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Quality of accommodation in Ceará: A study based on TripAdvisor customer reviews

Qualidade dos meios de hospedagem cearenses: Um estudo baseado nas avaliações do consumidor evidenciadas no site TripAdvisor

Calidad de las instalaciones de alojamiento en Ceará: Un estudio basado en evaluaciones de consumidores evidenciadas en el sitio web de TripAdvisor

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Keywords:

Quality;
Accommodation facilities;
Consumer;
TripAdvisor.

Abstract

The general objective of this study was to investigate the effect of service quality attributes on overall customer satisfaction, according to data from the TripAdvisor website. The sample was composed of the 43 most popular tourist destinations in Ceará, in a total of 2,293 tourist accommodation facilities, whose reviews were collected by a crawler and later analyzed by a parser, both implemented in Python language. The results were obtained by quantitative methods. The results suggest that improvements in room layout, service, and cleanliness, can increase customer satisfaction, since these attributes are those that most affect customer reviews. Other findings showed that the top-rated establishments are mainly on the coast, particularly in Jericoacoara. Also, accommodation facilities located in bigger and more populous municipalities are, on average, less likely to score the highest for overall satisfaction, and over time guests tend to become more demanding, thus lowering the overall satisfaction scores.

Palavras-chave:

Qualidade;
Meios de hospedagem;
Consumidor;
TripAdvisor.

Resumo

O objetivo geral do presente estudo é analisar a influência dos atributos da qualidade do serviço evidenciadas pelo site TripAdvisor, na satisfação geral do consumidor. A amostra é composta por 43 localidades cearenses que participam do ranking de destinos mais procurados pelos turistas no Ceará, constituindo um total de 2.293 estabelecimentos, cujas avaliações foram capturadas por um crawler e, em seguida, extraídas com uso de um parser, ambos executados em linguagem Python. Os resultados gerados por meio de métodos quantitativos. Os resultados sugerem que investimentos na estrutura dos quartos, no atendimento e na limpeza poderiam aumentar a satisfação dos clientes, tendo em vista que são esses atributos, respectivamente, que têm a maior probabilidade de influenciar um cliente a atribuir nota máxima ao estabelecimento. Outros achados mostram que a maioria dos estabelecimentos avaliados com nota máxima estão localizados principalmente no litoral, com destaque para os de Jericoacoara, que hospedagens situadas em municípios mais extensos e populosos têm, em média, menos chances de serem avaliadas com notas máximas de satisfação geral, que os hóspedes tendem a ficar mais rigorosos com o passar o tempo, levando a atribuir notas menores de satisfação geral.

Palabras clave:

Calidad;
Medios de hospedaje;
Consumidor;
TripAdvisor.

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Resumen

El objetivo general de este estudio fue analizar la influencia de dos atributos de calidad de servicio evidenciados por el sitio web de TripAdvisor, para la satisfacción general del consumidor. Muestra compuesta por 43 localidades en Ceará que participaron en la clasificación de los destinos más buscados por los turistas, y no en Ceará, lo que constituye un total de 2,293 establecimientos, cuyas evaluaciones fueron capturadas por un rastreador y luego extraídas con el uso de un analizador, ambos ejecutados en lenguaje Python. Los resultados generados a través de métodos cuantitativos. Los resultados sugieren que las inversiones en la estructura de dos habitaciones, la falta de servicio

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de limpieza, puede aumentar la satisfacción de dos clientes, considerando que estos atributos son, respectivamente, que tienen más probabilidades de influir en un cliente para que otorgue las mejores calificaciones al establecimiento. Otros expertos han demostrado que la mayoría de los dos establecimientos con las calificaciones más altas se encuentran principalmente en el extranjero, con énfasis en Jericoacoara, ubicado en los municipios más grandes y poblados, con menos probabilidades de ser reconocido con los puntajes de satisfacción general más altos, que los huéspedes tienden a suscribir a otros más estrictos, como pasar tiempo o tiempo, aumentando para asignar puntajes de satisfacción general más bajos.

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1 INTRODUCTION

Tourism is a fast-growing industry and tourists increasingly use new technologies to get information, plan, purchase, or voice their opinions (Silva, 2018). In this context, hotel review sites such as TripAdvisor and Booking.com have become a key source of information for independent travelers and service providers (Filieri, Alguezaui, & McLeay, 2015). There is evidence that travelers looking for information about various offers consider customer electronic word-of-mouth to be more relevant and informative than advertising materials of hotels (Sparks, Perkins, & Buckley, 2013).

Quality of service is directly linked to market competition, since the perceived quality is of importance when choosing between different companies providing the same service. Currently, due to the easy access to information, consumers can base their decisions on a knowledge of product benefits and value-for-money comparisons (Viana, 2017).

There are different widely disseminated parameters that guide research on service quality. In the literature 5 dimensions stand out: tangibility, reliability, assurance, responsiveness, and empathy (Parasuraman, Zeithaml, & Berry, 1988; Xu & Li, 2016).

In the context of accommodation services, several attributes related to these dimensions arise (Ekinci, 2001, Getty & Getty, 2003; Petry, Pickler, & Tomelin, 2016, Xu & Li, 2016), among them: service, value (cost-benefit analysis), cleanliness, location, sleep quality, and rooms, which are rated by TripAdvisor users, this being a site for sharing feelings and experiences about travel and accommodation.

The use of TripAdvisor as a quality assessment tool helps managers improve service quality regarding facilities, service, and products offered (Kucukusta, 2017; Ye, Li, Wan, & Law, 2014, Zhou, Ye, Pearce, & Wu, 2014). Reviews and ratings on TripAdvisor provide both quantitative (rankings, reputation of the establishment, number of comments), and qualitative information (personal experiences of users), enabling the owner of an establishment to identify strengths and address quickly and accurately the weaknesses in their businesses. Finally, the points of view posted by users on TripAdvisor have been used in several domestic and international studies (Banerjee & Chua, 2016, Rhee & Yang, 2015; Yang, Mao, & Tang, 2018).

In view of the above, the research question that guided this study was: what is the influence of service quality attributes on customer satisfaction, according to the ratings posted on TripAdvisor by guests in accommodation facilities in Ceará?

Seeking to answer this question, the general objective of this study is to investigate the influence of service quality attributes on customer satisfaction, according to the ratings posted on TripAdvisor by guests in accommodation facilities in Ceará. In order to achieve the general objective, the following specific objectives were formulated: a) to characterize tourist accommodation facilities in 32 municipalities in Ceará rated on TripAdvisor; b) to compare satisfaction, perceived quality and the relationship between them, according to the type of travel; and c) determine which factors are most important in the guests' decision to rate the accommodation facility with the maximum score.

It is extremely important to understand each factor in more detail, enabling managers to identify which attributes related to the quality of service have the most influence on customer satisfaction, so that Ceará establishments can focus on developing the most significant dimensions.

The TripAdvisor website was chosen as a source of data because of the wealth of information it provides and for its reputation, as it is the largest travel information exchange community in the world, having received more than 859 million reviews in the last 15 years and available in more than 49 markets that together form the largest travel community in the world (Tripadvisor, 2020).

This study addresses a gap in the literature by thoroughly examining Ceará tourist context, a thriving domestic and international destination attracting an increasing flow of tourists (Governo do Estado do Ceará, 2019). Thus, this investigation has significant importance for academic purposes. For practitioners, big data analysis is a strategy that helps to optimize processes and understand patterns of customer and market behavior to make services and products more profitable, as well as directing investments to satisfy customer needs. In addition, the study contributes to the characterization of the quality of service in tourist accommodation in Ceará, from which the authorities can direct public policies to promote tourism.

This study is organized into five sections: introduction, literature review, methodology, presentation and analysis of results, and concluding remarks.

2 LITERATURE REVIEW

In this section we identify the main theories and discussions on the dimensions of service quality of accommodations and analysis of customer reviews on TripAdvisor to establish the theoretical framework and achieve the objective of this study.

2.1 The TripAdvisor website

The TripAdvisor website was chosen as a source of data because of the wealth of information it provides and for its reputation, as it is the largest travel information exchange community in the world, having received more than 859 million reviews in the last 15 years and available in more than 49 markets that together form the largest travel community in the world (Tripadvisor, 2020).

According to information from TripAdvisor, people from all over the world use the platform, both through the website and through the application, to access ratings and reviews of 8.6 million accommodations, restaurants, experiences, airlines, and cruises. Furthermore, as reported by Stephen Kaufer and current CEO, the company was founded in the United States in February 2000, with the mission to help travelers around the world plan and book the perfect trip.

2.2 Quality of service in accommodation facilities

The quality of service in the hotel industry has been addressed in several recent studies. Many researchers link it to guest satisfaction (Blesic, Cerovic, & Dragicevic, 2011, Curakovic, Sikora, & Garaca, 2013, Markovic & Jankovic, 2013), others to loyalty (Kuo, Chang, Chen, & Hsu, 2013, Wilkins, Merrilees, & Herington, 2009). There are also those who advocate the use of quality as a business tool (Alonso-Almeida, Rodríguez-Antón & Rubio-Andrada, 2012), or as a competitive advantage (Hocayen-da-Silva & Teixeira, 2007, Zhong, Chen, & Xie, 2010). Guest behavior is also constantly related to the quality of hotel service (Kuo et al., 2013, Lu & Feng, 2010) and to experience (Grobelna & Marciszewska, 2013, Johann & Anastassova, 2014, Petry, Pickler, & Tomelin, 2016, Stupariu & Josan, 2014).

An instrument usually used to assess service quality is the SERVQUAL model, developed by Parasuraman, Zeithaml and Berry (2006), which measures satisfaction by comparing customers' expectations and perceptions. According to the authors, this scale assesses strengths and weaknesses along five dimensions: tangibility, reliability, responsiveness, security, and empathy. The attributes adopted by TripAdvisor reviews are based on these dimensions, which are discussed below.

Although price is not the object of this study, there are several empirical studies in the literature based on the theory of hedonic or implicit prices (Rosen, 1974), which aim to associate the characteristics of the accommodation with the prices charged by these establishments (Chen & Rothschild, 2010; Zhang, Ye, & Law, 2011) and assess the relationship between the market price and each of the attributes of the goods and services offered (Latinopoulos, 2018).

Based on hedonic pricing models, it is possible to compare the price charged for the different types of accommodation (Saló & Garriga, 2011), the influence of the star rating, and service quality (Abrate, Capriello, & Fraquelli, 2011; Fleischer, 2012), room characteristics (Fleischer, 2012), and distance to the beach (Coenders, Espinet, & Saez, 2003), as well as room rates of the previous day (Soler, Gemar, Correia, & Serra, 2019).

2.3 Evaluation of service attributes on TripAdvisor

Zhou et al. (2014) examined 1,345 user-generated reviews of 4- and 5-star Chinese hotels to identify the main

service attributes. The authors identified 6 service attributes: physical setting of the room, physical setting of the hotel, and physical setting of the food, value, location, and staff. In each category there were basic factors (e.g., cleanliness, room size, and noise), excitement factors (e.g., lobby, pool, and fitting center) and performance factors (e.g., amenities in the room and bathroom, friendliness of the staff, and the quality of food).

The study by Jeong and Jeon (2008) identified the room as one of the main aspects of positive evaluation and that service delivery explains guest satisfaction. The findings of Ong (2012) suggest that most users of travel websites considered the opinions about hotel staff service delivery to be relevant.

Rhee and Yang (2015), in turn, found that value, bedroom, and sleep quality were the most important aspects. However, on breaking down the sample by "Type of traveler", it was found that: among customers in the "Business" group, the most important aspects were sleep quality and value; in the "Family" group those aspects were value and room; for "Friends" the more important aspects were value and sleep quality; for the "Couple" group room and value are more relevant, and finally, those traveling "Solo" valued sleep quality and room. The authors point out that service is not among the most valued attributes.

On the contrary, Radojevic, Stanisic and Stanic (2015) investigating hotel customers in European capitals, found out that "Solo" travelers praised cheap and well located hotels, with free internet access, that the group "Friends" was also price sensitive, looking for cheap, well located hotels with a lobby bar. The group "Couple" showed no concern with the location, but prized the hotel's brand and free internet access, and, finally, "Family" also valued the hotel's brand, room air-conditioning, and the lobby bar, but did not value internet access.

In order to achieve this, Yang, Mao and Tang (2018) sought to identify the determinants of guest satisfaction with the location of hotels in Los Angeles, for a year. Accessibility to attractions, airports, universities, public transportation, green spaces, bodies of water spaces, and local businesses were identified as essential and significant attributes.

Value is considered one of the main evaluation criteria, together with service, room, and cleanliness. This attribute is the main satisfaction criterion (Jeong & Jeon, 2008). According to Ong (2012), most readers pointed it out as an important attribute.

In line with O'Connor (2010), comfort is an attribute that is usually evaluated positively. For Stringam and Gerdes Jr. (2010), however, there are negative opinions related to this attribute. The study by Chaves, Gomes and Pedron (2012), consistent with Stringam and Gerdes Jr. (2010), pointed to the comfort item as the one most associated with negative reviews.

Jeong and Jeon (2008) also points out that cleanliness is one of the main attributes. In this regard, Stringam, Gerdes Jr. and Vanleeuwen (2010) emphasize that when cleanliness has a low rating, it is highly unlikely the hotel has a high overall rating. These authors also highlight the positive relationship between rooms and overall satisfaction. Fernádez-Barcala, González-Díaz and Prieto-Rodriguez (2009) show that the more obsolete the rooms, the more expected is guest dissatisfaction.

The study by Limberger, Boaria and dos Anjos (2014) of reviews of 22 hotels from different countries, found that in the categories "Best Hotels" and "Small Size", the service appeared to be the most important factor in satisfaction. In turn, in the category "Budget" the room was more valued, and cleanliness was the main attribute in "Inns".

Banerjee and Chua (2016) using TripAdvisor data, analyzed 37,747 reviews to check if there was a difference between the ratings of independent hotels and chain hotels, in addition to considering possible differences by "Type of traveler" ("Business", "Couple ","Family", "Friends", and "Solo") and hotel location (America, Europe, Asia, and the Middle East). The results showed that the mean rating of independent hotels was higher than that of chain hotels, thus indicating that the different groups analyzed rated service quality differently.

According to Almeida and Pelissari (2019), the attributes room, service, value, and cleanliness can contribute to customer satisfaction; however, the importance and influence of the 6 attributes may vary according to categories "Type of traveler" – as reported by the guest ("Friends", "Couple", "Family", "Business", and "Solo") – and "minimum price for standard rooms".

Thus, the wealth of information that can be obtained from user reviews on TripAdvisor, the easy and quick access to them stands out, as well as the possibility of examining the Quality of Service as to the level of satisfaction with the service provided by the hotels and inns.

2.4 Customer satisfaction

Sheeran (2002) argues that customer satisfaction is a behavioral intention that indicates customers' motivation towards certain behavior. In this sense, the following stands out: the intention to pay a premium price for the service (Homburg, Koschate, & Hoyer, 2006, Casidy & Wymer, 2016); the intention to do business with other companies (Lai, Liu, & Lin, 2011, East, Grandcolas, Riley, & Lomax, 2012, Lehto, Park, & Gordon, 2015); the intention to repurchase a certain service or product (Jones, Mothersbaugh, & Beatty, 2000); and the intention to positively recommend the company to others (Liat, Mansori, & Huei, 2014, Liat & Chiau, 2015; Suh, Moon, Han, & Ham., 2015; Su, Swanson, & Chen, 2016, Su, Swanson, & Chen, 2016).

Customer satisfaction depends mainly on the accumulated perceived value of a product or service (Kotler & Armstrong, 2004). Reinforcing this idea, Fournier and Mick (1999) add that the concept of satisfaction is only maintained when the expectation is positive. Satisfaction can also be understood as feedback of customer assessment of a service experience, which can be more or less pleasant (Oliver, 2014).

In the hotel industry, Clifford (2013) listed some strategies used to improve customer satisfaction such as listening ears (proper customer compliant handling procedure or technique), adequate pricing policy, provision of security and satisfaction management, quality service delivery, prompt service delivery, courteous staff, employee training and retraining, etc. Anderson and Sullivan (1993) point out that consumer satisfaction is a response stemming from service quality.

This type of satisfaction measurement can be found in user-generated review sites, such as TripAdvisor, Expedia, and Booking.com. Several investigations have used ratings from these sites to measure customer satisfaction.

The study by Limberger, Boaria and dos Anjos (2014) used the overall satisfaction score as a dependent variable and the scores of service quality attributes, available on TripAdvisor (value, cleanliness, service, location, quality of sleep, and room) as independent variables in the regression model. The results indicate that the independent variables explained 27% of tourist satisfaction in small hotels, 63% for those who stayed in the best rated hotels, 70% for budget hotels, and 72% for inns, demonstrating that this set of variables fits different categories of hotels, although it has not proved to be efficient in measuring guest satisfaction with small hotels.

According to the above, it is possible to find different descriptions and ways to measure customer satisfaction in studies addressing the topic in the hotel industry, however, there is a common point between them: the understanding that satisfaction results from an evaluation process carried out by customers. Given the different concepts presented, this study adopts Oliver's (2014) definition of customer satisfaction, as it offers a theoretical basis for the way satisfaction is measured by customers on TripAdvisor.

3 METHODOLOGY

3.1 Population and sample

The sample consists of hotels and inns listed on TripAdvisor and located in 43 places in Ceará, 36 of which are in the ranking of the most popular destinations in the state. The remaining 7, although left out of the ranking, have accommodations reviewed on the website. In total, 2,293 establishments were listed, of which 1,266 were rated. The location of these accommodations is presented in Table 1.

Table 1 – Most popular destinations and accommodations rated in Ceará, according to TripAdvisor

Listed in the ranking			
1. Fortaleza	10. Sobral	19. Aracati	28. Itapipoca
2. Aquiraz	11. Caucaia	20. Fortim	29. Amontada
3. Paracuru	12. Trairi	21. Ubajara	30. Pecém
4. Icaraí de Amontada	13. Preá	22. Crato	31. Quixeramobim
5. Paraipaba	14. Cascavel	23. Tianguá	32. Marco
6. Jijoca de Jericoacoara	15. Itarema	24. Canindé	33. Mombaça
7. Juazeiro do Norte	16. Canoa Quebrada	25. Barbalha	34. Varjota
8. Guaramiranga	17. Beberibe	26. Maracanaú	35. Meruoca
9. Taíba	18. Camocim	27. Quixadá	36. Redonda
Not listed in the ranking			
1. Águas Belas	3. Flecheiras	5. Majorlândia	7. Novas Russas
2. Acaraú	4. Guajiru	6. Mulungu	

Source: TripAdvisor (2019).

Of the establishments with at least one review, a first sample of 129,290 reviews was collected, from which 17,615 duplicates were excluded, remaining 111,675 reviews. In addition, only complete reviews, i.e., those in which all attributes were rated were considered. Thus, the final sample included 27,094 reviews, encompassing the same 43 municipalities, but reducing the number of accommodation establishments to 588.

3.2 Data collection

The data were collected from TripAdvisor and included reviews from February 3, 2010 to April 4, 2019. The collection used a crawler, i.e., a program which gathers web pages, creating a collection of pages (Cho & Garcia-Molina, 1999). The crawler script can be found at the link <https://github.com/aesuli/trip-advisor-crawler>. The script was run using the Python programming language, version 3.7.2. In the line 137 of the original script, a change was made so that the program collected only pages referring to hotels and inns, excluding restaurants. The location codes that identify each city were collected manually on TripAdvisor. After that, the reviews from each city were collected separately through Python.

On TripAdvisor, users rate their overall satisfaction – a mandatory item – and predetermined service attributes (Value, Location, Sleep Quality, Rooms, Cleanliness, and Service) – which are not mandatory. In addition, the website shows the name of the reviewed accommodation ("Establishment Name"), the date of stay, the type of traveler ("Business", "Couple", "Family", "Friends", and "Solo") and it is possible to include a written review in which users describe their experience.

The user can rate the service on the following scale: 1– Terrible; 2 - Poor; 3 - Average; 4 - Very good, and 5 - Excellent. There is also an option for other users to thank those who posted the review, if they find it useful. Both positive and negative reviews are allowed on the website, but criticism should be respectful and abide by TripAdvisor's content policy.

To extract the relevant data, a parser was used. In the link of the original script of the crawler there is also a parser, however it was not used, as it extracted information out of the scope of this study. The parser used here was extracted from the work of Almeida and Pelissari (2019) and needed to be updated, since there were changes in the formatting of the TripAdvisor pages. The parser also uses Python language.

The crawler collected some duplicate or incomplete reviews which were excluded. In addition, the internal code of the pages (HTML) contained ratings on a scale from 10 to 50, being necessary to standardize it from 1 to 5.

3.3 Description of the variables

Table 2 describes each of the variables of the study, indicating the scale or unit, the nature, and the source.

Overall satisfaction is the dependent variable that corresponds user ratings of accommodation facilities and is a proxy for perceived service quality provided by these establishments. The independent variables attributes (value, location, sleep quality, rooms, cleanliness, and service) show what characteristics, on average, can influence perceived service quality.

The type of traveler is also a set of independent variables, of a categorical nature, which can explain customer overall satisfaction. For matrix reasons, the parameters are always estimated in comparison to a reference category which, in this case, is business traveler.

The other variables seek to identify the effect of other factors on overall satisfaction. It is believed that the place where the accommodation is located can influence overall satisfaction, as perception involves numerous factors besides the accommodation itself. Thus, the following elements were considered:

a) area: larger municipalities can concentrate more accommodation establishments and favor competition, as well as they can offer tourist attractions, such as beaches for example;

b) population: more populous municipalities are associated with less peaceful, noisier environments with more traffic, factors that can affect customer overall satisfaction; and

c) HDI (Human Development Index), education and GDP (Gross Domestic Product) per capita are socioeconomic indicators that reflect the living conditions of the local population and, consequently, can influence customer overall satisfaction, since these indicators may be associated, for example, with the level of violence, hygiene, and local sanitation, as well as the availability of qualified labor to work in the hotel industry.

Table 2 – Description of the variables

Variable	Description	Scale/Unit	Nature	Source
Overall satisfaction	Score of perceived customer satisfaction.	1 to 5	Quantitative	TripAdvisor
Value Location Sleep quality Room Cleanliness Service	Perceived service quality attributes.			
Area	Area of the municipality where the accommodation facility is located.	$Km^2/1.000$		Cities and States – The Brazilian Institute of Geography and Statistics (IBGE)
Population	Estimated population of the municipality where the accommodation facility is located.	$Population/10^5$		
Education	Percentage of the population aged 6 to 14 years, in the municipality enrolled in school.	%		
HDI	Municipal Human Development Index.	0 to 1		
GDP per capita	Ratio of Gross Domestic Product of the municipality and total population.	R$		
Region	Dummy value 1 if the municipality is coastal or 0, otherwise.	0 or 1		
Year of review	Indicates the number of years that have passed since the review, ranging from 0 = 2019 to 9 = 2010 (first record of the sample).	0 to 9		
Number of reviews	Corresponds to the number of complete reviews that each accommodation received.	Complete, positive and greater than 1.		
Type of traveler	Indicates the type of traveler reported by the guest: 1 –Business, 2 – Family, 3 – Solo, 4 – Friends, and 5 – Couple. The inclusion of this variable in regression models was done by transforming the following dummy variables (considering business travel as the reference category): D_0: 1 business trip; or 0, otherwise. D_1: 1 family trip; or 0, otherwise. D_2: 1 solo trip; or 0, otherwise. D_3: 1 trip with friends; or 0, otherwise. D_4: 1 trip as a couple; or 0, otherwise.	1 to 5	Qualitative	TripAdvisor

Source: Research data (2019).

Bearing in mind that Ceará is an attractive tourist destination for its coastline, the variable Region aims to identify whether a coastal location affects overall satisfaction.

The year of the review is a variable that aims to capture any changes in the standard of customer reviews over time. If this variable turns out to be significant, it may indicate that, on average, customers have become more (or less) demanding in their assessments of overall satisfaction.

Finally, the number of reviews corresponds to the amount of reviews received by the accommodation facility. This variable seeks to verify whether a higher number of reviews is related to overall satisfaction ratings. If this variable is significant it may suggest that the number of reviews influences higher scores for overall satisfaction.

3.4 Data analysis

The collected data were analyzed using descriptive statistics and multivariate analysis techniques with Stata software, version 14 and SPSS version 22. Linear regression was used to examine the influence of service quality attributes on customer overall satisfaction, thus achieving the general objective of this study.

After including the variables type of traveler, number of years since the review was posted, number of reviews, and some characteristics of the municipality (area, population, education, HDI, GDP per capita, and region), the following model is described:

$$\text{Overall Satisfaction}_i = \beta_0 + \beta_1 \text{Value}_i + \beta_2 \text{Location}_i + \beta_3 \text{Sleep Quality}_i + \beta_4 \text{Room}_i + \beta_5 \text{Cleanliness}_i + \beta_6 \text{Service}_i + \beta_7 \text{Year}_i + \beta_8 \text{No. of reviews}_j + \beta_9 \text{Area}_k + \beta_{10} \text{Population}_k + \beta_{11} \text{Education}_k + \beta_{12} \text{IDH}_k + \beta_{13} \text{GDPpercapita}_k + \beta_{14} \text{Region}_k + \beta_{15} D_1\text{Family}_i + \beta_{16} D_2\text{Solo}_i + \beta_{17} D_3\text{Friends}_i + \beta_{18} D_4\text{Couple}_i + \varepsilon_i$$

Where,

β_0, β_1, ..., β_{18}: are the coefficient of the model;
i: assessment index;
j: index referring to the accommodation facility;
k: index for the municipality where the accommodation is located;
ε_i: stochastic error associated with the *i*-th evaluation.

To achieve the first specific objective, the accommodation facilities were characterized using descriptive statistics. To address the second specific, the means of the variables referring to customer overall satisfaction and perceived quality were compared, according to type of travel, using analysis of variance (ANOVA). Also, satisfaction, perceived quality, and the relationship between them were compared according to the type of travel in which the stay occurs. Finally, multiple linear regression models were adjusted separately for each type of travel. The third objective was addressed using logistic regression to estimate the probability of a maximum score on satisfaction (dependent variable: 1 = maximum rating score; 0 = otherwise).

Following, the characteristics of the sample are presented, through descriptive statistics of the data, and after the results are discussed.

4 PRESENTATION OF RESULTS

4.1 Characteristics of the accommodation facilities

The mean score for overall satisfaction, considering all 27,094 reviews of accommodation facilities in Ceará in the study period, is 4.1127. Regarding quality attributes, the mean scores are: Location (4.4116), Sleep quality (4.2559), Service (4.2439), Cleanliness (4.2100), and Rooms (4.0907). These results suggest that the greatest strength of accommodations is location and, on the other hand, a focus on service, cleanliness, and layout of the room could increase the quality of these attributes.

Of the 588 accommodation facilities, Comfort Hotel Fortaleza received the highest number of reviews (2,430), followed by Quality Hotel Fortaleza (1,438), and Hotel Ibis Fortaleza (1,056). However, as suggested by Melián-González, Bulchand-Gidumal and González López-Valcárcel (2013), the largest number of reviews is not synonymous with higher scores.

The main establishments are listed in Table 3 in descending order of overall satisfaction (%). Two criteria were applied: a) establishments that have a number equal to or greater than 50 reviews in the sample; and b) following the criteria of data collection, all attributes must have been rated in the review. Thus, we sought to identify the establishments with the highest percentages of maximum scores for overall satisfaction per number of reviews.

Table 3 – Ranking of maximum scores for overall satisfaction per reviews

Rank	Accommodation facility	Location	No. Maximum Scores	No. of Reviews	Max. Scores per Reviews (%)
1	Pousada Jeribá	Jericoacoara	103	116	88.79
2	The Chili Beach Private Resort & Villas	Jericoacoara	57	69	82.61
3	Villa Mango Beach Bungalows	Icaraí de Amont.	60	75	80.00
4	Vila Kalango	Jericoacoara	97	122	79.51
5	Jeri Pousada	Jericoacoara	46	58	79.31
6	Pousada Atlantis	Jericoacoara	60	76	78.95
7	Pousada Castelinho	Canoa Quebrada	106	136	77.94
8	Pousada Bella Jeri	Jericoacoara	76	100	76.00
9	Pousada Vila Canoa	Canoa Quebrada	112	149	75.17
10	Galoo - Pousada Concept Area	Jericoacoara	47	63	74.60
11	Boutique Hotel & Restaurant	Cumbuco	44	59	74.58
12	Casa na Praia	Jericoacoara	93	125	74.40
13	Pousada Aqua	Jericoacoara	45	61	73.77
14	Cumbuco Guesthouse	Cumbuco	41	57	71.93
15	Pousada Araxá	Jericoacoara	42	59	71.19
16	Pousada WindJeri	Jericoacoara	67	95	70.53

Source: Research data (2019).

Pousada Jeribá, for example, had 116 ratings, of which 103 were maximum scores, i.e. 88.79% were 5-score ratings. In this ranking, only establishments with 70% of 5-score ratings appear. Interestingly, all 16 establishments are located on beaches, 11 of which are in Jericoacoara.

The scores of overall satisfaction and quality attributes, according to the type of travel, reveal that the mean scores for overall satisfaction and for all service quality attributes are lower when the customer is a business traveler. Although the reason for this result was not found in the literature, two assumptions are made: guests traveling for business are more demanding compared to others and/or business travel negatively affects perceived service quality, leading this type of guest to assign, on average, lower scores. On the other hand, in general, scores given by guests traveling as a couple or with friends are relatively higher compared to other types of travelers, as shown in Table 4.

Table 4 – Mean scores by type of travel

Type of travel	N	Overall satisfaction	Value	Location	Sleep quality	Rooms	Cleanliness	Service
Business	4613	3.9046	3.7899	4.3677	4.1008	3.9553	4.1108	4.1242
Family	9674	4.1048	3.9471	4.3927	4.2543	4.0870	4.1792	4.2236
Solo	1412	4.1218	4.0595	4.3980	4.2394	4.0382	4.2280	4.2663
Friends	3504	4.1604	4.0973	4.4341	4.2922	4.0896	4.2186	4.2686
Couple	7891	4.2213	4.0530	4.4528	4.3352	4.1843	4.2987	4.3238
Total	27094							

Source: Research data (2019).

Location was the highest rated attribute, regardless of the type of travel. On the contrary, Sleep Quality and Rooms are, respectively, the attributes with lowest scores.

By aggregating the accommodation facilities by location, considering only establishments with at least 50 reviews and locations with at least 5 establishments to avoid outliers, it was possible to rank the mean values of customer overall satisfaction (Table 5). It can be observed that Icaraí de Amontada (4.7237) was the location that obtained the highest overall satisfaction score, followed by Flecheiras (4.5534), and Canoa Quebrada (4.4151).

Of the 43 locations in the sample, 28 are in coastal municipalities and 15 are in interior municipalities. Sobral (3.6610) was the only interior municipality to appear in the ranking and, even so, with a score well below the other locations. These results point out that the coastal establishments have a perceived overall satisfaction greater than those located in the interior.

Table 5 – Ranking of mean overall satisfaction by location

Position	Location	Municipality	No. of Reviews	No. of Establish.	Overall Satisfaction	Region
1	Icaraí de Amontada	Amontada	152	5	4.7237	Coast
2	Flecheiras	Trairi	103	7	4.5534	Coast
3	Canoa Quebrada	Aracati	1783	64	4.4151	Coast
4	Jericoacoara	Jijoca	3834	107	4.4150	Coast
5	Paracuru	Paracuru	71	13	4.3662	Coast
6	Trairi	Trairi	92	11	4.3261	Coast
7	Lagoinha	Paraipaba	61	5	4.2295	Coast
8	Cumbuco	Caucaia	549	29	4.2149	Coast
9	Aquiraz	Aquiraz	1562	30	4.1498	Coast
10	Beberibe	Beberibe	1032	16	4.0892	Coast
11	Fortaleza	Fortaleza	17302	199	4.0017	Coast
12	Sobral	Sobral	59	7	3.6610	Interior
	Others	Others	494	95		
Share of total (%)			98.18	83.84		
Total			27094	588		

Source: Research data (2019).

Table 6 shows the correlation matrix of explanatory variables (quality attributes). The lowest correlation was 0.388 between Sleep Quality and Location, using Spearman's correlation coefficients and the highest observed correlation was 0.724 between Rooms and Cleanliness, a value obtained using Pearson's correlation coefficient.

Table 6 – Pearson's and Spearman's Correlation Coefficient Matrix

Spearman / Pearson	Value	Location	Sleep Quality	Rooms	Cleanliness	Service
Overall Satisfaction	0.595**	0.435**	0.633**	0.714**	0.674**	0.678**
Value	1	0.389**	0.514**	0.523**	0.528**	0.559**
Location	0.430**	1	0.388**	0.422**	0.407**	0.398**
Sleep Quality	0.583**	0.403**	1	0.662**	0.647**	0.567**
Rooms	0.599**	0.443**	0.709**	1	0.691**	0.584**
Cleanliness	0.590**	0.420**	0.670**	0.724**	1	0.628**
Service	0.623**	0.422**	0.606**	0.620**	0.658**	1

**Correlation is significant at 0.01 level
* Correlation is significant at 0.05 level

Source: Research data (2019).

Although there are some high correlations, the absence of multicollinearity is assumed. Multicollinearity hypothesis was verified using the variance inflation factor (IVF).

4.2 Group comparison by Type of Travel

In order to achieve the second specific objective, ANOVA parametric tool was used. For this purpose, 5 groups (or categories) were created according to the Type of Travel, as presented in Table 4.

Levene's test, based on the means, was performed for each of the variables of overall satisfaction and service quality. Except for Cleanliness, all others violate the hypothesis of homogeneity of variance. Furthermore, the Shapiro-Wilk and Komolgorov-Smirnov tests indicated a violation of the normality hypothesis.

This result (non-normality and heterogeneity of variance), in small samples, led to the application of a non-parametric analysis tool. However, it was considered that the 27,094 observations form a relatively large sample and, therefore, would authorize the use of parametric tools (Field, 2009).

Table 7 shows the results of ANOVA for all variables, which were compared with a single factor (Type of Travel).

Table 7 – Analysis of Variance (ANOVA)

		Sum of Squares	Mean Square	F	Sig.
Overall Satisfaction	Across groups	301.42	75.357	85.01	0.0000
	Within groups	24014.32	0.886		
	Total	24315.75			
Value	Across groups	275.94	68.98	71.62	0.0000
	Within groups	26091.03	0.96		
	Total	26366.97			
Location	Across groups	27.78	6.946	9.96	0.0000
	Within groups	18889.83	0.69		
	Total	18917.61			
Sleep Quality	Across groups	165.61	41.4	45.79	0.0000
	Within groups	24490.83	0.9		
	Total	24656.44			
Rooms	Across groups	157.61	39.4	42.56	0.0000
	Within groups	25075.39	0.92		
	Total	25233			
Cleanliness	Across groups	117.36	29.34	32.89	0.0000
	Within groups	24159.67	0.892		
	Total	24277.04			
Service	Across groups	123.26	30.81	34.12	0.0000
	Within groups	24461.09	0.903		
	Total	24584.36			

Source: Research data (2019).

These results suggest a significant effect of the type of traveler on overall satisfaction and service quality scores. In addition, consistent with the Levene's test – which indicated that the variances are not homogeneous – F-Welch and Brown-Forsythe robust tests of equality of means were run and all variables showed a p-value equal to zero. Thus, in cases where the assumption of homogeneity is not met, the results of the robust test are used as

parameters (Field, 2009). However, the results of ANOVA variables (Table 7) showed that the heterogeneity of variance did not influence the results.

Tukey's Honestly Significant Difference (HSD) test was also performed for comparison of all groups. The results show that the scores given to overall satisfaction, by guests in the Business group, presented significant values compared to the other groups. However, the fact of traveling alone, with family or friends does not influence Overall Satisfaction scores. Regarding the scores of Value, it makes no difference whether the guest is in the group Solo, Friends, or Couple. Regarding Location, being a business or solo traveler does not influence the score given to the item. There is also no significant difference for the solo group regarding all other attributes.

Table 8 shows the results of the influence of service quality on the overall satisfaction of guests, considering five models, according to the type of travel. It can be seen that in all the groups analyzed, the service quality variables influenced the score attributed to Overall Satisfaction, at the level of significance of 1%.

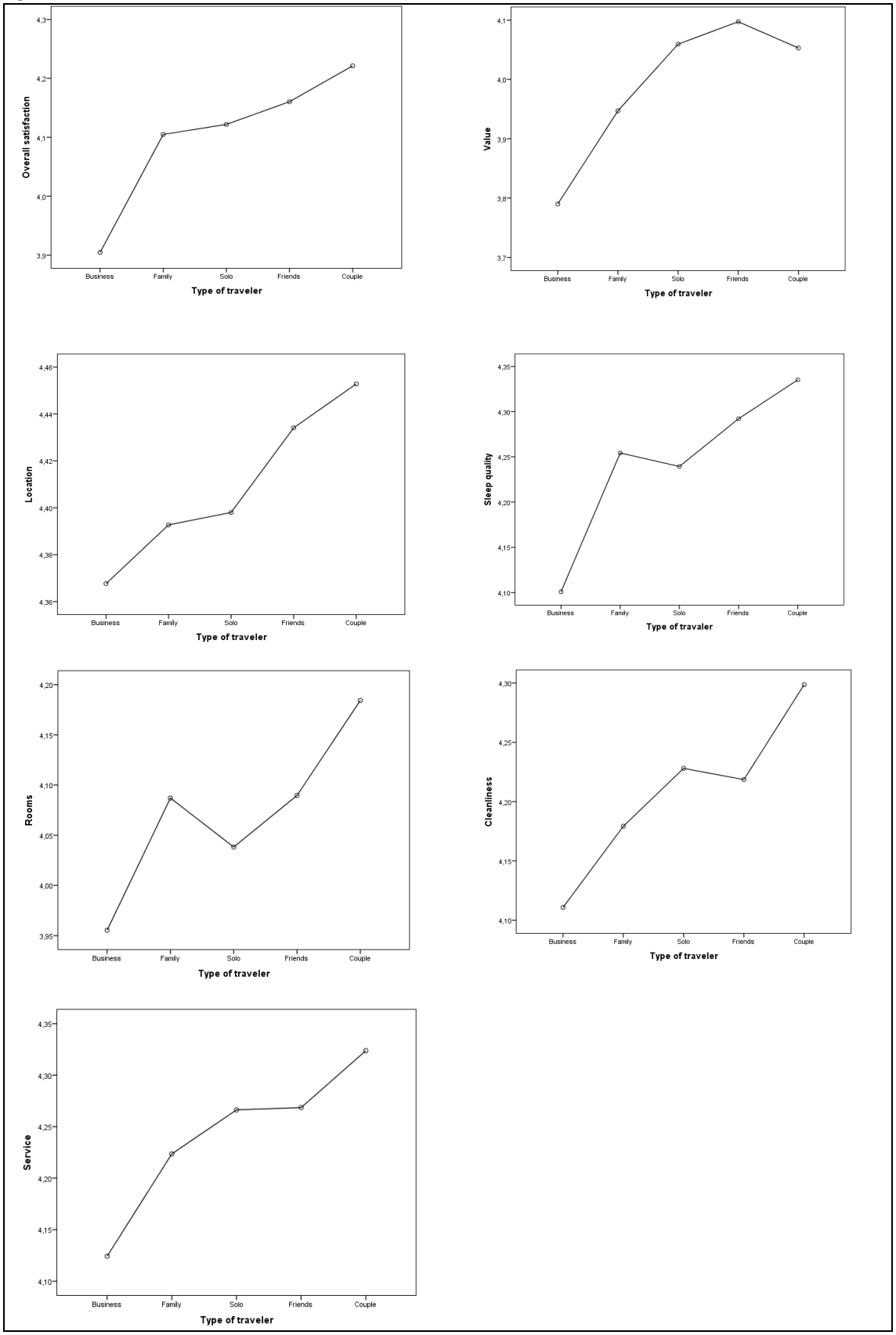
Table 8 – Multiple regression analysis adjusted by trip traveler

Group	Variables	β	Standard Error	Sig.	FIV	F-Prob	R^2
Business	(Constant)	-0.107	0.045	0.016		0.0000	0.7404
	Value	0.171	0.104	0.000***	1.98		
	Sleep Quality	0.150	0.012	0.000***	2.53		
	Rooms	0.322	0.012	0.000***	2.82		
	Location	0.043	0.011	0.000***	1.35		
	Cleanliness	0.136	0.012	0.000***	2.63	DW = 1.895	
	Service	0.333	0.010	0.000***	2.01	White = 0.000	
Family	(Constant)	-0.204	0.029	0.000***		0.0000	0.7512
	Value	0.145	0.007	0.000***	2.06		
	Sleep Quality	0.116	0.008	0.000***	2.45		
	Rooms	0.249	0.008	0.000***	2.75		
	Location	0.071	0.007	0.000***	1.37		
	Cleanliness	0.161	0.008	0.000***	2.64	DW = 1.878	
	Service	0.294	0.008	0.000***	2.31	White = 0.000	
Solo	(Constant)	-0.299	0.079	0.000***		0.0000	0.7520
	Value	0.211	0.018	0.000***	1.89		
	Sleep Quality	0.084	0.021	0.000***	2.36		
	Rooms	0.324	0.022	0.000***	2.68		
	Location	0.066	0.017	0.000***	1.32		
	Cleanliness	0.073	0.023	0.000***	2.68	DW = 1.921	
	Service	0.306	0.019	0.000***	2.05	White = 0.000	
Friends	(Constant)	-0.186	0.050	0.000***		0.0000	0.7403
	Value	0.136	0.012	0.000***	1.96		
	Sleep Quality	0.110	0.013	0.000***	2.36		
	Rooms	0.263	0.014	0.000***	2.83		
	Location	0.079	0.011	0.000***	1.35		
	Cleanliness	0.164	0.014	0.000***	2.82	DW=1.889	
	Service	0.283	0.013	0.000***	2.23	White = 0.000	
Couple	(Constant)	-0.141	0.033	0.000***		0.0000	0.7455
	Value	0.142	0.007	0.000***	1.93		
	Sleep Quality	0.113	0.008	0.000***	2.27		
	Rooms	0.293	0.009	0.000***	2.76		
	Location	0.066	0.007	0.000***	1.32		
	Cleanliness	0.144	0.009	0.000***	2.60	DW = 1.871	
	Service	0.268	0.008	0.000***	2.21	White = 0.000	

Level of significance: 1%(***); 5%(**); 10%(*)
Source: Research data (2019).

To illustrate the trend between the type of travel and the attributes investigated, Figure 1 shows that, in general, the lowest scores are given by Business guests and the highest are from those traveling as a couple. By observing the figures, some trend breaks can be identified: the group Friends tends to assign a higher score to Value than the Couple group; the Family group gives higher scores to Sleep Quality and Rooms than the Solo group, and finally, the Solo group gives higher scores to Cleanliness than the Friends group.

Figure 1 – Satisfaction and service quality attribute by type of traveler



Source: Research data (2019).

In the regression analysis, using ordinary least square (OLS) estimation, the variance inflation factor (VIF) <10 indicates that there is no multicollinearity problem. In addition, there is no sign of autocorrelation as indicated by the Durbin-Watson (DW) statistics within the range between 1.8132 and 2.1869 for 6 variables and observations greater than 200. However, White's test for heteroscedasticity rejected, at 0.01, the null hypothesis of

homoscedastic residuals, a problem that was corrected by the Huber-White method for robust standard errors. The Shapiro-Wilk and Kolmogorov-Smirnov tests showed that the residuals are not normally distributed, but this is not a problem given the sample size (Field, 2009). In addition, outliers were also eliminated in the sampling process. Finally, the R^2 values above 0.7 suggest that the models fit the data well, these values are higher than the 62% obtained by Ye et al. (2014) for explaining service quality.

Unlike previous analyses, regressions seek to establish a relationship between service quality attributes and overall satisfaction, in each Type of Travel group. Thus, it is concluded that the service quality influences guests' overall satisfaction, regardless of the group to which they belong.

4.3 Determinant factors of maximum satisfaction

In the logistic regression model, the scores of Overall Satisfaction were transformed into binaries, where the maximum score is 1 and all the others are 0, bearing in mind that the rating scale is discrete, ranging from 1 to 5. The Type of Travel variable was transformed into dummies (D_n) variables, as described in Table 2. Of the 27,094 reviews, 16,294 (60.14%) had less than the maximum score, while in 10,800 (36.86%) guests awarded the maximum score to the accommodation facilities.

The model was estimated using the Stepwise procedure (Table 9). In this case, the odds ratio for giving a maximum score was also estimated when changing a unit of the model variables, keeping the other constants. In the case of qualitative variables, which entered the model as dummies for each category, the odds ratio compared the chance of obtaining a maximum score in that category with the chance in the reference category or group.

Table 9 – Logit model estimation – Stepwise procedure

Variables	Odds Ratio	Coefficient	Standard error	p-value
Value	1.6005	0.4703	0.0432	0.0000***
Location	1.5231	0.4207	0.0453	0.0000***
Sleep Quality	1.5799	0.4574	0.0535	0.0000***
Rooms	3.5423	1.2648	0.1206	0.0000***
Cleanliness	1.9760	0.6811	0.0709	0.0000***
Service	3.4656	1.2429	0.1242	0.0000***
Year of review	1.0708	0.0684	0.0131	0.0000***
Area km2/1000	0.8486	-0.1642	0.0476	0.0030***
Population/100000	0.9687	-0.0318	0.0017	0.0000***
Region	1.6257	0.4860	0.3353	0.0180**
D_1Family	1.2666	0.2364	0.0729	0.0000***
D_2Solo	1.5219	0.4200	0.1455	0.0000***
D_3Friends	1.3674	0.3129	0.0972	0.0000***
D_4Couple	1.2846	0.2505	0.0777	0.0000***
Constant	0.0000	-20.9729	0.0000	0.0000***
No. of Observations	27.094			
LR Test (p-value)	0.2998			
LR Chi2 (14)	17530.54			
Prob>chi2	0.0000			
Pseudo-R2	0.4811			

Level of significance: (***) 0.01; (**) 0.05; (*) 0.10.
Source: Research data (2019).

The p-value of the chi-square statistics of the likelihood ratio test (LR Test) was greater than 0.05, showing that the exclusion of the variables (GDP per capita, HDI, and Education) did not change the quality of the fit, making the alternative model obtained by the Stepwise procedure preferable to the model with all variables.

From the Odds Ratio column, it is possible to conclude, for example, that a guest who rates Value higher has, on average and keeping the other factors constant, 60.05% more chances of giving the maximum overall satisfaction score to the accommodation facility. Among service quality attributes, Room (3.5423) and Service (3.4646) are the factors that most contribute to maximum scores, more than tripling the chance of guests giving maximum scores. Cleanliness (1.98) comes third, increasing the odds ratio of a maximum score by almost 98%. This result is consistent with the results of the descriptive statistics, where these three attributes presented the lowest mean score, i.e., investments in these items can increase the score of these attributes and, thus, customer overall satisfaction.

In turn, the variables regarding the municipality, Area and Population presented an odds ratio of less than 1. This indicates that the increase of one unit in the values of these variables decreases the chance of occurrence of the studied event (maximum score for overall satisfaction). Thus, it is concluded that accommodation facilities located in large and populous municipalities are, on average, less likely to be given maximum scores for overall satisfaction than less populous and smaller municipalities. This may suggest that guest expectations of accommodations in large cities, which are also generally more populous, lead to lower scores for overall satisfaction and service quality.

In this context, for each additional unit in the variable referring to the area of the municipality, the chances of the accommodation establishment to obtain a maximum score decreases by about 15%. For each additional unit in the variable referring to the population of the municipality, the chances of obtaining a maximum score decreases by approximately 3%. The Region variable points out that the fact that the accommodation is located on the coast increases the chances of getting a maximum score by 62.57%.

Regarding the year of the review, it is noted that the most recent ones tend to be more demanding than those of previous years, with the chance of obtaining a maximum score increasing by 7.08% for each year. This suggests that guests expect being surprised and also expect continuous improvement, so, they tend to be more demanding as time goes by or having high expectations based on scores given by other guests. For example, a guest who had no expectations about an accommodation and is surprised by a good service, is more likely to give a high score to Overall Satisfaction. However, when guests have built expectations based on other guests' ratings, they want it to be at least equal, i.e., they become more demanding of the accommodation facility. In fact, in these situations, guests' growing demand for quality lead them to perceive flaws in the services provided leading to lower Overall Satisfaction.

Regarding the Type of Travel, a guest traveling with family (D1) has, on average, 26.66% more chances of giving a maximum score compared to those traveling on business (base group). It is observed, in line with the analysis of subsection 4.2, that all other comparative groups are more likely to assign maximum scores, compared to the base group: Solo (52.19%), Friends (36.74%), and Couple (28.46%).

4.4 General multiple regression model

Finally, in order to achieve the general objective, the model mentioned in subsection 3.4 was estimated, containing all the variables mentioned in Table 2. It is noted that many results converge to those obtained in subsections 4.2 and 4.3.

Table 10 – Multiple regression model

No. of observations	**27,094**			
F(18, 27,750)	4592.08			
Prob>F	0.0000			
R-square	0.7533			
R-Adjusted	0.7531			
	β	**Standard-error**	**t**	**p-value**
Value	0.15065	0.00412	36.53	0.0000***
Location	0.06628	0.00399	16.61	0.0000***
Sleep Quality	0.11053	0.00465	23.75	0.0000***
Rooms	0.27263	0.00497	54.86	0.0000***
Cleanliness	0.14138	0.00493	28.65	0.0000***
Service	0.28505	0.00447	63.79	0.0000***
Year of review	0.02441	0.00220	11.10	0.0000***
No. of reviews	0.00003	0.00001	5.33	0.0000***
Area	-0.01916	0.00958	-2.00	0.0450**
Population	-0.00552	0.00186	-2.96	0.0030***
Education	-0.57895	0.77835	-0.74	0.4570
HDI	-0.04801	0.40657	-0.12	0.9060
GDP per capita	0.05296	0.11804	0.45	0.6540
Region	0.10109	0.03222	3.14	0.0020***
D_1Family	0.04348	0.00889	4.89	0.0000***
D_2Solo	0.04737	0.01460	3.25	0.0010***
D_3Friends	0.04264	0.01107	3.85	0.0000***
D_4Couple	0.04188	0.00939	4.46	0.0000***
Constant	0.23951	0.71264	0.34	0.7370

Level of significance: (***) 0.01; (**) 0.05; (*) 0.10.
Source: research data (2019).

From Table 10 it is clear that the variables of service quality significantly and positively influence the score of Overall Satisfaction with accommodation facilities, with Rooms, Service, and Cleanliness items contributing the most to the variation in satisfaction.

The variable Year of Review was significant and positive, i.e., the positive sign means the older the reviews, on average, the higher the overall satisfaction score. The size and population of the municipality (Area and Population) were significant and negative. Education, HDI, and GDP per capita did not contribute to explain the variation in the score of Overall Satisfaction.

As the variable Region was organized with number 1 indicating establishments on the coast, the positive result of the parameter indicates that the fact that the accommodation establishment is located on the coast contributes positively to Overall Satisfaction.

Finally, the dummy variables that correspond to the Type of Travel all had positive and significant estimated coefficients. As a result, the overall satisfaction scores for the four categories of type of travel are maintained, with the other variables being kept constant, they are, on average, superior to the base group (Business travel). In these terms, for example, the overall satisfaction score of those who travel with family is, on average, 0.0435 higher than that of business travelers.

The assumptions of the classic model were met to the extent that the IVF pointed to the absence of multicollinearity, White's test despite having rejected the hypothesis of homoscedastic variance, the problem that was corrected by the Huber-White method for robust standard errors and the normality is assumed given the sample size (Field, 2009). Finally, the R^2 above 0.7 suggests good fit of the models.

5 DISCUSSION OF RESULTS

The descriptive analysis of the data suggests that investment in room layout, service, and cleanliness could increase customer satisfaction, considering that these attributes, respectively, are most likely to influence maximum scores awarded to the accommodation facility. Despite the existence of several attributes in the literature, these results are consistent with studies that consider service quality as a factor that affects customer overall satisfaction (Curaković et al., 2013; Marković & Janković, 2013).

Another curious finding is that most of the establishments with the highest scores were located mainly on the coast. In general, coastal lodging have a higher overall perceived satisfaction compared to those located inland. What is not surprising, since they are beaches with consolidated tourist activity, namely, establishments in Jericoacoara and Canoa Quebrada stood out for the high scores.

Breaking down the scores of overall satisfaction and of service quality attributes by type of travel, it was observed that the mean scores are lower for business travelers. The reason for this has not been found in the literature, however, it is assumed that guests traveling for business are more demanding compared to others and/or business travel negatively influences perceived service quality and/or accommodation facilities in Ceará, on average, are not prepared for this market segment, perhaps because they have specialized in leisure travel.

On the other hand, in general, the scores given by guests traveling as a couple or with friends are relatively higher compared to other types of travelers, which may suggest that a romantic or warm atmosphere resulting from travel companions can positively influence perceived service quality. In addition, those who travel with family are 26.66% more likely to give a maximum score for satisfaction than business travelers, these chances increase by 52.19% in the case of solo travelers.

Observing service quality attributes by type of travel, contrary to the studies by Jeong and Jeon (2008) and O'Connor (2010), Location was the best rated aspect. Sleep Quality and Rooms, respectively, scored the lowest, regardless of the type of travel.

Thus, a relationship was established between service quality variables and overall satisfaction through regression analysis, in each Type of Travel group. The results obtained suggest that service quality positively influences customer overall satisfaction, regardless of the type of travel, although the intensity of this relationship differs across the groups. In addition, Rooms, Service, and Cleanliness are the aspects that most contribute to the variation in satisfaction reinforcing the findings of the descriptive analysis.

Adding to the analysis the characteristics of the municipality where the establishment is located, it was observed that accommodation located in very large and populous municipalities are, on average, less likely to be top-rated

on overall satisfaction than those in smaller and less populated municipalities. This may indicate that guest expectations of lodging in large cities, which in general are populous areas, lead to lower scores for overall satisfaction and service quality. More specifically, this result may be associated with the fact that Ceará is a leisure destination, with guests looking for peaceful and quiet environments, which, in general, are found in smaller cities.

The positive and significant result of the variable "Number of reviews", although the coefficient has a value very close to zero, leads to the conclusion that customers, on average, are willing to rate the accommodation facility when overall satisfaction is higher. To a certain extent, this contradicts the findings of Melián-González, Bulchand-Gidumal and González López-Valcárcel (2013) who reported that a higher number of reviews does not mean higher scores.

Regarding the year in which the review was posted, it is noted that the most recent reviews have, on average, lower scores than in previous years. This result may be because guests tend to become more demanding as time goes by or that the lodging facilities are unable to maintain a high standard of service for a long time. Finally, education, HDI and GDP per capita were not significant to explain the overall satisfaction score, although it is expected that these factors could contribute positively to labor training and the infrastructure of places and, consequently, reflected in perceived overall satisfaction and service quality.

6 CONCLUDING REMARKS

The general objective of the study was to investigate the influence of service quality attributes on customer satisfaction, according to the ratings posted on TripAdvisor by hotel guests in Ceará. To this end, accommodation establishments in 32 municipalities in Ceará were characterized, satisfaction, perceived quality, and the relationship between them were compared, according to the type of travel, and the aspects that most affect top scores.

From an academic point of view, this work sought to address gaps in the literature. The empirical-methodological design makes the study innovative, as it uses different statistical and computational approaches to obtain the results. In addition, the combination of satisfaction variables with regional characteristics broadened the horizon of analysis and allow to understand the effect of the environment in which the accommodation facility is located.

The results obtained can provide useful insights to the hotel sector in Ceará. Thus, by identifying weaknesses in hotels, decisions can be made to improve service, cleanliness, and room layout, thus increasing perceived quality. These attributes are even more important because they increase the chances of good scores.

The managers of the studied establishments can also focus their attention on business travelers. In addition, together with municipal and state public authorities, hotel establishments located in large cities should be more focused on the services provided, while the authorities of these cities should intensify actions that promote the well-being of tourists.

In fact, the coast of Ceará is the state's greatest tourist attraction. However, this does not mean that establishments located in the interior do not have tourist potential. But, as the results of this study demonstrate, non-coastal lodging must also improve service quality.

The results show that word-of-mouth communication is very important, particularly because customers are more likely to rate the service when they feel satisfied. Increasing access to and sharing of information has led to intensification of word-of-mouth, thus, accommodation facilities must adapt to this transformation that makes customers more and more demanding. The hotel industry in Ceará must be aware of these changes, so that Ceará remains an attractive Northeastern tourist destination, important for the creation of jobs and local income.

The secondary nature of the data limited the collection of other information such as gender, income, frequency of travel, among other demographic characteristics of the sample that could affect customer needs and, thus, satisfaction. In this study, only the demographic characteristic "Type of travel" was provided by the user in the review.

Also, due to the source of the data, it was not possible to carry out a qualitative analysis of the users' written reviews, which could be useful to identify which factors influence the scores of each of the attributes. On the other hand, the amount of data can capture the assessment of a standard guest, even though guests may have different rating scales, influenced by several individual factors, which would be impossible to fully apprehend.

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