Juan Carlos Martín / Concepción Román

Measuring service quality in the hotel industry: The value of user generated content

Abstract

This paper presents a fuzzy multi-attribute decision making approach for evaluating the service quality of the hotels of an important tourist destination island: Gran Canaria. We first extract the information provided in www.tripadvisor.com which is becoming one of the most popular websites that assists customers in gathering travel information. The information provided for the hotels located on the island of Gran Canaria using the fixed seven attributes is obtained. Service quality is a composite of these seven attributes, evaluated in a 5 point Likert scale, which are intangible and difficult to measure. For this reason, a method based on Fuzzy Logic is proposed using Fuzzy Numbers (FN). Triangular fuzzy numbers and fuzzy set theory is a very powerful tool to overcome some linguistic problems associated with the Likert scales. Based on the concept of the degree of optimality, we also develop through TOPSIS an overall service performance index for each hotel included in the sample. This index could be used by different stakeholders for understanding and analyzing their relative ranking position and the level of quality provided by the hotels in a specific area. Finally, the ranking is analyzed according to the standard star classification system finding that the hotel industry provides more quality than the extra-hotel industry.

Key words: fuzzy numbers; service quality; hotel industry; TOPSIS; user-generated-content; Spain

Introduction

Gran Canaria is an island that belongs to the Canary Islands archipelago where the boom in mass tourism had its origins in the international tender of ideas for the Maspalomas coastline that was launched in the year 1961. Since then, the economic impact of the tourism sector has achieved a high degree of importance in the overall economic activity of the island. It can indeed be said that the island was transformed from the primary to the tertiary sector. As a result, the tourism and the hospitality industry evolved rapidly with a spectacular increase in the number of tourist arrivals, hotels, apartments, and beds.

The hotel and extra-hotel industry in Gran Canaria, as part of a world known mass tourism mature destination, is struggling these days with different turbulent issues. For example, there is a wide debate about the different measures that need to be taken in order to make Gran Canaria a competitive and sustainable tourism destination. This debate is not free from controversy between the different stakeholders as a consensus between the private sector (hotel and extra-hotel associations) and the public sector (destination management organizations- DMOs) does not exist. Some of the most controversial issues are the normative of the classification, quality standards and the functional role of DMOs.

Juan Carlos Martín, Prof., Institute of Tourism and Sustainable Economic Development, University of Las Palmas GC, Las Palmas, Spain; Research in Economic Environs and Society (TREES), North-West University, Potchefstroom, South Africa; E-mail: jcmartin@daea.ulpgc.es

Concepción Román, Prof., Institute of Tourism and Sustainable Economic Development, University of Las Palmas GC, Las Palmas, Spain; Research in Economic Environs and Society (TREES), North-West University, Potchefstroom, South Africa; E-mail: croman@daea.ulpgc.es

Original scientific paper
Juan Carlos Martín / Concepción Román
Vol. 65/ No. 4/ 2017/ 390 - 405
UDC: 338.488.2:640.41(460)

Akehurst (2009) argued that tourism organizations cannot afford to ignore the development of user generated content (UGC), peer-to-peer web applications and virtual communities, as market research has found that consumers trust websites with reviews more so than professional guides and travel agencies, so this topic is far from irrelevant. The Tourism Cluster of the Canary Islands argued about the potential benefits and costs of analysing the voluminous information, usually referred to as Big Data, to get an adequate picture of the current situation of the tourism industry. Most studies used customer reviews from TripAdvisor and other similar websites as their UGC source (King, Funk & Wilkins, 2011; Miguéns, Baggio & Costa, 2008; Verna, 2010).

Until recently, previous research has been done within the destination and lodging industry, with just a few exceptions conducted in the airline, travel agencies, and restaurant industry (Lu & Stepchenkova, 2015). Most of the studies however, are related to service quality (50) and destination image and reputation (26). Service quality englobes different topics like customer satisfaction, complaint behaviour, service failure and recovery. The features of the products that customers value more are crucial for management (Li, Ye & Law, 2013; Magnini, Crotts & Zehrer, 2011; Zhou, Ye, Pearce & Wu, 2014). Service quality is usually seen as an antecedent of customer satisfaction.

Despite the importance of developing an adequate strategy for improving customer experience and satisfaction as a key factor to prevent business failure and poor financial returns in the lodging industry, little effort has been made to investigate how the UGC can be used to analyse and rank the service quality in the lodging industry in a particular area. Thus, the primary goal of this study is to fill this research gap by developing a synthetic service quality index in the island of Gran Canaria, extracting the information provided by TripAdvisor. More specifically, the objectives of this study are: (1) to rank the perceived service quality of an important sample of lodging establishments located in Gran Canaria; and (2) to determine whether this index has a positive relationship with the classification and quality standard programs normative.

This study is unique in that it investigates the role of each of the seven dimensions considered by TripAdvisor in the overall evaluation of the synthetic service quality index. The use of this indicator allows different stakeholders to understand more about tourists in service quality perception and assessment, expanding the horizon of how well this can be represented by the typology and the classification normative. With this understanding, DMOs and hotel managers will be able to design effective policies that enhance Gran Canaria's lodging industry competitiveness. Thus, the results are expected to be useful to the lodging industry.

Research contextualization

Service quality definitions are based on some conceptual model that measures how the service provided matches customers' expectations (Lewis & Booms, 1983; Parasuraman, Zeithaml & Berry, 1985). Rust, Zahorik and Keiningham (1995) indicate that customer satisfaction and service quality have a measurable impact on customer retention, market share and profitability. Over the years numerous papers have analysed the different attributes that conform the overall service quality in the lodging industry that influence the choice of accommodation by guests. Callan (1996) identified 166 hotel attributes under the headings of: (1) Location, (2) Image, (3) Price/value, (4) Competence, (5) Access, (6) Security, (7) Additional services, (8) Tangibles-bedroom, (9) Tangibles-other, (10) Leisure facilities and (11) Service provider. Different instruments were designed to measure this complex phenomenon, for example, SERVQUAL, SERVPERF, LODGQUAL, HOLSERV and HISTOQUAL (Wu & Ko, 2013). However as many authors have highlighted, it is indeed always a challenge to assess service

quality with a completely objective measurement or scale (Albacete-Sáez, Mar Fuentes-Fuentes & Javier Lloréns-Montes, 2007). Karatepe, Yavas and Babakus (2005) contend that service quality could not be objectively measured due to its abstraction and elusiveness. Thus, organizations often rely on their own help-us-to-improve surveys that identify their strengths and weaknesses.

Hotel classification and quality standards have been analysed in the work of O'Connor and Piccoli (2003) and Hewitt and Schlichter (2008), where the authors find that leading online agencies such as Expedia, Travelocity, Orbitz and Priceline have their own star rating systems based on customers' ratings. The ample and not always robust information provided by different internet channels might confuse customers. Su and Sun (2007) analyse the hotel rating systems of the UK, the US, China and Taiwan, and find that the British Tourism Board's hotel rating system classifies facilities and service quality independently. In the US, the hotel rating system is based on the American Automobile Association's (AAA) classification; meanwhile in China and Taiwan, it is controlled by the National Tourism Administration and Tourism Bureau, respectively. Fernandez and Bedia (2004) conclude, after analysing a sample of hotels in Spain, that the higher star rating is not necessarily a good indicator of hotel quality. Similarly, Núñez-Serrano, Turrión and Velázquez (2014) find that the official stars classification and levels of quality of some adjacent categories are overlapped.

Pike and Page (2014) analyse the destination marketing importance based on the involvement of a large number of nations, states and cities to compete and attract new tourists' arrivals. In order to enhance the perceptions of service quality and destination image for the entire destination, DMOs need to take into account how the service quality is perceived in the hotel and extra-hotel industry (Molina-Azorin, Periera-Moliner & Claver-Cortes, 2010). Tourists select destinations by assessing different dimensions that are based on previous experiences for those who repeat visits, marketing campaigns, word of mouth and information compiled in social media Andrades-Caldito, Sánchez-Rivero & Pulido-Fernández, 2013; Baloglu & Brinberg, 1997; Bornhorst, Brent Ritchie & Sheehan, 2010; Chon, 1992). Lemmetynen and Go (2009) argue that destination image is a multidimensional complex construct, which is a key motivation driver to selecting a particular destination. Araña and Moreno (2013) find, analysing the case of Canary Islands, that regarding the functional image tourists have before visiting the destination, the islands are characterized as a destination with pleasant weather and good beaches, easy access and good connections, a lodging industry with good service quality, and friendly residents.

The tourism industry is nowadays benefitting from the revolution in social media that includes digital information that can be traced on Facebook, Google+, and Twitter. The customer reviews on airlines, hotels, restaurants, and attractions have transformed the way in which customers distil positive and negative e-word-of-mouth. For this reason, the impact of UGC is gaining its momentum for research regarding the field of tourism and hospitality. The digital information affects travellers' choices and firms are losing part of their previous market power. The era of social media has evolved from a broadcasting medium based on static information to a more dynamic live participatory platform (Li & Wang, 2011; Thevenot, 2007; Tse & Zhang, 2013).

The lodging industry is very competitive and different products and services appear constantly so for the industry is crucial to understand what are the main product characteristics that customers are ready to pay for. As said above, competition is more challenging than ever as potential market offerings can almost be online assessed as the advances in information technology make customers aware of the different alternatives. For example, hotel customers can easily compare these different alternatives at online reservation channels such as Expedia, Orbitz, Kayak, and Travelocity (Verna, 2010). They can also read comments and recommendations from previous experiences at different channels. Other travellers

also use professional ratings provided by AAA and Forbes Travel Guide (Verma & Smith, 2010). And finally, other more general content social media platforms affect also the travellers' behaviour (Xiang, Wang, O'Leary & Fesenmaier, 2014).

Analysing the supply side, Dellarocas (2003) contends that social media also provides an infinite number of unexplored possibilities regarding consumer behaviour and marketing. Leung, Law, van Hoof and Buhalis (2013) assess the literature on social media not only from the consumers' perspective, including also the topics that affect promotion, product distribution, communication, management, and research. Among other things, they find that distributing hotel room inventory on TripAdvisor is another strategy used by hotel companies to generate revenue through links to booking platforms. Aureli, Medei, Supino and Travaglini (2013) analyse TripAdvisor reviews of 40 (20 four-star and 20 three-star) hotels in the province of Rimini to see whether the positive/negative comments affect the online reservation. The authors conclude that: (1) the traditional core service like room and personal interaction represent the main drivers in determining customer appreciation and criticism; and (2) there exists a linear relationship between operational hotel performance and online reputation.

Online social networking sites have evolved from the second generation of web-based services (Web 2.0), mainly characterized by how consumers do not only generate content, but also share and interact with others on the web. Web 2.0[1] has not remained unnoticed in activities genetically bound to the human nature like travel (Sigala, 2009). The impact of Web 2.0 on tourism has been, is and will be significant. It is beyond the scope of this paper to see how these radical changes have an effect on the way e-services are provided and consumed on the Internet (Erat, Desouza, Schafer-Jugel & Kurzawa, 2006). Travelers are beginning to have an active part in the search of hotel characteristics that better adapt to their likes and preferences. Many hotels should revise their e-business models in order to be prepared for the new information technological era in which the old word-of-mouth has been replaced by the active participation of travellers in social networks. The information generated by travellers provides rich and relevant data for travel planning.

Therefore, online social networking is based on how the travellers search the information via the Internet through the huge information resources that have been collected by travellers themselves and as a natural consequence they are starting to believe in these resources over and above others. In this regard, www.tripadvisor.com is one of the most popular and most important references for tourism information. TripAdvisor is a website where the posted information is autonomously generated by travellers. The travellers post reviews, comments and ratings on a destination, a hotel, an attraction, a restaurant or any other tourism related 'item' or service. Furthermore, it is possible to add multimedia elements such as photos and videos. In May 2013, TripAdvisor showed opinions for 437 establishments located in the island of Gran Canaria. There were 179 reviews for the best hotel, and these reviews started in October 2004.

The dataset

The service attributes to evaluate the quality performance are based on the screens captured in the TripAdvisor website. Unfortunately, the user generated content is fixed and cannot be changed by researchers. Thus, the dimensions analysed in this website contain seven attributes: value; sleep quality; rooms; cleanliness; quality price ratio, service and location.

To stay competitive, the establishments in the island need to regularly scrutinize the results. Some managers also analyse the results of their own satisfaction surveys. These surveys are usually based on

the clients' ratings over a set of different attributes that depends on the complexity of the questionnaire developed in each establishment. The seven attributes employed in TripAdvisor are fairly standard in studies on service quality and are usually included in all the surveys administered at different establishments.

There are two differentiated parts on the screen of the TripAdvisor survey: (1) a first compulsory part; and (2) a second optional part. In the first part, there is an overall rating based on a 5-point Likert scale, a text field for the title of the review and the proper review, which has to contain 200 characters at least in order to be valid; then there is a segmentation for the type of trip: business, couples, family, friends or alone; and, finally, a field that contains information about the date that includes the month of the trip. The second optional part contains information for the seven different attributes mentioned above. Travelers can also leave a tip to help other travellers choose a good room and they also can share photos of the establishment or the area.

Data for all the establishments for the island of Gran Canaria, (total of 457) included in TripAdvisor, were collected according to different stages. Firstly, basic information for each hotel, like the name, area, overall performance and number of opinions, was gathered. Secondly, the individual page for each establishment provides information about the different dimensions or attributes[2]. One of the main strengths of the TripAdvisor community is that many users are true fans and are loyal to this new tool of interactive information. This poses a real challenge and threat to hotel managers, mainly in that the internal service quality surveys used to implement strategies to improve the performance do have an influence on the service provided but less influence on the hotel image projected by these new tools. This can be also extensive to tourist policy makers, as the reviews are not only circumscribed to the hotel industry but on diverse topics such as for example destination attractions and restaurants[3].

Data were gathered during the first week of March 2013. In total, Vivential provided us with information on 11,163 opinions of 367 establishments, but we decided to analyse only 7,850 opinions of 157 hotels as we established a threshold of at least 50 opinions per hotel for including it in the analysis. It is evident that the survey employed by TripAdvisor is usually much simpler than the regular surveys administered in the hotels, where more dimensions allow travellers to mark the different dimensions in a more precise way. In the survey process, one set of 5 radio buttons, requiring just a single response without considering any scale, is used for assessing the quality of each dimension respectively, then each tick is converted to a set of linguistic terms ({terrible, poor, average, very good, excellent}). This process is made internally by TripAdvisor and might be subject to some bias, as it is possible that the linguistic terms contain different degrees of information, for example, one may think of the following semantic scale ({terrible, poor, fair, good, very good}). Another empirical exercise that can also be done is to see whether these scales are robust by adding a set of some graphical expressions of the human face, such as emoticons, that appear in some other questionnaires.

Methodology

This section is based on a well-known methodology that has already been applied to evaluate the service quality in the hotel industry. Therefore, the model, context and notation are mainly based on Benítez, Martin and Roman (2007). Fuzzy set theory has also been applied in different fields of general management science (Hutchinson, 1998; Viswanathan, 1999; Xia, Wang & Gao, 2000) and it is gaining more acceptance and popularity in the analysis of service quality (Tsaur, Chang & Yen, 2002; Yeh & Kuo, 2003; Benítez et al., 2007; Lin, 2010; Kabir & Hasin, 2012; Bai, Dhavale & Sarkis, 2014; Saeida Ardakani, Nejatian, Farhangnejad & Nejati, 2015).

Fuzzy sets constitute a good alternative when researchers deal with subjective and imprecise information generally provided by the social surveys (Herrera & Herrera-Viedma, 2000; Zimmermann, 1996). The Likert semantic scales can be more adequately addressed by the logic of fuzzy sets (Zadeh, 1965, 1975; Mamdani & Assilian, 1975).

A triangular fuzzy number $\tilde{A}$ can be parameterized by a triplet (a_1, a_2, a_3), in which the membership function $\mu_A(x)$ is defined as:

$$\mu_A(x) = \begin{cases} \dfrac{x - a_1}{a_2 - a_1}, & a_1 \le x \le a_2, \\ \dfrac{x - a_3}{a_2 - a_3}, & a_2 \le x \le a_3, \\ 0, & otherwise. \end{cases} \quad (1)$$

Each linguistic term is then represented by a triangular fuzzy number that contains this vague information. Our representation is based on the range 0-100, according to the default values shown in Table 1. It can be seen that in this case, the extreme values are represented by degenerated TFNs whose range is 30, and the intermediate values are symmetric TFNs whose range is only 20. Other type of representations taking into consideration more symmetric TFNs is also possible. For example, Lin (2010) uses also degenerated TFNs in the extremes of the scale but the range for the whole set of the 5-point Likert scale is always 20. In our case, we prefer to assume that the information is more blurred in the overlapping areas of the extreme values.

Table 1
Triangular fuzzy numbers. Default values of linguistic terms

TripAdvisor survey linguistic terms	Terrible (T)	Poor (P)	Average (A)	Very good (VG)	Excellent (E)
Fuzzy number	(0,0,30)	(20,30,40)	(30,50,70)	(60,70,80)	(70,100,100)

For each attribute and hotel, the average of TFNs is calculated as follows:

$$\tilde{A} = (a_1, a_2, a_3) = \left(\frac{1}{n}\right) \bullet \left(\tilde{A}_1 \oplus \tilde{A}_2 \oplus \cdots \tilde{A}_n\right) = \left(\frac{\sum_{i=1}^{n} a_1^{(i)}, \sum_{i=1}^{n} a_2^{(i)}, \sum_{i=1}^{n} a_3^{(i)}}{n} \right) \quad (2)$$

where $\bullet$ is the multiplication of a scalar and a fuzzy number, and $\oplus$ is the add operation of fuzzy numbers, so $\tilde{A}$ is the overall average performance valuation. Buckley (1985) showed that this average is also a TFN.

The hotel ranking will be based on the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). This method needs a crisp information matrix as an input (Hwang & Yoon, 1981), so then it is crucial to use some defuzzification method as a way to locate the Best Nonfuzzy Performance (BNP) value. Many different methods, like the mean-of-maximum, center-of-area, and a-cut methods, have been previously proposed (Zhao & Govind, 1991). Our procedure is based on Chen (1996)[4] because it is simple and synthesizes the ideas proposed by Kaufmann and Gupta (1988).

TOPSIS is characterized by the notion of the best (Zeleny, 1982) through a process of comparison of the observations to the relative closeness to ideal solutions – positive and negative solutions. Ideal solutions are computed based on the following equations:

$$A^{+} = \left\{ \left(\max V_{ij} \,|\, j \in J \right), \left(\min V_{ij} \,|\, j \in J' \right), i = 1, 2, \ldots, m \right\} \tag{3}$$

$$A^{-} = \left\{ \left(\min V_{ij} \,|\, j \in J \right), \left(\max V_{ij} \,|\, j \in J' \right), i = 1, 2, \ldots, m \right\} \tag{4}$$

where J and J' form a partition of the different criteria according to whether they can be considered positive or negative characteristics. Then, the positive and negative closeness is calculated as

$$S_i^{+} = dist(V_i, A^{+}) = \sqrt{\sum_{j=1}^{n} \left(V_{ij} - A_j^{+} \right)^2} \quad i = 1, 2, \ldots, m \tag{5}$$

$$S_i^{-} = dist(V_i, A^{-}) = \sqrt{\sum_{j=1}^{n} \left(V_{ij} - A_j^{-} \right)^2} \quad i = 1, 2, \ldots, m \tag{6}$$

And finally, the relative closeness ratio for each observation is calculated as

$$C = \frac{}{S_i^{+} \quad S_i^{-}} \quad i = 1, 2, \quad , m \tag{7}$$

where $0 \le C_i \le 1$. An observation shows a better performance as *Ci* approaches to 1. A set of alternatives can then be ranked according to the descending order of *Ci.*

Results

Following the method explained in section 4, the average performance is calculated as a triangular fuzzy number for each dimension and all the establishments of Gran Canaria included in the analysis. Tables 2 and 3 show the raw data and the fuzzy performance measure for three different hotels.

Table 2
Service quality opinions. TripAdvisor

Hotel	Dimensions	Opinions				
		E	VG	A	P	T
Sunprime Atlantic View Suites & amp; Spa	Value	21	23	6	0	0
	Sleep quality	19	13	6	2	1
	Rooms	29	14	4	0	0
	Cleanliness	36	11	0	0	0
	Quality price ratio	27	13	7	0	0
	Service	28	13	5	1	0
	Location	14	18	11	4	0
Bungalows Miraflor Park	Value	21	20	6	2	1
	Sleep quality	16	6	1	2	0
	Rooms	30	8	5	0	3
	Cleanliness	28	14	3	2	0
	Quality price ratio	13	11	5	1	1
	Service	27	13	7	0	0
	Location	31	7	4	1	3

Table 2 **Continued**

Hotel	Dimensions	Opinions				
		E	VG	A	P	T
Suite Hotel Jardin Dorado	Value	9	18	17	6	0
	Sleep quality	12	16	12	4	2
	Rooms	15	22	10	3	0
	Cleanliness	19	21	8	1	1
	Quality price ratio	15	15	12	5	3
	Service	7	14	13	10	6
	Location	5	13	19	11	2

Source: Own elaboration.

Table 3
Service quality fuzzy numbers and defuzzification

Hotel	Dimensions	Def.	Fuzzy number
Sunprime Atlantic View Suites & Spa	Value	77.05	(60.60, 80.20, 87.20)
	Sleep quality	74.02	(56.83, 77.32, 84.63)
	Rooms	82.18	(63.62, 86.81, 91.49)
	Cleanliness	87.23	(67.66, 92.98, 95.32)
	Quality price ratio	79.95	(61.28, 84.26, 90.00)
	Service	80.43	(61.91, 84.89, 90.00)
	Location	68.62	(52.55, 70.85, 80.21)
Bungalows Miraflor Park	Value	74.20	(57.80, 77.20, 84.60)
	Sleep quality	80.40	(62.00, 85.20, 89.20)
	Rooms	78.42	(59.35, 82.83, 88.70)
	Cleanliness	80.43	(62.34, 84.89, 89.57)
	Quality price ratio	72.90	(56.13, 75.81, 83.87)
	Service	79.95	(61.28, 84.26, 90.00)
	Location	78.48	(59.35, 83.04, 88.48)
Suite Hotel Jardin Dorado	Value	62.45	(46.80, 63.80, 75.40)
	Sleep quality	64.46	(48.70, 66.09, 76.96)
	Rooms	70.35	(54.60, 72.60, 81.60)
	Cleanliness	73.30	(57.00, 76.00, 84.20)
	Quality price ratio	64.20	(48.20, 66.00, 76.60)
	Service	52.45	(38.40, 52.60, 66.20)
	Location	53.35	(38.40, 53.80, 67.40)

Source: Own elaboration.

After obtaining the performance measure in terms of fuzzy numbers, TOPSIS is applied to the information matrix provided by the crisp numbers obtained by the defuzzification method. Then, the ideal solutions are obtained for each dimension. Table 4 shows the best and worst ideal solutions for each dimension with the respective observation. We will obtain 1 as a TOPSIS value if the ideal solution was observed for the same hotel for each dimension, or we can conceive that the best possible performance in Gran Canaria will be obtained by the mix of the hotels (Seaside Grand Hotel Residencia, Vista Golf, Radisson Blu Resort, Seaside Grand Hotel Residencia, Hotel Terraza Amadores, Seaside Grand Hotel Residencia, Ifa Faro Hotel), bearing in mind that the order of this mixture corresponds to each of the dimensions used in the analysis.

A similar analysis could be done with the ideal negative solution. In this case, the worst hotel will be a mixture of these hotels (Corona Roja - Playa del Inglés, Los Salmones Apartments, Koka Apartments, Bungalows Marbella Golf, Corona Roja - Playa del Inglés, Bungalows Marbella Golf, Vista Dorada

Apartments). The last column shows the increment ratio between the best and worst performance in percentage, and it can be seen that in most of the dimensions the values are higher than 100 per cent. It is remarkable that the dimension that presents the lowest figure is the quality price ratio. In this case, travellers have already internalized part of the observed differences by the price they have paid. A similar result is found by Fasone, Hofer and Scuderi (2016) as the authors observe how price does not necessarily correlate with hotel quality and related business models, so it can be assumed that the value for money might be more homogenous. In contrast, Bertan, Bayram and Benzergil (2015) find that tourists visiting thermal hotels in Turkey evaluate in general the 5 star hotels as those which offer the best value for money and conclude that these hotels meet more adequately guests' expectations than others.

Table 4
Service quality. Ideal positive and negative solutions

Dimension	A^+	Hotel	A^-	Hotel	Inc.%
Value	88.55	Seaside Grand Hotel Residencia	40.50	Corona Roja - Playa del Inglés	118.64%
Sleep quality	92.50	Vista Golf	40.70	Los Salmones Apartments	127.29%
Rooms	88.81	Radisson Blu Resort, Gran Canaria	34.95	Koka Apartments	154.11%
Cleanliness	91.43	Seaside Grand Hotel Residencia	37.44	Bungalows Marbella Golf	144.18%
Quality price ratio	83.19	Hotel Terraza Amadores	44.88	Corona Roja - Playa del Inglés	85.36%
Service	91.43	Seaside Grand Hotel Residencia	38.80	Bungalows Marbella Golf	135.61%
Location	91.03	Ifa Faro Hotel	45.53	Vista Dorada Apartments	99.96%

Source: Own elaboration.

The relative quality performance of each hotel using the TOPSIS method is then presented, comparing the relative closeness to the positive ideal solution in order to rank all the observations according to what we name as the service quality index SQI. The results for the 20 best and 20 worst performers can be seen in Table 5.

Table 5
Final TOPSIS service quality synthetic indicator for the 20 best and worst performers

Hotel	Topsis	Rank	TripAdvisor	Hotel	Topsis	Rank	TripAdvisor
Seaside Grand Hotel Residencia	0.916	1	5 1(69)	Maspalomas Oasis Club	0.369	138	3.5 33(69)
Hotel Parador de Cruz de Tejeda	0.886	2	4.5 1(3)	Green Sea Aparthotel	0.345	139	3 114(135)
Gloria Palace Royal Hotel & Spa	0.877	3	4.5 1(60)	Santa Clara Bungalows	0.345	140	3.5 57(135)
Apartamentos Judoca Colors	0.873	4	4.5 4(135)	Koala Garden Suites	0.330	141	3 38(69)
Hotel Terraza Amadores	0.858	5	4.5 4(60)	Los Salmones Apartments	0.315	142	3 82(135)
Radisson Blu Resort, Gran Canaria	0.858	6	5 1(6)	Monte Feliz	0.290	143	3.5 71(135)
Gloria Palace Amadores Thalasso & Hotel	0.849	7	4.5 2(60)	Tisalaya Park	0.285	144	3 39(69)
Cordial Mogan Playa	0.840	8	4.5 1(4)	Malibu Apartments	0.272	145	3 45(60)
Lopesan Villa Del Conde Resort And Thalasso	0.839	9	4.5 4(69)	Broncemar Apartments	0.264	146	2.5 101(135)

Table 5 **Continued**

Hotel	Topsis	Rank	TripAdvisor	Hotel	Topsis	Rank	TripAdvisor
Seaside Sandy Beach	0.836	10	4.5 3(135)	Bungalows Sonora Golf	0.262	147	2.5 52(69)
Cordial Mogan Valle	0.835	11	4.5 2(4)	Blue Star Apartments	0.241	148	3 29(60)
Riu Palace Maspalomas	0.834	12	4.5 2(135)	Partner Playa del Ingles	0.237	149	2.5 26(37)
Marina Suites	0.833	13	4.5 3(60)	Green Ocean	0.233	150	3 99(135)
Ifa Faro Hotel	0.822	14	4.5 6(69)	Vista Dorada Apartments	0.221	151	3 50(69)
Seaside Palm Beach	0.822	15	4.5 2(69)	Corona Roja - Playa del Inglés	0.218	152	2.5 104(135)
Servatur Aparthotel Terrazamar Sunsuite	0.820	16	4.5 6(60)	Jardin del Atlantico	0.215	153	2.5 102(135)
San Augustin Beach Club	0.815	17	4.5 1(19)	Capri Bungalows	0.209	154	3 45(69)
Club Rio Maspalomas II - Canary Garden Club	0.798	18	4 11(69)	Koka Apartments	0.189	155	2.5 122(135)
Lopesan Baobab Resort	0.796	19	4.5 3(69)	Canaima Apartments	0.188	156	3 43(60)
Seaside Grand Hotel Residencia	0.788	20	5 1(69)	Bungalows Marbella Golf	0.139	157	2.5 108(135)

Source: Own elaboration.

Table 5 can help managers understand the relative strengths and weaknesses of the overall service quality performance. A comparison of the results with other establishments of similar characteristics can determine adequate strategies and policies that enhance the service quality provided, keeping the good work in the strengths and implementing correcting measures in those observed weaknesses. This can also be used as a primary approach to develop a framework for hotel service design. As Kozak and Gürel (2015) claim, hotel service design is a paramount tool for increasing service value in hotels.

We analyse now whether the classification of the tourist establishments has an effect on the service quality experienced by the tourists. In this paper, the normative about the tourist standards of lodging establishments, the decree 142/2010 of the Tourist Department of the Autonomous Region of the Canary Islands will be used. According to this decree, there are mainly two types of tourist lodging establishments: hotels and extra-hotels that broadly describe two different types of activities. The standards for the hotels are categorized according to six different categories: one-five stars and five stars great luxury. The extra-hotel typology for the apartments is categorized according to three different categories: one-three stars. There is only one category for the rest of the establishments included in this typology, mansions or villas, and emblematic and rural houses. Nevertheless, all the establishments had a three-year period to adapt their category to this decree; and in 2013, it was still common to see the category of some apartments in the old denomination, such as apartments with one-three keys. Thus, two different classifications will be taken into account: typology and categorization.

Based on these two different classifications, we attempt to address the following questions:

- Is there any evidence that service quality is affected by the typology of the tourist establishment?
- If so, which type tends to show a better performance regarding the service quality?
- Is this service quality performance affected by the normalization of standards?

Table 6 shows some descriptive statistics such as the number of establishments, the minimum, the maximum, the average, and the standard deviation for each of the classifications under analysis. It is worth remarking that there are some figures and patterns that can be considered absolutely plausible and normal. For example, it can be seen that the establishments showing the lowest and the highest service quality belong to the group of extra-hotels and hotels, respectively. However, it was not expected that the lowest service quality would belong to the group of three-star apartments; meanwhile the highest quality is observed in the group of the hotels with five stars. It can also be seen that the extra-hotel group seems to have lower service quality than the group of the hotels. Focusing on the patterns of performance regarding the service quality by the standardization normative, it can be seen that the minimum values do not follow a monotonic increasing function and on the contrary the pattern is counterintuitive as the best minimum performance is observed in the group of the one-star apartments. Analysing the average values, it can be seen that the group with the lowest service quality performance is that of the two-star apartments. However, this anomaly is not found in the group of the hotels where the pattern according to a monotonic increasing function is observed for the group of three, four and five star hotels. There is only one two-star hotel that shows more service quality than the average hotel in the three-star hotel group.

Table 6
Descriptive statistics of the lodging establishments

Group	#	Min	Max	Avg	SD
Extra-hotel	76	0.1387	0.8731	0.5039	0.1865
Hotel	81	0.2372	0.9159	0.6647	0.1316
A1*	6	0.3303	0.7525	0.5312	0.1490
A2*	25	0.1883	0.8731	0.4275	0.1830
A3*	45	0.1387	0.8351	0.5427	0.1831
H2*	1	0.5944			
H3*	23	0.2372	0.7884	0.5865	0.1385
H4*	47	0.3957	0.8861	0.6854	0.1151
H5*	10	0.5780	0.9159	0.7541	0.1094
Total	157	0.1387	0.9159	0.5868	0.1792

Source: Own elaboration.

To address the three different questions posed, we employ a one-way analysis of variance - Anova. The first question asks if there is any statistical difference between the overall service quality performance of each different typology of establishment, that is, hotel and extra-hotel. Table 7 shows the results from Anova and it can be seen that there is a statistical significant difference across the factor group for each of the factors under analysis (typology and standard classification), and therefore it can be concluded that hotels in Gran Canaria show a better service quality than extra-hotels, as the null hypothesis of equal average service quality performance is rejected. This result confirms that the hypothesis of different service quality performance that was previously mentioned looking at Table 6 does exist.

Table 7
Analysis of variance of service quality performance by typology and standardization

Source	SS	Df	MS	F	Prob>F
Typology	1.01407	1	1.01407	39.37	$3.34\ 10^{-9}$
Error	3.9927	155	0.02576		
Total	5.00677	156			
Standardization	1.47805	6	0.24634	10.47	$1.09\ 10^{-9}$
Error	3.52872	150	0.02352		
Total	5.00677	156			

Source: Own elaboration.

Table 7 also shows that there is a significant statistical difference in the service quality performance according to the standardization. However, independently if we can accept the null or the alternative hypothesis, we would like to obtain more general information about which pairs of means are significantly different, and which are not. For this reason, we have also studied pair wise mean differences to assess in what sense a group can be characterized by its better or lower performance. To do this, we employ the Tukey-Kramer test in order to determine if average service quality performance differences assessed by these factors are statistically different from zero. As we want to compare all the groups to each other, one can form up to 2 and 21 unique pairs of groups to obtain their mean differences, respectively.

We find that the difference between the hotels and the extra-hotels is statistically different from 0, and it can be concluded that the hotels in Gran Canaria consistently exhibit better service quality performance. In a similar way, analysing the standardization factor, we observe that there are only 5 pairs out of the 21 possible ones that exhibit a different service quality performance. For example, it was seen that the three, four or five stars hotels show a better service quality than the two-star apartments; and that the four or five star hotels show more service quality than the apartments with three stars. Paradoxically, the service quality performance of the apartments with one star and the hotels with three stars is not statistically different that the service quality of the hotels with four and five stars. Thus, it can be concluded that the standardization process according to the normative ruled out by the Autonomous Region of the Canary Islands cannot be used in order to infer the service quality of the lodging establishments.

Conclusions

This study sheds some light to the hospitality and tourism marketing literature. We first obtained a ranking of the lodging establishments in Gran Canaria according to the service quality applying a robust tool to the data extracted from a very popular travel website like TripAdvisor. This index was used to analyse whether the service quality is affected by the typology of the tourist establishment among hotels and extra-hotel apartments and by the normalization of standards imposed by the decree 142/2010 of the Tourist Department of the Autonomous Region of the Canary Islands.

UGC has already been researched in tourism and hospitality focusing mainly in various aspects of service quality, destination image and reputation and experiences and behaviour (Lu & Stepchenkova, 2015). These authors claim that the field of tourism and hospitality will benefit from other information science approaches that speed up data collection, handling and analysis. Our case study constitutes an empirical evidence of this assessment, as the dataset and models are based on well-known information system analysis.

The lodging industry is subject to a worldwide fierce competition amplified by the persistence of the current financial crisis, so hotel managers need to make considerable efforts in improving their customers' satisfaction. We have seen how TripAdvisor contains valid information about 157 lodging establishments on the island for seven different dimensions. Through the use of fuzzy numbers, a ranking of the service quality of the hotels of the island has been obtained. We have found important empirical insights that can be used not only by the hotel managers but also by the destination management officers. In particular, it is relevant that our results showed that the lodging classification norm cannot be used to infer the service quality provided by the establishment. For example, it was shown that the hotels in Gran Canaria consistently outperformed the counterpart apartments. Focusing now in the standardization results, it was observed that there were only 5 pairs out of the 21 possible ones that exhibited significant differences on service. For example, it was observed that the three, four or five stars hotels outperformed the two-star apartments; and similarly the four or five star hotels showed more service quality than the apartments with three stars.

The study is not exempt from some limitations. Firstly, the data were obtained from TripAdvisor, so there are important issues regarding the sample representativeness, and the reliability and validity of the considered dimensions that are part of a black box that other future researches should pay attention to. Another important drawback that can also be investigated in the future is whether the semantic scale using different linguistic terms for the classifications or the dimensions requiring just a single response (a radio button) without considering any scale (1-5, or 2-7) has an effect on the responses made by travellers. And finally, regarding the generalizability of the research, it can be said that our results are not generalizable as these are based on a particular case study, the island of Gran Canaria, but our method can be replicated in any other geographical context.

Notes

[1] Some scholars use the term Travel 2.0 when they refer to the tourist version of Web 2.0 as a set of tools in the hands of travellers that can affect the image of the tourist destinations. Nowadays, these decentralized tools based on interactive information exchange between travellers through real conversations can have more impact than expensive marketing campaigns.

[2] We thank Vivential (www.vivential.com) for the collection of the data. Without their help, this paper would have not been possible. We especially want to express our sincerest gratitude to Rafael González, CEO of Vivential, for his help and explanations regarding the data.

[3] O'connor (2010) analyzed the negative reviews in TripAdvisor and found particularly worrying that hoteliers did not spend more time responding to this important issue in the "right to reply" facility that TripAdvisor provides to the hotels. He found that this facility is rarely if ever used.

[4] The deffuzzified value for the TFN (a_1, a_2, a_3) is equal to $v_{\tilde{A}} = (a_1 + 2a_2 + a_3)/4$

Acknowledgments

The authors want to acknowledge support under the program of research and development of the Spanish Ministry of Science and Innovation (Project ECO2011-23852).

References

Akehurst, G. (2009). User generated content: the use of blogs for tourism organisations and tourism consumers. *Service Business*, *3*(1), 51-61.

Albacete-Sáez, C. A., Mar Fuentes-Fuentes, M. & Javier Lloréns-Montes, F. (2007). Service quality measurement in rural accommodation. *Annals of Tourism Research*, *34*(1), 45-65.

Andrades-Caldito, L., Sánchez-Rivero, M. & Pulido-Fernández, J. I. (2013). Differentiating Competitiveness through Tourism Image Assessment. An Application to Andalusia (Spain). *Journal of Travel Research*, *52*(1), 68-81.

Araña, J. & Moreno, S. (2013). *Elaboración de la estrategía de posicionamiento turístico de los diversos productos-destinos*. Viceconsejería de Turismo del Gobierno de Canarias. Las Palmas de Gran Canaria.

Aureli, S., Medei, R., Supino, E. & Travaglini, C. (2013). Online Review Contents and Their Impact on Three and Four-Star Hotel Reservations: Some Evidence in Italy. In Z. Xiang & I. Tussyadiah (Eds), *Information and Communication Technologies in Tourism 2014* (pp. 381-393). New York: Springer International Publishing.

Bai, C., Dhavale, D. & Sarkis, J. (2014). Integrating Fuzzy C-Means and TOPSIS for performance evaluation: An application and comparative analysis. *Expert Systems with Applications*, *41*(9), 4186-4196.

Baloglu, S. & Brinberg, D. (1997). Affective images of tourism destinations. *Journal of Travel Research*, *35*(4), 11-15.

Benitez, J., Martin, J. C. & Roman, C. (2007). Using fuzzy number for measuring quality of service in the hotel industry. *Tourism Management*, *28*(2), 544–555.

Bertan, S., Bayram, M. & Benzergil, N. (2015). The evaluation of thermal hotels' online reviews. *Tourism*, *63*(1), 53-65.

Bornhorst, T., Brent Ritchie, J. R. & Sheehan, L. (2010). Determinants of tourism success for DMOs & destinations: An empirical examination of stakeholders' perspectives. *Tourism Management*, *31*(5), 572-589.

Buckley, J. J. (1985).Ranking alternatives. Using fuzzy numbers. *Fuzzy Sets and Systems*, *15*(1), 21-31.

Callan, R. J. (1996). An appraisement of UK business travelers' perceptions of important hotel attributes. *Hospitality Research Journal*, *19*(4), 113-127.

Chen, S. M. (1996). Evaluating weapon systems using fuzzy arithmetic operations. *Fuzzy Sets and Systems, 77*(3), 265-276

Chon, K. S. (1992). Self-image/destination image congruity. *Annals of Tourism Research*, *19*(2), 360-363.

Dellarocas, C. (2003). The digitization of word of mouth: Promise and challenges of online feedback mechanisms. *Management Science*, *29*(10), 1407–1424.

Ekinci, Y. & Riley M. (1998). A critique of the issues and theoretical assumptions in service quality measurement in the lodging industry: time to mode the goal posts? *International Journal of Hospitality Management*, *17*(4), 349–62.

Erat, P., Desouza, K., Schafer-Jugel, P. & Kurzawa, M. (2006). Business customer communities and knowledge sharing: Studying the critical issues. *European Journal of IS*, *15*(5), 511–524.

European Commission. (2003). *Final report of the expert group on enterprise clusters and networks*. Brussels: Enterprise DG.

Fasone, V., Hofer, S. & Scuderi, R. (2016). Hotels in a customer-centred business model: Empirical findings from Val Gardena. *Tourism, 64*(1), 97-108.

Herrera, F. & Herrera-Viedma, E. (2000). Linguistic decision analysis steps for solving decision problems under linguistic information. *Fuzzy Sets and Systems*, *115*(1), 67-82.

Hutchinson, M. O. (1998).The use of fuzzy logic in business decision-making. *Derivatives Quaterly*, *4*(4), 53-67.

Hwang, C. & Yoon, K. (1981). *Multiple attribute decision making: Methods and application*. New York: Springer.

Kabir, G. & Hasin, A. A. (2012). Comparative analysis of TOPSIS and Fuzzy TOPSIS for the evaluation of travel website service quality. *International Journal for Quality Research*, *6*(3), 169-185.

Karatepe, O., Yavas, U. & Babakus, E. (2005). Measuring service quality of banks: Scale development and validation. *Journal of Retailing and Consumer Services*, *12*(5), 373–383.

Kaufmann, A. & Gupta, M. (1988). *Fuzzy mathematical models in engineering and management science.* New York: Elsevier Science.

King, C., Funk, D. C. & Wilkins, H. (2011). Bridging the gap: An examination of the relative alignment of hospitality research and industry priorities. *International Journal of Hospitality Management*, *30*(1), 157–166.

Kozak, M. A. & Gürel, D. A. (2015). Service design in hotels: A conceptual review. *Tourism*, *63*(2), 225-240.

Kuo, C. M. (2009). The managerial implication of an analysis of tourist profiles and international hotel employee service attitude. *International Journal of Hospitality Management*, *28*, 302–309.

Lemmetyinen, A. & Go, F. M. (2009). The key capabilities required for managing tourism business networks. *Tourism Management*, *30*(1), 31-40.

Leung, D., Law, R., van Hoof, H. & Buhalis, D. (2013). Social Media in Tourism and Hospitality: A Literature Review. *Journal of Travel & Tourism Marketing*, *30*(1-2), 3–22.

Lewis, R. C. & B. H. Booms (1983). The marketing aspects of service quality. In: G. Shostack, L. Berry & G. Upah (Eds). *Emerging Perspectives on Services Marketing*. (pp. 99-107). Chicago: American Marketing.

Li, H., Ye, Q. & Law, R. (2013). Determinants of customer satisfaction in the hotel industry: an application of online review analysis. *Asia Pacific Journal of Tourism Research*, *18*(7), 784-802.

Li, X. & Wang, Y. C. (2011). China in the eyes of western travelers as represented in travel blogs. *Journal of Travel & Tourism Marketing*, *28*(7), 689–719.

Lin, H.-T. (2010). Fuzzy application in service quality analysis: An empirical study. *Expert Systems with Applications*, *37*(1), 517–526.

Lu, W. & Stepchenkova, S. (2015). User-generated content as a research mode in tourism and hospitality applications: Topics, methods, and software. *Journal of Hospitality Marketing & Management*, *24*(2), 119-154.

Magnini, V. P., Crotts, J. C. & Zehrer, A. (2011). Understanding Customer Delight An Application of Travel Blog. *Analysis. Journal of Travel Research*, *50*(5), 535-545.

Mamdani, E. & Assilian, S. (1975). An experiment in linguistic synthesis with a fuzzy logic controller. *International Journal of Man-Machine Studies*, *7*(1), 1-13.

Miguéns, J., Baggio, R. & Costa, C. (2008). Social media and Tourism Destinations : TripAdvisor Case Study. *Advances in Tourism Research Aveiro*, 1–6.

Molina-Azorin, J., Periera-Moliner, J. & Claver-Cortes, E. (2010). The importance of the firm and destination effects to explain firm performance. *Tourism Management*, *31*, 22-28.

Núñez-Serrano, J. A., Turrión, J. & Velázquez, F. J. (2014). Are stars a good indicator of hotel quality? Assymetric information and regulatory heterogeneity in Spain. *Tourism Management*, *42*, 77-87.

O'Connor, P. (2010). Managing a Hotel's Image on TripAdvisor. *Journal of Hospitality Marketing & Management*, *19*(7), 754–772.

O'Connor, P. & Piccoli, G. (2003). Marketing hotels using global distribution systems revisited. *The Cornell Hotel and Restaurant Administration Quarterly*, *44*(5), 105-114.

Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing, 49*(3), 41-50.

Pike, S. & Page, S. J. (2014). Destination Marketing Organizations and destination marketing: A narrative analysis of the literature. *Tourism Management*, *41*, 202-227.

Rust, R. T., Zahorik, A. J. & Keiningham, T. L. (1995). Return on quality (ROQ): Making service quality financially accountable. *Journal of Marketing*, *59*(2), 58–70.

Saeida Ardakani, S., Nejatian, M., Farhangnejad, M. A. & Nejati, M. (2015). A fuzzy approach to service quality diagnosis. *Marketing Intelligence & Planning*, *33*(1), 103-119.

Sigala, M. (2009). E-service quality and web 2.0: Expanding quality models to include customer participation and intercustomer support. *The Service Industries Journal*, *29*(10), 1341-1358.

Thevenot, G. (2007). Blogging as a social media. *Tourism and Hospitality Review*, *7*(3–4), 287–289.

Tsaur, S-H., Chang, T-Y. & Yen, C-H. (2002). The evaluation of airline service quality by fuzzy MCDM. *Tourism Management*, *23*(2), 107-115.

Tse, T. S. & Zhang, E. Y. (2013). Analysis of blogs and microblogs: A case study of Chinese bloggers sharing their Hong Kong travel experiences. *Asia Pacific Journal of Tourism Research*, *18*(4), 314-329.

Verma, R. (2010). Customer Choice Modeling in Hospitality Services: A Review of Past Research and Discussion of Some New Applications. *Cornell Hospitality Quarterly*, *51*(4), 470–478.

Verma, R. & Smith, R. A. (2010). The Quest for Consistent Ratings. *Cornell Hospitality Roundtable Proceedings*, *2*(2), 4-12.

Viswanathan, M. (1999). Understanding how product attributes influence product categorization: development and validation of fuzzy set-based measures of gradedness in product categories. *Journal of Marketing Research*, *36*(1), 75-95.

Wu, H. C. & Ko, Y. J. (2013). Assessment of service quality in the hotel industry. *Journal of Quality Assurance in Hospitality & Tourism*, *14*(3), 218-244.

Xia, X., Wang, Z. & Gao, Y. (2000). Estimation of non-statistical uncertainty using fuzzy-set theory. *Measurement Science and Technology*, *11*(4), 430-435.

Xiang, Z., Wang, D., O'Leary, J. T. & Fesenmaier, D. R. (2015). Adapting to the Internet: Trends in Travelers' Use of the Web for Trip Planning. *Journal of Travel Research*, *54*(4), 511-527.

Yeh, C. H. & Kuo, Y-L. (2003). Evaluating passenger services of Asia-Pacific international airports. *Transportation Research E*, *39*(1), 35-48

Zadeh, L. (1965). Fuzzy Sets. *Information and Control*, *8*(3), 338-353.

Zadeh, L. (1975). The concept of a linguistic variable and its application to approximate reasoning: I. *Information Science*, *8*(3), 199-249.

Zeleny, M. (1982). *Multiple Criteria Decision Making*. New York: McGraw-Hill.

Zhao, R. & Govind, R. (1991). Algebraic characteristics of extended fuzzy number. *Information Science*, *54*(1), 103-130.

Zhou, L., Ye, S., Pearce, P. L. & Wu, M. Y. (2014). Refreshing hotel satisfaction studies by reconfiguring customer review data. *International Journal of Hospitality Management*, *38*, 1-10.

Zimmermann, H. J. (1996). *Fuzzy Set Theory and its Applications*. Boston: Kluwer Academic Publishers.

Submitted: 20/05/2017
Accepted: 20/11/2017