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Ensuring positive feedback: Factors that influence customer satisfaction in the contemporary hospitality industry

Tijana Radojevic [a, *], Nemanja Stanisic [b], Nenad Stanic [c]

[a] Faculty of Tourism and Hospitality Management, Singidunum University, Belgrade, Serbia
[b] Faculty of Business Economics, Singidunum University, Belgrade, Serbia
[c] Faculty of Computer Science, Singidunum University, Belgrade, Serbia

HIGHLIGHTS

- We examine the extent to which certain hotel features affect customer satisfaction in the European hospitality industry.
- Data were collected from one of the leading online hotel reservation service's systems.
- After controlling for the hotel classification, we identify eight additional factors that affect customer satisfaction.
- Our findings provide assistance to hotel managers in determining the optimal allocation of scarce financial resources.

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ABSTRACT

This study provides insight into the hotel characteristics that have a significant association with customer satisfaction. Data related to a sample of 6768 hotels located in 47 capital cities in Europe are analysed by using a linear mixed model technique. The results confirm the findings of previous studies, which state that hotel star rating is the single most important factor that influences customer experience. Furthermore, the presence of air-conditioning devices in rooms, a bar located within the hotel area, access to Wi-Fi Internet free of charge, membership in a branded hotel chain and price have significant positive associations with customer satisfaction (ceteris paribus). Variables that appear to be adversely associated with customer satisfaction are distance from the city centre, size of the hotel, and general hotel price level in the city where the hotel is located.

1. Introduction

Customer satisfaction is a business philosophy that highlights the importance of creating value for customers, anticipating and managing their expectations, and demonstrating the ability and responsibility to satisfy their needs (Dominici & Guzzo, 2010). Achieving and maintaining customer satisfaction is one of the greatest contemporary challenges faced by management in service industries (Yen-Lun Su, 2004). In the hospitality industry, customer satisfaction is the determinant of and the secret to success, as hotels are not able to compete effectively without fulfilling their guests' wishes. Therefore, to expand and improve their businesses, hotel managers should have a clear perception of which factors provide customers with higher value (Narver, 2000). Customer satisfaction metrics can be valuable for improving this perception, as they provide hotel managers with information that is necessary to identify and understand the real requirements and needs of customers (Forozia, Zadeh, & Gilani, 2013).

Presently, one of the most prevalent methods used by customers to provide feedback on his or her satisfaction with the services provided is evaluating the hotel on one of the prominent online hotel booking websites according to how well it provided relevant aspects of service. These evaluations are commonly compiled to form a single figure called a rating score, which can be regarded as a comprehensive metric of customer satisfaction. In addition to being a means of providing hotel management with valuable feedback,

* Corresponding author. Danijelova 32, Belgrade, Serbia. Tel.: +381 11 30 93 220; fax: +381 11 30 93 294.
E-mail addresses: tradojevic@singidunum.ac.rs (T. Radojevic), nstanisic@singidunum.ac.rs (N. Stanisic), nstanic@singidunum.ac.rs (N. Stanic).

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rating scores also act as recommendations for future customers, thus affecting the overall reputation of a hotel.

Moreover, information regarding hotel characteristics, ranging from general aspects such as pricing and location, to more specific information itemising activities and facilities, and even details regarding pet policy or languages spoken by the staff, has become increasingly comprehensive and much more accessible to the public.

Although many authors have analysed data generated from online reviews (for a comprehensive review, see Serra Cantallops & Salvi, 2014), to the best of our knowledge, there is no study that takes full advantage of the abundance of available information with the aim of re-examining the extent to which certain hotel features affect customer satisfaction. To fill this gap, data have been collected from one of the leading online booking services and have subsequently been analysed and presented in this study. For each characteristic appearing to present a significant association with the average rating, we have determined the sign and magnitude of the association and have offered a hypothetical explanation.

The website Booking.com ™ has a large market share, especially in Europe, operating on a commission-based model and allowing its registered users to carry out a complete booking procedure online quickly and securely. One of the main advantages of this internet-based service is its large and active community, which continually generates valuable feedback information. Shortly after a stay, a user is routinely invited via email to fill out a guest review form. The first part of the form allows users to evaluate the property they stayed in, using a standardised set of criteria—specifically: cleanliness, comfort, location, facilities, staff, and value for money—while the second part of the form gives users the option to write additional comments. Information received is then rendered anonymous, processed, summarised, and finally presented publicly in the guest reviews section of the page dedicated to the corresponding property. Some studies (Dickinger & Mazanec, 2008) demonstrate that, alongside the personal recommendations of friends, online reviews are the most important factor influencing the booking of accommodations.

The geographical focus of this study concentrates on Europe, and more specifically its capital cities. As their global market share has been contracting steadily recently, the cities of the Old Continent have had to adapt their marketing activities to offer new types of products (World Tourism Organization, 2012), such as city breaks. City tourism has recently become one of the key drivers of outbound tourism in Europe (Dunne, Buckley, & Flanagan, 2007), growing at a faster pace than coastal tourism. Some researchers (Dunne et al., 2007) emphasise the increased tendency of Europeans to take more frequent, albeit shorter, holidays, which has been further stimulated by the emergence of low-cost airlines. In light of the recent trends and fierce competition, the need to reassess customer preferences has greatly increased, making it an imperative endeavour in the hospitality industry.

2. Literature review

Customer satisfaction is the result of a customer's perception of the value received in a transaction or relationship, where value is equal to the perceived service quality relative to price and customer acquisition cost (Blanchard & Galloway, 1994). Service quality, in turn, is determined by how well customers' needs are met (Lewis & Booms, 1983).

Providing high-quality services and improving customer satisfaction are widely recognised as fundamental factors that boost the performance of companies in the hotel industry (Barsky & Labagh, 1992; LeBlanc, 1992; LeBlanc & Nguyen, 1996; Oppermann, 1998; Stevens, Knutson, & Patton, 1995), whereby hotels with good service quality will ultimately improve their profitability (Oh & Parks, 1997). Therefore, it can be understood that in a highly competitive hospitality industry, which offers homogeneous services, individual hoteliers must be able to better satisfy customers than their counterparts (Choi & Chu, 2001).

Given the nature of the characteristics ascribed to hospitality service, research in this field often focuses on the measurement and analysis of transaction-specific customer satisfaction. Transaction-specific customer satisfaction, as defined by Jones and Suh (2000), is related to a specific encounter with the organisation (in this particular case, a stay in a hotel). For example, the empirical study conducted by Ryan and Gu (2007) showed that guests' satisfaction with regards to hotels is predominantly influenced by hotels' star ratings. Star ratings, which are primarily determined by physical aspects of a facility and its service quality, act to reflect the degree of luxury of a hotel, and moreover provide an effective proxy for prestige among international hotels (Ingram & Roberts, 2000).

The HOTREC association (Hotels, Restaurants & Cafés in Europe) has developed its own European Hotelstars Union system (Hotelstars Union – Classification criteria 2010–2014, 2014). The system includes a catalogue of criteria with 21 qualifications encompassing 270 elements, where some are deemed mandatory for acquiring a star, and others are optional. The main criteria focus on the areas of quality management, wellness, and sleeping accommodations.

However, despite the progress made towards the harmonisation of national classification standards, owing to cultural, national and other traditions, some European countries continue to employ private rating systems, which prevents the application of a single classification system worldwide (European Consumer Centre Germany, 2009).

This lack of cohesion among national rating standards and the resulting absence of minimal requirements for particular star ratings act to characterise star ratings as an imperfect measure of hotel quality and, furthermore, render any international assessment of the impact of star ratings on customer satisfaction inconclusive. As a result, this phenomenon has motivated the development of a significant body of research aiming to quantify the impact of various factors on customer satisfaction.

Wuest, Tas, and Emenheiser (1996) discuss the importance of various hotel facilities and attributes deemed necessary for achieving customer satisfaction. Attributes such as cleanliness, price, location, security, personal service, physical attractiveness, opportunities for relaxation, standard of services, appealing image, and reputation are recognised as critical determining factors in a number of studies (Ananth, DeMicco, Moreo, & Howey, 1992; Atkinson, 1988; Barsky & Labagh, 1992; Cadotte & Turgeon, 1988; Knutson, 1988; McCleary, Weaver, & Hutchinson, 1993; Rivers, Toh, & Alaoui, 1991; Wilensky & Buttle, 1988). Saleh and Ryan (1992) find that, besides the tangible components of the hotel product, such as the presence of a restaurant or convenient parking, the aesthetics of the hotel, both interior and exterior, are of particular concern to customers. They also report that the longer the stay, and the more experienced the client as a user of hotels, the more important the client–staff relationship becomes. According to the results of the empirical study conducted by Gu and Ryan (2008), the main determinants of hotel guests' satisfaction are the external environment, reputation, and cleanliness of the rooms, while Choi and Chu (2001) concluded that staff quality, room quality, and value for money to be the most prevalent factors. Similarly, Chaves, Gomes, and Pedron (2012) established that rooms, staff, and location are the terms most frequently used to qualify the concepts of customer satisfaction with regards to hotels. Furthermore, according to Mattila and O'Neill (2003), price also plays a highly significant role in shaping perceptions held by guests

with regards to the value and quality of the hospitality product they are consuming, as the general expectation of guests is that a higher price should yield a higher level of service (Matzler, Renzl, & Rothenberger, 2006).

Although the opportunity to experience new locations is certainly important to many tourists, several studies have highlighted that a considerable proportion of travellers choose to return to holiday destinations they have already visited, showing a certain degree of loyalty (Fyall, Callod, & Edwards, 2003; Oppermann, 1998). As a result, many hotels tend to increase their investments aimed at improving service quality and the perceived value for guests, and moreover, to cultivate a better relationship with each customer, to achieve higher customer satisfaction and, ultimately, customer loyalty (Jones, Mak, & Sim, 2007).

Therefore, service quality, customer satisfaction, and price are highly important selection criteria for guests and are also the key determinants of post–purchase behaviour such as word-of-mouth recommendations and repurchase (Matzler et al., 2006). A satisfied guest provides positive word-of-mouth promotion at no cost to the enterprise, and with an effect and credibility superior to those of conventional advertising (Lee, Lee, & Feick, 2006; Tarn, 2005; Villanueva, Yoo, & Hanssens, 2008). The effect of word-of-mouth promotion is also amplified by the inherent nature of the World Wide Web (Dominici, 2009) and is especially important in the hospitality and tourism industry, whose intangible products are difficult to evaluate prior to their consumption (Litvin, Goldsmith, & Pan, 2008). With this, the Internet provides both ample avenues for consumers to publicly share their views, preferences, and experiences with others as well as opportunities for hotels to take advantage of word-of-mouth marketing via web services (Trusov, Bucklin, & Pauwells, 2009).

In consideration of the aforementioned literature, this research aims to explore, using statistical methods, some of the key measurable attributes of accommodation services in the European hotel industry that affect customer satisfaction.

3. Methodology

This research used the data available on www.booking.com, one of the most visited websites dedicated to hotel reservation services. For the purpose of web data extraction, software named iRobot (Cai, Jiang-Ming, Wei, & Yida, 2008) was employed, accessing the website on the 6th and 8th of March 2013 for data collection. Altogether, 6768 hotels located in 47 capital cities in Europe were included in the research.

The average ratings provided by registered users of the website were used as proxies for general customer satisfaction with regards to hotel services. These figures were calculated by averaging the scores based on the set of specific criteria for which customers were asked to evaluate the hotel (room cleanliness, room comfort, hotel location, hotel facilities, hotel staff, and value for money). In accordance with the theory, these ratings are a cumulative and aggregate measure of numerous transaction-specific satisfaction scores assigned by customers of a given hotel over a certain period of time. The number of votes of registered users per hotel was log-normally distributed, with a mean[1] of 773.40 and a standard deviation of 801.53. The total number of votes comprised by the sample was 2,067,370.

Internet surveys have created various significant advantages, such as substantial reductions in the cost and time required for the collection of the data, while also improving privacy and convenience for respondents. Nevertheless, they are recognised as being extremely prone to coverage bias, in addition to self-selection bias, compared to traditional survey methods, and thus the reader should bear in mind the possible limitations of these types of studies. Coverage bias is a consequence of differing internet penetration rates across countries and demographic groups and, therefore, estimates derived from the data may be biased to the extent that sampled persons with internet access are systematically different from those without internet access (Dever, Rafferty, & Valliant, 2008). Based on the findings reported in the relevant literature, it is expected that people who are young, educated (Bethlehem, 2010) and live in urban areas (Smyth, Dillman, Christian, & O'Neill, 2010) are overrepresented in internet surveys. Conveniently, it could be argued that typical hotel guests in European capitals differ from the general population in the same way, at least as regards the latter two criteria. Additionally, an analysis of the distribution of guests across varying demographic groups did not reveal any major disproportion regarding the first criterion (age).[2] Moreover, a recent study by Mohorko, De Leeuw, and Hox (2013) reports that coverage bias is declining across the countries of Europe, further relieving concerns with regard to coverage bias. Other drawbacks inherent to internet surveys are instances of self-selection bias, whereby disappointed guests may have a stronger impulse to publicly share their impressions than satisfied customers. As a result, it is important to be aware of the above-mentioned factors and their potential influence on the reported estimates.

Given the purpose of this research, average ratings were not weighted[3] by the number of votes; however, it must be noted that because the research includes all properties located in European capital cities that were listed on the web service at the moment of data collection, the number of listed properties varied widely amongst the cities. Therefore, the most popular destinations were generally more greatly represented in the sample. For example, Paris was represented by 1024 properties, while only 11 properties located in Monte Carlo were listed on the website at the moment of data collection. The results should be interpreted with this in mind.

In a previous study (Radojevic, Stanisic, Stanic, & Sarac, 2014), the partial correlation method was used to determine the variables (hotel characteristics) that are highly associated with customer satisfaction. A preliminary assessment of associations between variables and average ratings was conducted using the partial Spearman rank-order correlation coefficient, where star classification acted as the control variable. By doing so, we ensured that each of the variables included in the model provides some unique and relevant information. The results suggested that together with star rating, which is by far the most comprehensive metric of hotel service quality, several variables show significant associations with customer satisfaction. More specifically, these variables are:

(1) Distance from city centre in kilometres
(2) Size measured by total number of rooms in the hotel
(3) Price measured by double room price per night in Euros
(4) Presence of air-conditioning devices in rooms
(5) Presence of a lobby bar in the hotel
(6) Accessibility of a Wi-Fi network free of charge
(7) Three regression scores obtained from principal component analysis

[1] The mean is based on the original (non-transformed) distribution.

[2] Demographic groups are represented in the sample of responders in the following way: Solo travellers, 27.49%; Groups of friends, 16.25%; Young couples, 22.28%; Families, 13.82%; and Mature couples, 20.16%.

[3] If the ratings were weighted based on the number of votes, large, high volume, and/or high occupancy rate hotels would be overrepresented in the model definition process, which would lead to biased coefficients.

Distances were estimated by geocoding[4] the data on hotel addresses and transformed by using natural logarithms together with size and price. Given that the values of these variables have a positive skew, the aim of the transformation was to increase the linearity of their relationships with the dependent variable.

The values of the remainder of the independent variables were based on a large number (87) of optional fields available on the website, which provided detailed descriptions of hotel facilities and policies. Of these optional fields, points four to six (shown above) appeared to have the highest association with the dependent variable and, as such, were included in the models as predictors. These variables were dummy-coded and treated as factors.

The regression scores (presented under point seven) were obtained by means of a dimension reduction technique, on the basis of a comprehensive set of 84 specific hotel characteristics in the previous research (Radojevic et al., 2014). Their purpose was to capture part of the residual difference in the overall quality of hotel services described on the website.

In this research, the statistical significance of the previously identified independent variables was examined, this time taking into account the clustering structure of individual hotels within cities. Using the information that some of the hotels in the sample are located in the same cities, and hence share some common characteristics (which makes their ratings more similar), is much more efficient than assuming independence. Thus, a linear mixed effects model was defined, with the objective of estimating the importance of these variables (features) when perceived en masse as a hotel stay experience by authentic customers, while also making allowances for the aforementioned structure.

Given that the statistical significance of the association of the variables with customer satisfaction was expected to change, they were sequentially added to the model in a three-step procedure. To ensure that the mixed effects model is a suitable technique for the data, the significance of between-cities variation in a model with no predictor variable (null model) was tested. Then, in Model 1, the variable with the strongest theoretical foundation—hotel classification—was added. In the final step, a model with the remainder of the variables that previously seemed to act as reliable predictors was specified, omitting the variables that had lost statistical significance and including two additional variables.

To estimate the variance of components in the null model, the restricted maximum likelihood method was employed. To compare the fit in the subsequent two models, the maximum likelihood method was used instead.

The statistical methodology used in this research is primarily based on Heck, Thomas, and Tabata (2013), which should be referred to for additional details.

4. Results

4.1. Specification of the null model (model 0)

To determine the degree of variance in the average ratings between the cities, total variance was partitioned into within (-cities) and between (-cities) components. Therefore, the null model is specified as follows:

$$Y_{ij} = \gamma_{00} + u_{0j} + \varepsilon_{ij}$$

where Y_{ij} (the dependent variable) is the average customer rating for hotel *i* in city *j*. The overall mean of hotel ratings in the sample is represented as γ_{00} (the intercept), u_{0j} captures the variation in intercepts between cities (deviations of city means from the overall mean), and ε_{ij} captures variation within cities (deviations of hotel means from city means). The results of the null model are presented in Tables 1 and 2.

The estimated variance between cities comprises a substantial proportion of total variance (ICC[5] = 0.125565). It is statistically significant (Wald Z = 4.097, p < .001), and therefore, the intercept was treated as a random effect in subsequent models.

4.2. Specification of the model with hotel classification as a predictor (model 1)

In this step, the hotel classification variable was added to the null model as a dummy-coded fixed factor predictor. The purpose of Model 1 is to quantify the relationship between customer satisfaction (approximated by average rating) and hotel classification. Model 1 is stated as follows:

$$Y_{ij} = \gamma_{00} + u_{0j} + \gamma_{10} \times (Stars = 1)_{ij} + \gamma_{20} \times (Stars = 2)_{ij} + \gamma_{30} \times (Stars = 3)_{ij} + \gamma_{40} \times (Stars = 4)_{ij} + \varepsilon_{ij}$$

where γ_{10}, γ_{20}, γ_{30}, and γ_{40} are the differences in intercepts for each individual level of hotel classification. The results of Model 1 are presented in Tables 3 and 4.

The reference group is composed of five-star hotels, and therefore the values of the slope coefficients for the other four groups are negative. The largest declines in ratings between consecutive classification groups were observed between the three-star and two-star hotel groups and between the five-star and four-star hotel groups (with estimated values of −0.47941 and −0.45998, respectively). The value of the −2 log likelihood for this model is 3118.179.

4.3. Specification of the model with the most significant predictor variables obtained from previous research and new variables (model 2)

In this step, the most significant effects obtained in previous research (see methodology section) were added. Despite some of these variables sharing a common variation with star classification factors,[6] because of the previously discussed imperfection of the star rating classification, the significance of their effect on average rating was tested.

Due to their relatively low absorption of the variance in the explanatory variables (the three components explain only 19.55% of the total variance) and the lack of both statistical (after accounting for the nesting structure of data, only one component remained significant at $\alpha = .05$) and practical significance (the single significant component explains approximately 4% of the total variance in the dependent variable), the regression scores are excluded from the analysis. Bearing in mind the purpose of the research and possible future applications of the model, priority is given to the

[4] The Google Geocoding API was used in this research.

[5] Intraclass correlation – $ICC = s^2(b)/s^2(b) + s^2(w)$. In this particular case, intraclass correlation measures the degree to which the average satisfaction scores of hotels located within the same city are more similar to one another than to the average satisfaction scores of hotels located in different cities (Hollingshead & Poole, 2012). This similarity should be attributed to the shared destination.

[6] For instance, according to the criteria set by the European Hotelstars Union system, an attribute such as a bar is a minimum criterion for four- and five-star hotels. Free Wi-Fi is a requirement for three-, four-, and five-star hotels. The presence of an air-conditioning device is not included in any star category as a minimum indicator.

Table 1
Estimates of fixed effects.[a]

Parameter	Estimate	Std. error	df	t	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Intercept	8.001692	.042719	43.896	187.311	.000	7.915592	8.087792

[a] Dependent variable: average rating.

Table 2
Estimates of covariance parameters.[a]

Parameter		Estimate	Std. error	Wald Z	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Residual		.514112	.009782	52.556	.000	.495293	.533647
Intercept [subject = City]	Variance	.073824	.018020	4.097	.000	.045754	.119115

[a] Dependent variable: average rating.

variables that have a more natural interpretation and are relatively easy to identify.

A new dichotomous variable, which defines whether a hotel is part of a branded hotel chain, was included in the model. Theoretically, higher levels of customer satisfaction are expected for hotels that are affiliates of larger, well-known hotel groups. As this variable is likely to be positively correlated with price, the coefficients associated with the latter variable were expected to change.

Finally, the price effect was decomposed into two distinct effects:

(1) A city-specific price variable (log-transformed mean price in Euros of a stay in a double room in a particular city—denoted in the model as LnPriceLevel);
(2) A hotel-specific variable (log-transformed price in Euros of a stay in a double room in a particular hotel—denoted in the model as LnPriceLevel).

Because the prices of hotel services are to a certain degree influenced by the overall price level of the city in which the hotel is situated, a city-specific variable for general hotel price level was added.

Based on the considerations above, Model 2 was stated as follows:

$$Y_{ij} = \gamma_{00} + u_{0j} + \gamma_{10} \times (Stars = 1)_{ij} + \gamma_{20} \times (Stars = 2)_{ij} + \gamma_{30} \times (Stars = 3)_{ij} + \gamma_{40} \times (Stars = 4)_{ij} + \gamma_{50} \times (HChain)_{ij} + \gamma_{60} \times (WiFi)_{ij} + \gamma_{70} \times (AirCon)_{ij} + \gamma_{80} \times (Bar)_{ij} + \gamma_{90} \times (LnDistance)_{ij} + \gamma_{100} \times (LnSize)_{ij} + \gamma_{110} \times (LnPrice)_{ij} + \gamma_{01} \times (LnPriceLevel)_{j} + \varepsilon_{ij}$$

The results derived from Model 2 are presented in Tables 5 and 6.

In this model, the value of the −2 log likelihood decreases to 2788.455, which indicates that the model fit was improved.

The results demonstrate that hotel classification is of utmost importance to understanding overall customer experience, even when other relevant hotel characteristics are considered. However, it can be noticed that, in comparison with the previous model, a significant part of the explanatory power has been taken over by the complementary variables. Nonetheless, membership in a branded hotel group is positively associated with customer satisfaction and makes a difference in average rating of approximately 0.12.

Table 3
Estimates of fixed effects.[a,b]

Parameter	Estimate	Std. error	df	t	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Intercept	8.678791	.049770	100.758	174.376	.000	8.580057	8.777525
[Stars = 1]	−1.582778	.066547	4950.876	−23.784	.000	−1.713240	−1.452316
[Stars = 2]	−1.306093	.040657	4958.333	−32.125	.000	−1.385798	−1.226388
[Stars = 3]	−.826684	.034443	4955.134	−24.001	.000	−.894209	−.759160
[Stars = 4]	−.459983	.034373	4947.413	−13.382	.000	−.527369	−.392598
[Stars = 5]	0[b]	0	–	–	–	–	–

[a] Dependent variable: average rating.
[b] This parameter is set to zero because it is redundant.

Table 4
Estimates of covariance parameters.[a]

Parameter		Estimate	Std. error	Wald Z	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Residual		.370338	.007462	49.628	.000	.355997	.385256
Intercept [subject = City]	Variance	.063447	.015804	4.015	.000	.038939	.103379

[a] Dependent variable: average rating.

Table 5
Estimates of fixed effects.[a,b]

Parameter	Estimate	Std. error	df	t	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Intercept	9.874664	.505257	27.324	19.544	.000	8.838537	10.910791
[Stars = 1]	−.959448	.147013	1664.574	−6.526	.000	−1.247797	−.671099
[Stars = 2]	−.801909	.084375	1676.548	−9.504	.000	−.967400	−.636419
[Stars = 3]	−.427615	.065007	1663.463	−6.578	.000	−.555118	−.300112
[Stars = 4]	−.267973	.056020	1654.947	−4.783	.000	−.377851	−.158095
[Stars = 5]	0[b]	0	–	–	–	–	–
[Hotel chain = 0]	−.123292	.035639	1679.464	−3.459	.001	−.193194	−.053391
[Hotel chain = 1]	0[b]	0	–	–	–	–	–
[Free Wi-Fi = 0]	−.181184	.039154	1666.420	−4.627	.000	−.257980	−.104387
[Free Wi-Fi = 1]	0[b]	0	–	–	–	–	–
[Air Conditioning = 0]	−.258208	.033935	1664.983	−7.609	.000	−.324768	−.191648
[Air Conditioning = 1]	0[b]	0	-	-	-	-	-
[Bar = 0]	−.094595	.034722	1668.787	−2.724	.007	−.162698	−.026492
[Bar = 1]	0[b]	0	-	-	-	-	-
Ln distance from city centre in km	−.045435	.016512	1653.133	−2.752	.006	−.077823	−.013047
Ln number of rooms	−.123093	.018647	1685.297	−6.601	.000	−.159666	−.086519
Ln double room price	.407730	.032985	1674.733	12.361	.000	.343034	.472426
Ln double room price city average	−.571628	.113845	28.325	−5.021	.000	−.804709	−.338547

[a] Dependent variable: average rating.
[b] This parameter is set to zero because it is redundant.

Table 6
Estimates of covariance parameters.[a]

Parameter		Estimate	Std. error	Wald Z	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Residual		.295295	.010310	28.642	.000	.275764	.316209
Intercept [subject = City]	Variance	.054038	.019854	2.722	.006	.026301	.111030

[a] Dependent variable: average rating.

In keeping with current standards, the absence of an air-conditioning device or free Wi-Fi takes a toll, reflected in an average decrease in the overall hotel rating of 0.25 and 0.18, respectively. As a gathering point, a hotel bar, usually located in the lobby area, provides an opportunity for socialising and improves average rating by 0.08.

The distance from the hotel to the city centre, ceteris paribus, has a modest adverse association with customer satisfaction. Furthermore, it can be understood that the average level of hotel price for a given city has a negative impact on customer satisfaction. Depending on one's willingness to take the average hotel price as a proxy for the general price level in a city, it can be argued that the results demonstrate an unfavourable effect of general city price level on customer satisfaction. However, once the general price level in a city is taken into account, the price charged by a specific hotel appears to be positively associated with customer satisfaction.

5. Discussion and conclusions

Big data, which at this moment is essentially a by-product of the prominent web-based service companies, comes with equally large opportunities. By means of modern statistical and data mining techniques, valuable and up-to-date information regarding customer preferences can be obtained from a detailed examination of the data. Managers in hospitality can, and more importantly, should, use the data to update and re-examine their beliefs about the values their guests attribute to specific hotel characteristics, to rethink the role geographic, demographic, socioeconomic and cultural differences have in defining these values, and finally, to identify potential areas for improvement.

In this paper, a research model was developed with the aim of determining the factors that most significantly influence customer satisfaction in the hospitality industry, with a particular focus on hotels located in the capital cities of Europe.

The first conclusion that can be drawn from this study is that a significant portion (approximately 12.56%) of the total variance in the average ratings of hotels is attributable to characteristics pertaining to the destination in which they are located. It is worth noting that this result confirms the findings of recent research (Bulchand-Gidumal, Melián-González, & González Lopez-Valcarcel, 2013), which reports the “destination effect” to stand at approximately 14.03%. These findings illustrate the importance of employing multilevel models in this type of research. Failing to account for the effect of the destination may lead to biased results and flawed conclusions.

Approximately one-third of the variability in the average satisfaction scores for the hotels in the sample ($R^2 = 0.326$[7]) can be explained by their star classification alone, and slightly less than half ($R^2 = 0.471$) after accounting for the most important factors included in this research. This represents a significant improvement in comparison to the previously conducted study, in which the R^2 values stood at 0.289 and 0.397, respectively. Currently, the findings in this study appear to present the limit for predicting average customer satisfaction based solely on publicly available quantitative parameters.

The research results confirm previous findings that indicate the star rating of a hotel is the most reliable predictor of typical customer experience—a notion that is by no means surprising, as star classification is indeed designed to reflect the overall quality of

[7] Calculated by regressing actual values on those predicted by the model.

hotel facilities. However, the assimilation-contrast theory (Oliver, 2010; Sherif & Hovland, 1961) may provide an interesting framework for further interpretation of the importance of star classification. This theory suggests that if the disparity between expectation and performance is small enough to fall within the latitude granted by the consumer for acceptance, the consumer will tend to assimilate the product rating with his or her expectations. Yet in the event that the discrepancy between expectations and performance is so large that it falls within the zone of rejection, a contrast effect ultimately occurs, and the consumer magnifies the perceived disparity (Hamer, 2006). Applied to this particular situation, the theory suggests that if the disparity is within certain limits, guests tend to assimilate the ratings and reviews for their stay experience with the expectations created by the star classification that is assigned to the hotel.

Moreover, one can conclude that the reliability of average scores is higher for luxury hotels, as standard errors of the classification coefficients decrease for hotels with a high classification. Due to its conceptual and symbolic nature, luxury often conveys a touch of ambiguity, which, in turn, according to Hoch and Ha (1986), creates increased opportunity for assimilation. Therefore, ratings of stylish hotels might be more affected by expectations created by their high classifications. The findings of a study performed by Hu, Bose, Koh, and Liu (2012) might offer some further explanation for the greater variability among hotels with a low classification. By analysing data collected from some of the most prominent online review websites, they found evidence that review manipulation, which is expected to increase disagreement (and therefore observed variability) among ratings, is shown to be less common for highly rated items.

Furthermore, membership in a branded hotel chain has a positive association with customer satisfaction, as it helps to ensure the highest levels of quality standards. The aforementioned physiological assimilation effect may also have a subtle effect in this case.

Finally, the presence of specific hotel amenities such as air conditioning, free Wi-Fi, and a hotel bar also have a positive influence, as they are considered to be the norm for guests in the contemporary hospitality industry. The results demonstrate that the price of a stay in a particular hotel is positively related to customer satisfaction, which confirms previous findings that hotel guests tend to be more demanding, and equally more rigid, in terms of their requirements and expectations when paying more for a certain service. Conversely, the findings of this study show that the distance from the city centre, the number of rooms in the hotel, and the general hotel price level in the city have an adverse association with customer satisfaction levels.

Despite the geographical focus of the study being limited to hotels located in Europe, there is no reason to believe that the conclusions drawn in this study are not equally applicable to those located in other geographical regions. However, the decision to exclusively use data related to capital cities does present certain limitations on the generalisability of the results. Capital cities typically represent “city tourism” destinations where visitors have specific travel motivations, such as “sightseeing” or “getting among the people” (Ashworth & Page, 2011), and as such, a location close to the city centre is perceived as a favourable feature of a hotel (Hall & Page, 2014). Conversely, visitors to hotels located in typical “sea-and-sun tourism” destinations will almost certainly perceive other attributes, such as swimming pools (Albayrak & Caber, 2015) or characteristics of beaches (Rigall-I-Torrent et al., 2011), as more relevant and important than the proximity to the city centre. Therefore, the results of this study are mainly applicable to hotels located in urban destinations.

By identifying the factors of importance for customers in the hospitality industry of today, the findings of this study may also provide assistance to hotel managers in determining the optimal allocation of scarce financial resources with respect to customer satisfaction criteria. Because any decision has to be economically justified in the long run, managers should compare the costs of obtaining and maintaining a specific feature to the potential economic benefits that would occur as a result of the improved rating score. While costs vary significantly from country to country, a recent study carried out by Anderson (2012) may provide valuable insight regarding expected economic benefits. The author reports that a 1% increase in an online rating score leads to an increase in hotel occupancy of up to 0.54% and an increase in price of 0.89%. If we assume that the hotels in the sample use the same mix of increase in price and occupancy rate, and given that the reported effects are the ones after accounting for the price of stay, we are left with the expected effect of a 0.54% increase in the occupancy rate for each 1% increase in the average online rating score. Ultimately, this means that an estimated increase in the online rating associated with providing free Wi-Fi of 0.18 (which is a 2.3% increase in the rating score for an average-rated hotel) converts into a 1.24% increase in the occupancy rate. If the expected marginal profit from the increase in the occupancy rate of 1.24% exceeds the cost of setting up and maintaining an internet network and the opportunity cost of not charging Wi-Fi fees, then it is economically justified to provide Wi-Fi at no cost. Similarly, if the present value of the expected net marginal cash flow produced by a 3.27% increase in the occupancy rate exceeds the initial investment of installing an air-conditioning system (devices) and the present value of expected cash outflows required for maintenance, then it is reasonable to consider its installation.

In addition to analysing the attributes that are preferred and valued by their specifically targeted customer groups, it is imperative that hotel managers pay special attention to the comment sections of review websites. Customer comments can reveal various subtle performance issues that are easily remedied, yet difficult to diagnose, and which may act to hamper the reputation of the hotel if left unaddressed. With the advent of sentiment analysis, large-scale examination of consumer perceptions in hospitality, as demonstrated in some studies (M. S. Chaves et al., 2012; Chaves, Freitas, & Vieira, 2012), is no longer restricted to quantitative variables. Using software for natural language processing, a supplementary analysis of guest comments can be performed to confirm and address the conclusions of the analysis of the ratings more specifically. This feature is especially important given that a manager's influence over capital investments (which in large part determines the classification of the hotel and its membership in a branded chain) is generally limited. Regardless of the fact that these types of analysis are subject to certain biases (see the Methodology section), once these factors are recognised and taken into account, the benefits of the analysis would ultimately outweigh its costs.

Finally, this paper may provide valuable direction for further research. In this paper, the use of the linear mixed model technique for dealing with multilevel data structures has been demonstrated. Another effective statistical technique that is commonly used in the field of tourism and hospitality is Structural Equation Modelling (SEM) (Gursoy, Jurowski, & Uysal, 2002; Kim, Lee, & Law, 2008; Reisinger & Turner, 1999). However, only recently, with the advancement of statistical software, has the development of a multilevel SEM become appropriate for analysing hierarchically structured datasets, demonstrating the potential for new opportunities with regards to future research. For instance, multiple hotel-level variables can be used to define a latent construct at both the hotel level and the city level, and mediational hypotheses can be evaluated at both levels (Mehta & Neale, 2005). Developing such a complex model that is theoretically well-grounded undoubtedly presents a motivating challenge, particularly given the myriad variables that have to be considered. Nonetheless, it is to be

anticipated that a growing body of theory in the field may soon provide concepts that are sufficiently precise to suggest the convincing causal relationships that are needed for SEM, even with regards to highly specific hotel attributes.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.tourman.2015.04.002.

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Tijana Radojevic is an Assistant Professor at the Faculty of Tourism and Hospitality Management, Singidunum University, Belgrade, Serbia. Her research focuses on marketing strategy in the hospitality industry.

Nemanja Stanisic is an Associate Professor at the Faculty of Business Economics, Singidunum University, Belgrade, Serbia. His research expertise includes corporate finance and valuation.

Nenad Stanic is a Research Associate at the Faculty of Computer Science, Singidunum University, Belgrade, Serbia. His research interests include statistical computing, data mining, and web scraping.