical analysis using average, median and standard deviation formulas and relational linear-logarithmic regression analysis to determine relationships between variables. The linlog regression analysis was chosen to estimate relations between different property attributes on one side and price and occupancy in the log form on the other, because the previous research mostly used the same mathematical tool based on recommendation from Rosen (1974), followed by Espinet et al (2003), Thrane (2007), Chen & Rothschild (2010), KUSHl & Caca (2010), Abrate, Fraquelli, & Viglia, (2012) for hotel accommodation and Monty & Skidmore (2003), Juaneda, Raya, & Sastre (2011) and Portolan (2013) for other types of accommodation.

The explanation of the general model is the following. Travelers chose from an offer consisting of a finite number of multi-attribute listing. A general model is established by which every listing carries a set of attributes:

$$F_i = (q_{i1}, q_{i2}, q_{i3}, \dots, q_{ik}, \dots, q_{im})$$

where $i=1, \dots, n$ indexes listings and q_{ik} ($k=1, \dots, m$), each of its attributes. Since the listing's occupancy rate is abstracted to a function of its attributes, the hedonic function for F_i can be the following:

$$CUR = CUR(q_{i1}, q_{i2}, q_{i3}, \dots, q_{ik}, \dots, q_{im})$$

where the functional form of CUR is assumed to be constant listings-wide, although the contribution of each attribute may be varied. This general set of attributes determines the specific choices made by travelers relative to their perception of a listing's value.

RESULTS

Descriptive analysis show that 51% of private accommodation offer in Split has a superhost status, 35% allow smoking and 36% allow pets. The average rating on a 5-star scale of properties is 4.8 stars (SD=0.27). Within specific ratings, communication rating average is 4.94 stars (SD=0.17), while cleanliness and check in experience are at 4.9 stars (SD = 0.23 and 0.26). The average number of amenities provided in a property is 24.02 (M = 24.02, SD = 8.92). The average price per night between 20th of July and 20th of August is €131 and median price is €119/per night (M=131.31, SD=52.56, Mdn=119). The average number of bookings for this period is 14.71 and median is 16.5 (M=14.71, SD=9.49, Mdn=16.5), which is 46% average booking at the time of data collection (early April).

Relational analyses were conducted to determine relationships between variables. linlog regression was used to establish if variables are connected and to confirm the significance of correlation found. All the attributes were compared to two dependent variables: price and occupancy.

The first linlog regression analysis was conducted to establish the relationship between the attributes and price. According to Table 2, the significant correlations were established only with amenities (P-value= 0.004470038, corr. coeff.= 0.010382131, Multiple R= 0.269117714) and stars (P-value= 0.014181030, corr. coeff.= 0.294331297, Multiple R= 0.233279416). It would appear that amenities have only 1%, whereas stars would have 29.4% influence on price, with both relatively weak relationships because of the relatively low Multiple R values closer to 0 than to 1. However, the explanatory model power of the model is low, explaining 18.48% of the variations in hedonic function as measured by the cumulative adjusted R².

The second linlog regression analysis was conducted to establish the relationship between the attributes and occupancy (Table 3). According to Table 3, The only significant correlation established was the correlation with price (P-value= 0.016835660) but the correlation was weak (Multiple R= 0.244735449), mathematically insignificant and, surprisingly, negative (corr. coeff.= - 0.003010155). As above, the explanatory power of the model is low, explaining 4.64% of the variations in hedonic functions measured by the cumulative adjusted R².

Table 1. Description of variables used in hedonic regression

| Variable | Description of variable |
|-----------------------------|---|
| <i>Dependent variables</i> | |
| Price | Rate per night in \$ between July 20th and August 20th |
| LOGPRICE | Price, logged |
| Occupancy | Days occupied between July 20th and August 20th |
| LOGOCCUPANCY | Occupancy, logged |
| <i>Explanatory variable</i> | |
| Parking | Availability of free parking space |
| Price | Rate per night in \$ between July 20th and August 20th |
| Occupancy | Days occupied between July 20th and August 20th |
| Superhost status | Awarded by Airbnb to hosts recognizing superb experiences provided to guests. |
| Smoking allowed | Option to smoke on the premises. |

| | |
|----------------------|---|
| Pets allowed | Option to bring pets on the premises. |
| Amenities | Number of amenities as counted on the listing. |
| Communication | Number of points for quality of communication based on guest reviews. |
| Cleanliness | Number of points for cleanliness based on guest reviews. |
| Check-in | Number of points for check-in procedure quality based on guest reviews. |
| Stars | Number of stars based on guest reviews. |

Table 2. Hedonic price linlog analysis for Airbnb listings in Split city centre

| Attribute | Coefficient | Std. Error | T-value | P-value |
|-------------------------|--------------------|-------------------|----------------|----------------|
| Parking | -0.065165431 | 0.006671400 | -0.976970000 | 0.330854000 |
| Occupancy | -0.053764927 | 0.105315407 | -0.510513406 | 0.610743439 |
| Superhost status | 0.037725092 | 0.065801567 | 0.573316014 | 0.567622611 |
| Smoking allowed | -0.043717099 | 0.069155535 | 0.632156181 | 0.528620810 |
| Pets allowed | -0.092893647 | 0.068286726 | -1.360347057 | 0.176552675 |
| Amenities | 0.010382131 | 0.003575255 | 2.903885526 | 0.004470038 |
| Communication | 0.118024166 | 0.197912873 | 0.596344058 | 0.552204953 |
| Cleanliness | 0.244065209 | 0.126264003 | 1.932975373 | 0.055857669 |
| Check-in | 0.113755963 | 0.143709807 | 0.791567154 | 0.430344817 |
| Stars | 0.294331297 | 0.118058551 | 2.493095956 | 0.014181030 |
| Adj. R-squared | 0.184775467 | | | |

Table 3. Hedonic occupancy linlog regression analysis for Airbnb listings in Split city centre

| Attribute | Coefficient | Std. Error | T-value | P-value |
|-------------------------|--------------------|-------------------|----------------|----------------|
| Parking | 0.175344719 | 0.158666174 | 1.105117204 | 0.271899807 |
| Price | -0.003010155 | 0.001236626 | -2.434166461 | 0.016835660 |
| Superhost status | 0.218938157 | 0.136994722 | 1.598150310 | 0.113401772 |
| Smoking allowed | -0.192909976 | 0.143439744 | -1.344885110 | 0.181933010 |
| Pets allowed | -0.222128135 | 0.143910238 | -0.153763450 | 0.878129422 |
| Amenities | -0.001787225 | 0.007994199 | -0.223565274 | 0.823585948 |
| Communication | -0.161513041 | 0.396412551 | -0.407436832 | 0.684623520 |
| Cleanliness | -0.072879197 | 0.256829951 | -0.283764402 | 0.777221713 |
| Check-in | 0.033242457 | 0.298244951 | 0.111460249 | 0.911491592 |
| Stars | -0.261141799 | 0.249902006 | -1.044976803 | 0.298742245 |
| Adj. R-squared = | 0.046487908 | | | |

DISCUSSION

This research was inspired by our initial perception that the Airbnb market in Split lacks hedonic differentiation and this was actually confirmed by the research findings. Our findings in Split market contradict the earlier finding of Portolan (2013) in Dubrovnik that hedonic attributes aka amenities, e.g. garden, balcony, peaceful location and parking, play a decisive role in the formation of the price. They also counter the findings of Wang & Nicolau (2017) that the policies of allowing smoking and pets are raising the price of accommodation. Although the Superhost status was stated to be one of the most important price determinants in that study, in Split, the Superhost status appears to have no significance. To a degree, the findings of the study confirm a positive relationship between online reviews and price previously established by Agušaj, Bazdan & Lujak (2017).

The regression analysis has shown that the collected data in most cases is dispersed to the level that it is impossible to derive any predictability in the sense that the improvement of the attributes measured

by Airbnb would result in a higher revenue or occupancy. Therefore, attributes measured by Airbnb cannot be seen as price or occupancy determinants and, by the same token, value determinants.

This all begs the question why. In our opinion, the reason is connected to Ashby's Law aka the First law of Cybernetics, which states that "the degree of control of a system is proportional to the amount of information available." (Ashby, 1956). This would imply that we must have an adequate amount of information in order to gain control of the system. However, if the system has some hidden properties, the information is incomplete and there is uncertainty about its behaviour (junk in/ junk out). This effectively means that there probably exist other powerful attributes/ price determinants which were not captured by our observational study.

Those could be several. First, the demand pressure is so extremely high during the season in Split that the general attributes of the destination, the sea, monuments, nature, countryside, food, wine, etc., are the most important price determinants, and that enchantment with those destination attributes decisively influences the quality of guest experience and subsequently their reviews. That this could be the case shows a study conducted in Barcelona showing that hotel prices are very dependent on the destination's attributes. This attracts significant number of alternative, mainly peer-to-peer, accommodation offers, which disappear in the post-season period when the demand wanes (Soler, Gemar, & Guzman-Parra, 2019). We have a very identical situation in Split (hedonic attributes relatively insignificant, while the peer-to-peer offer all but shuts down in the winter time), which is something that could be separately studied and could lead to the conclusion that pricing location is an indirect proof of the quality of the destination in the eyes of its guests (Juaneda, Raya, & Sastre, 2011).

Other possible reasons are the possible manipulation of guests' reviews through the means of corruption. There have been widespread rumours that online reviews can be bought and paid for, and that interested parties see it as a "legitimate" form of marketing and budgeting expenses, in spite of the illegality of those acts. It would appear that emerging (low trust) markets would be more prone to such manipulation. In other words, service providers ask their customers to write a favourable review in exchange of a financial reward (Durdan, 2019). This deserves a further study with a possible comparison of our data with the same set of data from a high trust destination, such as, for instance, Stockholm, Tokyo, Geneva, and Munich or similar, where such behaviour would be theoretically less likely to happen, as the research of 33 touristic cities shows (Wang & Nicolau, 2017). In that research, out of 33 cities, 32 cities were located high-trust countries/cultures destination which would fit the parameters established by Fukuyama (1996), whereas Split, due to its geographical location and the demographical attributes of the renters, could be seen more aligned with a low trust area.

The skewing of the results could be happening not on the side of the service providers, but on side of Airbnb, because it is believed that Airbnb incentivizes users to leave only positive reviews (Mann, 2019). This results in the culture on Airbnb site where guests are somehow expected to leave 5-star reviews or nothing, because they can also get negative reviews from their hosts which could result in the next host rejecting them (FlyerTalk, 2016). This also deserves a further study.

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