



## Hotel guests' perceptions of environmental friendly practices in social media

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### ABSTRACT

Despite hotels' managers spend substantial time and money on environmental initiatives; they are not sure whether their guests perceive their green efforts appropriately. The purpose of this study is to analyze guests' perceptions of hotels' environmental practices expressed through social media. Main results suggest that even though customers perceive green efforts regarding six items: Energy, Water, Purchasing, Waste, Site and Education & Innovation, they do not discern hotels' level of environmental commitment. Moreover, guests' perceptions of hotel efforts in environmentally friendly practices do not significantly differ by the mode of travel nor by the reviewer's experience in travel platforms. A relevant implication is that the communication about environmentally friendly practices needs to be redesigned and intensified by hotel managers in order to take advantage of these efforts.

### 1. Introduction

The literature suggests that 'being green' has become an effective strategic approach to differentiate and position companies' products and services (Chen and Chang, 2013; Han and Yoon, 2015; Trang et al., 2018). In the hospitality sector, Han et al. (2010) highlighted that managers in green hotels should be cautious with the fact that one environmentally favorable action is not necessarily related to the intention to visit or to make an eco-purchase. Thus, rather than the promotion of environmental friendly practices, it is a successful communication of such actions, what allows the attractions of environmentally committed guests and encourage those pro-environmental actions. In this sense, Web 2.0 and social media technology form a set of communication and organizational tools that are increasingly gaining attention in this framework, due their potential to heighten environmental concern and facilitate sustainable behaviors in the public (Ballew et al., 2015). In fact, online technology complements traditional forms of media consumption and social participation and are increasingly and widely used for green marketing purposes (Chan, 2013). Accordingly, hotels' green environmental strategies should be communicated through social media to enhance their corporate image or standing and to give guests the chance to participate more actively in environmentally friendly actions.

In particular, social media websites provide users with an "online

space" to interact and connect with other people. Thus, customer-generated reviews, one of the major sources of information of electronic word of mouth (e-WOM), are showing a particularly strong impact on how customers reach booking decisions on hospitality products and services (Ballew et al., 2015; Chen and Xie, 2008; Sparks et al., 2016; Wei et al., 2013; Zhao et al., 2015). Mainly, positive e-WOM is a strong marketing tool that influences the purchase decision of potential customers, so hoteliers should pay more attention to guests' reviews (Nusair et al., 2011). Therefore, it is important that hotel managers make an effort to communicate their green practices and properly listen to customers' opinions about these practices; and social media websites can be an effective tool for hotels to communicate their environmentally friendly practices to customers and to motivate them to go green. However, despite its importance, the major part of previous researches have focused their analysis on guests' green behavior in relation to their environmental concerns and attitudes (Chang et al., 2015; Chen and Peng, 2012; Han et al., 2018, 2015, 2011, 2009; Han and Hyun, 2018; Han and Yoon, 2015; Kim and Kim, 2014; Kim and Han, 2010; Trang et al., 2018; Wei et al., 2013). The literature which specifically has used social media websites as source of information, has mainly analyzed perceived trust and communication quality: Phillips et al. (2015); Wei et al. (2013); Xie et al. (2017a, Xie et al., 2017b; Zehrer et al. (2011), with exception of Ballew et al. (2015); Lee et al. (2016); Yi et al. (2018) and Yu et al. (2017), which performed empirical

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studies based on data from social media websites to evaluate how and to what extent guests perceive hotels' environmental efforts.

This paper attempts to contribute to this gap related to hotels' environmental practices and guests' perceptions, and extends previous literature's proposals by considering different levels of environmental commitment and by empirically testing it using, as case study, a geographical area never before analyzed, Canary Islands, where the environmental practices are really important due to its insular condition and the huge amount of international visitors this destination receives. Moreover, this paper analyzes which hotels' green practices are more perceived by guests and whether there are differences in those perceptions depending on the level of environmental commitment of hotels where they are lodged. Additionally, we test whether the type of tourists and their experience as users of online travel platforms have some influence on their perceptions.

To examine guests' perceptions of hotels' green practices expressed through social media, the paper uses content analysis on the reviews that customers made available on TripAdvisor. Content analysis has been widely used to assess customer satisfaction: [Chaves et al. \(2012\)](#); [Fuentes-Medina et al. \(2018\)](#); [Li et al. \(2013\)](#); [Lu and Stepchenkova \(2012\)](#); [Magnini et al. \(2011\)](#) and [Zhou et al. \(2014\)](#); but there are only few studies which analyze specifically the green comments written by reviewers on online review sites for the hospitality sector: [Lee et al. \(2016\)](#); [Yi et al. \(2018\)](#) and [Yu et al. \(2017\)](#).

## 2. Literature review

### 2.1. Environmental communication in hotels

[Chan \(2014\)](#) points out the need for further research on the influence of green marketing in the hotel sector due to the intangibility of the service and the close relationship with the customer. Equally, it is essential to improve the communication of all these environmental protection actions by the hotel to those affected. Particularly, [Trung and Kumar \(2005\)](#) find that staff training and involving guests are powerful tools for improving the efficiency of resource management. In this sense, standards and certifications of the hotel's environmental achievements are very useful marketing items to communicate hotels' efforts in promoting environmentally responsible actions. Environmental management certifications permit to improve hotel's environmentally friendly image ([Yi et al., 2018](#)) (p. 198) and, a "green" image has a positive influence in guests' perceptions ([Lee et al., 2010](#); [Millar and Baloglu, 2011](#)).

Additionally, [Chan \(2014\)](#) (p. 932) finds that a 'green partnership' is the most important factor in a hotel's green marketing strategy, especially as, 'there may be a relationship between the strategies in the green marketing life-cycle and customers' emotional experiences'. Finally, as well as a potential reduction in operating costs, researchers consider that the other main incentives for hotels to become green are promoting their public image and gaining a competitive advantage ([Chen and Peng, 2012](#); [Chen and Tung, 2014](#); [Chou et al., 2012](#)). In this sense, it is very important to go deeper into the determining factors of hotels' customers green choices ([Chang et al., 2015](#)).

Environmentally sensitive tourist choices have gained importance in recent years. More and more eco-conscious customers look for hotels following practices to protect the environment ([Han et al., 2018](#); [Han and Yoon, 2015](#); [Manaktola and Jauhari, 2007](#)). Thus, marketing environmentally-friendly practices can be an effective strategy for a hotel looking to change its position and achieve competitiveness in the lodging industry ([Erdem and Tetik, 2013](#); [Fotiadis et al., 2014](#)). However, research into green marketing is still incipient ([Chan, 2014](#)).

According to the literature, companies with a better ecological reputation can increase the demand from environmentally-sensitive consumers ([Chan, 2013](#); [Pereira-Moliner et al., 2015](#)). Thus, brand managers in the hotel industry can deliver emotional benefits through the brand, at the same time as making sure that target groups perceive

real environmental benefits ([Hu, 2012](#)). As for the tourists who see themselves as knowledgeable about green products, it is important that green hotels demonstrate a sense of belonging by showing concern about the seriousness of ecological degradation, which provides a source of intangible differentiation ([Han et al., 2010](#); [Han and Hyun, 2018](#); [Kim and Han, 2010](#)). For the less knowledgeable customers, hotels can utilize recommendations from environmental activists and celebrities ([Chen and Peng, 2012](#)). In both cases, hotels must underline the benefits to customers of a green purchase, the added experience gained in addition to the core purchasing attributes of quality, convenience and price.

More specifically, [Kang et al. \(2012\)](#) and [Chang et al. \(2015\)](#) (p. 68) review literature concerning factors affecting the behavior of green hotels' customers, particularly in their willingness to pay for such factors. They indicate that, according to [Han et al. \(2010\)](#), one of the constraints that tourists face when choosing green hotels is the lack or difficulty to access information on about it.

Moreover, in their consumer study, [Chen and Chang \(2013\)](#) find that if the information about a company's green behavior is interpreted by the customers as a mere 'greenwash', this negatively affects their 'green trust'. This confirms the need for establishments to pay special attention to their environmental communication and how it is perceived by their guests ([Lee et al., 2016](#); [Yi et al., 2018](#)). In this sense, certifications of environmentally responsible hotel's behavior must be stressed in advertising and communication materials to guests, because those recognized standards help to minimize guests' negative perceptions, appealing to their emotional empathy ([Yi et al., 2018](#)).

### 2.2. Guests' perceptions of green hotel practices and effective hotel communication through social media

[Manganari et al. \(2016\)](#) highlight the prominence acquired by the internet and social networks in the processes of booking and communicating with customers. However, it is worth noting the scarce use that hotels make of these means to communicate their environmentally friendly practices. Some papers have pointed out the importance to evaluate the effectiveness of communicating hotels' green images online, the negative effects of green washing and the need to pay special attention to guests' negative perceptions about the services offered (e.g. dissatisfaction; reactance; resentment; counter arguing) or the image (e.g. manipulative intent) attributed to the hotel's environmental practices ([Chan, 2014](#); [Chen and Chang, 2013](#)).

With regard to the effectiveness of the communication of ecological initiatives by hotels, [Manganari et al. \(2016\)](#) summarize and analyze the main empirical studies. These authors conclude that the main factors to motivate guests to "co-create" green value in collaboration with hotels were the following ones: first, the hedonic motivation, such as personal comfort and enjoyment ([Miao and Wei, 2013](#)); second, specific information on how the hotel company contributes to the protection of the environment ([Hu, 2012](#)) and finally, the credibility of hotel's green efforts ([Chan, 2014, 2013](#); [Kim and Kim, 2014](#)).

Special emphasis should be placed on providing more specific and less confusing information on environmental protection practices developed by hotels through more direct and proactive communication from management to customers, especially in cases where some of these practices may harm the service experience. This information should have an educational and motivating component to try to involve customers in the hotel's environmental commitment and by appealing to normative arguments ([Lee et al., 2016](#); [Lee and Blum, 2015](#)).

For this, in addition to the interaction inside the establishment itself, social media are very useful. In particular, the potential of e-WOM as a marketing tool is reflected in the high impact that other users' comments have on customers' purchasing decisions ([Lee et al., 2016](#); [Lee and Blum, 2015](#)). Thus, for example, ([Lee et al., 2016](#)) (p. 194) note that in the specific case of Trip Advisor 'the GreenLeaders Program has been helping guests to understand the hotels' green practices. Guests

are more quickly informed about green hotel practices when they search for a hotel's information on TripAdvisor. After the implementation of the GreenLeaders Program, more guests began to recognize the hotels' green practices and left more positive comments about the practices'.

Precisely because of the above, it is worth highlighting the low level of managers' responses to comments on environmental issues by their customers on social media (Lee et al., 2016; Lee and Blum, 2015), even when the main reason for a customer's complaints is, precisely, the scarcity of information available on an establishment's environmental commitment. This lack of information on environmental matters is particularly striking, given that these are establishments with a high level of environmental commitment (Lee et al., 2016).

Accordingly, the first hypothesis of this study aims to contrast the effectiveness of social media to communicating hotel's environmental information to their guests:

**H1.** Hotels that use social media to communicate their environmentally friendly practices increase guests' perceptions.

The conclusions drawn so far by previous authors reveal the importance of the way in which customers interpret the environmental information of hotels, strengthening the need to identify which are the most or least effective means and formats of communication are. So, for example, the results of Millar and Baloglu (2011), obtained from a sample of guests lodged in an environmentally-responsible hotel, highlight that the most valued attribute by customers is that the establishment's environmental management system is accredited by a recognized certification or standard. This is followed by attributes such as refillable shampoo dispensers, energy-efficient light bulbs and towel and linen reuse policies. In the same way, Yu et al. (2017) find that advanced green practices, such as certified environmental management systems, have greater impact on guest satisfaction. Moreover, the accreditation of environmental management through internationally recognized certifiable standards favors the credibility of a hotel's green image (Chan, 2014; Yi et al., 2018).

Therefore, it is pertinent to evaluate if a greater environmental commitment of the proactive hotels is rewarded with an adequate perception of the clients for such efforts, as it is proposed in the following hypothesis:

**H2.** A higher level of commitment to environmentally friendly hotel practices is related to a better perception by guests.

On the other hand, the literature indicates that there is a positive relationship between customers' ability to perceive green practices and their own environmental awareness (Han et al., 2015; Lee et al., 2016; Yi et al., 2018). An immense majority of customers perceives positively the environmental protection practices of hotels, and that positive experience favors their own concerns or environmental awareness. In the same sense, many customers who state that they do not perceive the environmental protection practices carried out by hotels also they have a low environmental awareness themselves.

However, previous analysis of customers' comments on TripAdvisor indicates that the customers' level of understanding of the set of environmental protection measures carried out by establishments is, in general, positive but low (Lee et al., 2016; Yi et al., 2018). This perception depends on whether the environmental protection practices have been directly experienced by customers in the services offered (energy and education, mainly), or have been explicitly informed (purchasing and innovation), as in the case of hotels certificates.

Another interesting aspect is that, if these "aware customers" perceive a predominance of environmental protection measures aimed mainly at saving costs (saving water, energy, etc.), their willingness to pay for a green room is reduced (Millar and Baloglu, 2011). By contrast, Manganari et al. (2016) find that when a hotel dedicates savings derived from its environmental protection measures to altruistic purposes, customers show greater willingness to participate.

In accordance with these approaches of the preceding literature, third hypothesis of this study is proposed:

**H3.** Guests' perceptions of efforts in environmentally friendly practices differ according to the components that make up the environmental protection measures i.e., Energy, Water, Purchasing, Waste, Site and Education & Innovation.

Therefore, despite the claims that green marketing should appeal to the needs and desires of environmentally concerned customers (Chan, 2014; Chen and Peng, 2012; Lee et al., 2016; Yu et al., 2017), little empirical evidence exists on how customers perceive the efforts made by hotels on environmental management strategy. Besides, there is still a gap to identify what types of green practices most affect guests' environmental sensitivity. Thus, research hypotheses 1–3 evaluate if distinct levels (effort) of ecological practices have different impacts on customers' perceptions.

In addition, this paper analyzes if the characteristics of the reviewers influence their perceptions about green practices. Previous research (Chan, 2013; Chang et al., 2015; Han et al., 2009; Han and Hyun, 2018) has considered some basic demographic characteristics such as age, gender or nationality, to analyze their influence on the relationships among visitors' motivations and their willingness to stay in green hotels. We extend the current literature by considering two other characteristics based on the type and level of reviewer assigned by TripAdvisor. Type involves the mode of travel (e.g., couple, single, on business, with friends, with family) and a reviewer's level is based on experience of using social media (e.g., level null; level 1; level 2;... level 6). We consider that these factors could impact on guests' hospitality experience. Independently of how environmentally conscious the guests are, the mode of travel and reviewer experience could affect their attitude, receptivity and the way to be in touch with hotel environmental practices (e.g. reuse, recycle, water and energy savings). In accordance, the following two hypotheses are proposed:

**H4.** Guests' perceptions of efforts in environmentally friendly practices differ according to mode of travel.

**H5.** Guests' perceptions of efforts in environmentally friendly practices differ according to reviewer's experience.

Perceptions about green practices, in general, lack a more in-depth analysis. In particular, there is a need to analyze the polarity of perceptions, that is, if perceptions about the green practices are positive, negative or neutral. In this paper, we contribute to literature analyzing this aspect and relating it to the overall rating that the reviewer gives to the hotel. This research proposal intends helping hotel's environmental communications through social media, considering guests' perceptions, so that online technology can be strategically used to foster hotels' pro-environmental actions.

### 3. Data and methodology

In this paper, we analyzed hotel guests' perceptions of green practices by using the reviews published on the TripAdvisor website, which is one of the largest online reviews sites for the hospitality sector, with 535 million reviews and opinions on about 7 million lodgings, restaurants and attractions worldwide. TripAdvisor launched the GreenLeaders Program in Europe in March 2014. In order to apply for this program, hotels must fill in a survey, which set their level of environmental commitment, from highest to lowest, as Platinum, Gold, Silver or Bronze, according to the hotels' efforts in six predefined green items: Energy, Water, Purchasing, Waste, Site, and Education & Innovation. Thus, TripAdvisor's reviewers can write in addition to the general review about the hotel, a comment about the hotel's environmental practices using the so-called GreenTip field, available in the questionnaire. The GreenTip is, as the general comment, a free text field where a reviewer can express whatever he/she wants about the

**Table 1**

Hotels reviews within GreenLeaders Program for 4 and 5-stars hotels in the Canary Islands.

Source: TripAdvisor reviews written in English and retrieved on May 2017.

GreenLeader Level	Hotels 2016	Rooms 2016	Reviews 2016	GreenTips 2016	Reviews 2015	GreenTips 2015	Reviews 2014	GreenTips 2014
Platinum	8	1,895	2,018	291	1,583	244	1,178	38
Gold	14	3,967	5,253	593	4,635	497	3,540	68
Silver	15	4,618	7,996	568	6,327	414	5,458	78
Bronze	11	3,191	4,494	269	2,724	180	2,306	81
<b>Subtotal</b>	<b>48</b>	<b>13,671</b>	<b>19,762</b>	<b>1721</b>	<b>15,269</b>	<b>1335</b>	<b>12,482</b>	<b>265</b>
No GreenL.	354	75,425	68,732	63	–	–	–	–
<b>Total</b>	<b>402</b>	<b>89,096</b>	<b>88,493</b>	<b>1784</b>	–	–	–	–

environmental facts observed in the establishment.

As case of study we have chosen all 4 and 5-stars hotels in the Canary Islands, which is one of the main tourist destinations in Spain with 14.3 million international tourist arrivals in 2017 moreover the hospitality sector represents 34.3% of regional GDP (39.7% of employment) (Impactur, 2017). Besides that, the islands show an important commitment with the environment, counting four National Parks, two of them declared as World Heritage Sites by UNESCO, and the other two declared World Biosphere Reserves.

The data used in this analysis were retrieved on May 2017 and consist of all reviews that have a GreenTip comment (3384), for all the 4 and 5-star hotels in the Canary Islands from 2014 to 2016 written in English. We focus the analysis in 4 and 5-star hotels due previous empirical evidence suggest that customers' concern for the environmental issues and their willingness to pay more for services in green hotels is influenced, between others, by the customers income level.

Of those comments, 1784 were written in 2016, 1335 in 2015 and 265 in 2014 (Table 1). The sample is formed by 402 hotels found on TripAdvisor in 2016 (Table 1), of which 48 were part of the GreenLeaders Program, 8 of them with Platinum level, 14 with Gold level, 15 at Silver and 11 at Bronze level. There were 354 which were not part of the GreenLeaders Program, although they had GreenTip comments. In terms of rooms, the GreenLeaders Program included 13,671 rooms, out of a total of 89,096. As for the reviews, 19,761 were published by the GreenLeaders Program hotels, compared to 88,493 reviews in 2016 for the total. Out of these reviews, a total of 1721 reviews in 2016 contained a GreenTip comment about GreenLeaders hotels, 291 for Platinum hotels, 593 for Gold, 568 for Silver and 269 for Bronze hotels. This means that 9% of GreenLeaders hotel reviews had a GreenTip comments, among which 14% of Platinum Hotels had a GreenTip comment, and 11%, 7% and 6% of Gold, Silver and Bronze levels had one, respectively. In 2016, the data also include 63 reviews of hotels that were not part of the GreenLeaders Program but had a GreenTip comment in their reviews. Interestingly, the average number of reviews per room is higher for hotels in the GreenLeaders Program than hotels not in it, with 1.45 and 0.91, respectively in 2016. However, regarding GreenLeaders level, the highest level was not the one with the highest ratings as expected, with Platinum having 1.06, Gold 1.32, Silver 1.73 and Bronze 1.41 reviews per room. Nevertheless, the number of GreenTip comments per room was higher for the higher levels on the program, with 0.15, 0.15, 0.12 and 0.08 for Platinum, Gold, Silver and Bronze, respectively.

Besides the GreenTip comment, the category of the hotel and its level in the GreenLeaders Program, if any, we have also collected for each reviewer three features. First, their level of contribution; TripAdvisor, according to the number of comments and the helpfulness of the reviews assigns each collaborator a level from 1 (lower) to 6 (higher). Second, the mode of travel: as a couple, solo, on business, with friends, or with family. Third, the overall score for the hotel given by each reviewer.

Content analysis and polarity analysis were carried out to extract information from the GreenTip comments. According to Berelson

(1952) content analysis is a research technique for the objective, systematic and quantitative description of the manifest content of communication. Nowadays, content analysis can be performed automatically by using specific software, which allows, among others functionalities, getting word frequencies in a text. On the other hand, polarity analysis or semantic orientation analysis is a sort of sentiment analysis which attempts to determine whether a text as a whole expresses a positive or negative opinion (Wilson et al., 2009).

To perform the content analysis some previous works have been taken as reference (Wei et al., 2013; Lee et al., 2016; Yu et al., 2017; Xie et al., 2017a, b and Yi et al., 2018). Through content analysis, we extracted information about the content of GreenTip comments. Specifically, we searched for words that could indicate that the reviewer was talking about any of the six green items mentioned previously: Energy, Water, Purchasing, Waste, Site, Education & Innovation. In order to select the searchable words used to identify each item, we use a two-step procedure, first we made a list of words related to each of the items by analyzing the TripAdvisor survey's content of and second, we analyze the own comments by creating a wordcloud in order to identify additional words frequently used in the GreenTip comments'. Once the keywords are identified, we automated the process to classify the GreenTip comments by searching for these listed words. Specifically to identify comments that talk about Energy we searched for the following words: led, fluorescent, lighting, energy, glazing, solar, daylight, light, timer and standby; for the Water item, the keywords were: water, towel, linen, flush and shower. For Purchase the words were: locally, 0 km, ecological, biodegradable and suppliers. For the Waste item, we searched for: bins, paper, waste, glass, plastic, cardboard, recycle. For Site, the keywords were: garden, reuse, design. Lastly, for the item Education & Innovation, the following words were used: info, feedback, survey, label, certificate, staff, behave, guest. Once, all the GreenTip comments are classified according to the items they mentioned, the frequency of mention of the different attributes was calculated and the statistical significance of the results determined through the non-parametric chi-square test for differences in proportions between groups.

The frequency analysis was performed by grouping comments into the different GreenLeader levels: Platinum, Gold, Silver or Bronze, by considering the mode of travel: as a couple, solo, on business, with friends, with family; and a proxy for the reviewer experience in writing reviews, which is measured through the user's contribution level of the reviewer on the TripAdvisor website. For the first grouping, the relative position of each GreenLeader level with respect to the others according to the frequency of mention of the attributes in the comments is performed using correspondence analysis. This is a statistical technique that allows an analysis of contingency tables with numerical frequencies of different categories and provides a graphical representation that allows a quick interpretation and facilitates the understanding of the data (Greenacre, 2008). Finally, the polarity of each GreenTip comment is automatically identified using sentiment package by (Jurka, 2012). All the above analyses were performed using statistical software R.

**Table 2**  
Frequency in % by item, year and GreenLeader level.

	2014				2015				2016				NG
	P	G	S	B	P	G	S	B	P	G	S	B	
Energy	16	7	9	14	18	11	20	17	16	12	16	13	17
Water	37	28	49	48	45	37	48	39	42	34	43	35	32
Purchase		3			1	1	1		2	1	1		
Waste	16	24	19	16	24	32	23	26	21	37	29	46	62
Site	8	3	9	10	3	4	8	7	3	4	8	5	3
Ed. & Innov.	11	10	12	6	9	9	11	8	11	9	9	8	10
Overall	63	54	69	64	74	66	71	71	73	68	73	79	86

Note: P stands for Platinum Level, G stands for Gold Level, S stands for Silver Level, B stands for Bronze Level and NG stands for Not a GreenLeader hotel.

**4. Results**

Using the data and the methodology described above, we have been able to test the five hypotheses proposed in this research and to determine: 1) what items are the most commented on and therefore most noticed by guests, in the whole sample and by each type of hotel, 2) what items are most frequently mentioned with positive/negative polarity; 3) if there are statistically significant differences in the proportion of comments that mention each item according to the hotel type and the characteristics of the reviewer.

Table 2 shows frequencies for each year and hotel level of the items identified, and the overall identification frequency, which is the percentage of GreenTip comments that identified at least one item. In 2014 and 2015, the item Water was the most commented, followed by Waste and Energy. However, in 2016, the items Water and Waste shared first place as the most frequently mentioned depending on the level of the hotel analyzed.

We performed a chi-square test to assess how different these frequencies are; the test shows that there are no statistically significant differences for any item among different pairs of hotels in 2014. However, in 2015 the proportions are significantly different among Silver and Platinum Hotels in Site (p-value: 0.007678), and among Silver and Gold hotels in Energy (p-value: 0.0006931), Water (p-value: 0.0007853) and Waste (p-value: 0.004337). In addition, in 2016 we detect some statistically significant differences in Waste item among the different GreenLeader badges; Platinum vs Gold (p-value: 2.888e-6), Platinum vs Silver (p-value: 0.009987), Platinum vs Bronze (p-value: 2.214e-10), Platinum vs No GreenLeader (p-value: 2.564e-9), Gold vs Silver (p-value: 0.009748), Gold vs Bronze (p-value: 0.007692), Gold vs No GreenLeader (p-value: 0.0007879), Silver vs Bronze (p-value: 1.75e-6), Silver vs. No Greenleader (p-value: 3.479e-6). Also, there are relevant differences among Gold and Platinum and Silver hotels for the Water item (p-values: 0.002111 and 7.86e-5, respectively) and between Gold and Silver for Site item (p-value: 0.0009747).

We also analyze the number of items identified in each comment (Table 3); this is another way to assess the degree of perception by customers. The results show that the majority of the comments talk about one or two items. Moreover, there are no statistically significant differences among the different GreenLeader badge’s hotels, in any of the years analyzed.

**Table 3**  
Frequency in % by number of identified items is mentioned and GreenLeader level.

	2014				2015				2016				NG
	P	G	S	B	P	G	S	B	P	G	S	B	
1 item	71	73	69	62	70	68	59	66	70	63	60	63	61
2 items	25	19	22	31	27	23	29	29	20	26	26	28	33
3 or more	4	8	9	8	4	8	11	5	10	10	13	8	6

The above suggest that hypothesis 1 should be rejected. There is no evidence that customers of hotels in the GreenLeaders Program have a higher perception about the environmental policy of the establishment than customers of hotels which do not follow the GreenLeaders Program; nor taking into account the number of items identified (Table 3) nor considering the items individually, with exception of Waste item, which is higher perceived in the hotels which does not follow the GreenLeaders program. In addition, results also suggest that hypothesis 2 should be rejected. The results seem to indicate that higher GreenLeader levels are not related to higher perceptions of the environmental policy of the establishment by customers, nor in number of items identified, nor for each item individually. However, results suggest that hypothesis 3 should not be rejected: customers perceived some items more than others. Specifically, the items Water, Waste and Energy are easily identified by customers, but items such as Purchase, Site or Education & Innovation are less visible and therefore more complicated to identify.

We also carried out a correspondence analysis to observe similarities and differences between the different GreenLeader levels based on the frequency of comments that mention the different items of environmental policies (Fig. 1) based on the results for the 2016 subsample. The two first dimensions identified by correspondence analysis explain 97.1% of the variance.

Thus, to help us interpret the graph, we point out, for example, that the frequency of Purchase into the different GreenLeader levels is very different from that of the other items, as it is isolated in the graph, meanwhile the items Energy and Education and Innovation are very similar in terms of the distribution of the frequency with which they were mentioned in the different GreenLeader levels and, therefore, they are close to each other in the graph. Regarding the GreenLeader levels, the graph shows that Platinum (P) is clearly isolated on the second orthant, and it means that the attribute “Purchase” is the one that Platinum badge is more different with to the rest of badges; the same applies to “Site” attribute and Silver (S) badge. Thus, the correspondence analysis allows us to set the relative position of items considering their distribution along the different GreenLeader levels and the relative position of GreenLeader levels considering the distribution of the items and shows these relations in a simple visual way.

We extend the analysis by considering hypotheses 4 and 5, that is, the mode of travel (e.g., couple, single, on business, with friends, with family) and the experience of using social media proxied by the reviewer’s level granted by TripAdvisor (e.g., level null; level 1; level 2;... level 6) influence the guests’ perceptions about green practices.

The analysis of frequencies considering the mode of travel (Table 4) and the reviewer’s experience (Table 5) does not support hypothesis 4 nor hypothesis 5, both of them should be rejected, because, the chi-square test did not reveal significant differences among each pair of frequencies shown in both tables. Thus, the environmental perception does not seem to be influenced by the mode of travel nor by the reviewer’s experience. This last result contradicts the obtained in a recent published study in which it was found percentage differences according to the reviewers’ experience (Yi et al., 2018).

Furthermore, in order to add value to the analyses performed, we also used polarity analysis. This is a key issue, which has not been considered by aforementioned previous researches about guests’ perceptions. The analysis of the polarity of the comments allow us to know the way in which the reviewer perceives the environmental policy, that is if the GreenTip comment is expressed in a positive, neutral or negative way. Table 6 shows the percentage of comments, which identifies an item with a particular polarity. Clearly, the perception of all the items is expressed mainly in a positive way, but there are also comments with negative polarity, although it can be observed that, in general, their frequency has been reduced over the years.

Finally, in order to assess how much a positive perception of the environmental policy of a hotel is related to the overall satisfaction of staying in that establishment, Table 7 shows for each year the

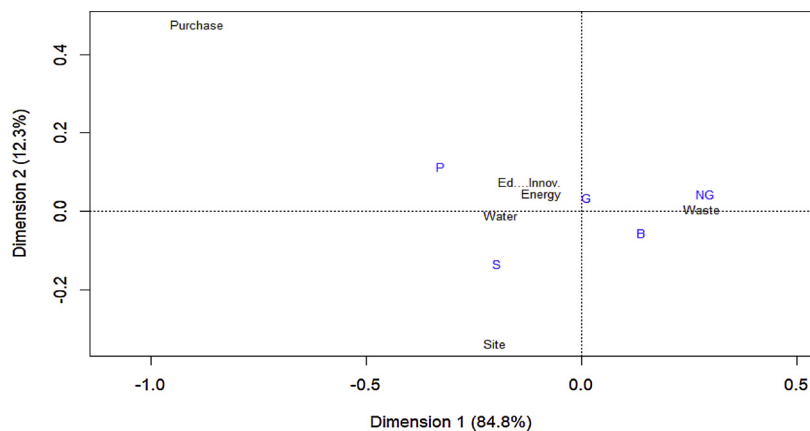


Fig. 1. Relative position of each GreenLeader level according to the frequency of each item in 2016.

**Table 4**  
Frequency in % by mode of travel.

	as a couple	solo	on business	with friends	with family
2014	64	89		50	61
2015	70	62	67	66	71
2016	66	66	50	66	71

**Table 5**  
Frequency in % by reviewer experience.

	No level	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
2014	67	67	55	48	67	47	75
2015	72	62	73	69	59	73	76
2016	65	63	69	68	68	72	65

**Table 6**  
Frequency in % of polarity by item and year.

	2014			2015			2016		
	+	=	-	+	=	-	+	=	-
Energy	69	10	21	67	16	17	70	14	16
Water	65	11	24	69	14	17	73	14	13
Purchase	100			100			75	13	13
Waste	54	30	16	70	13	17	69	13	17
Site	75	5	20	80	9	11	73	15	12
Ed. & Innov.	72	16	12	70	17	14	73	18	9

Note: + stands for positive polarity, = stands for neutral polarity and - stands for negative polarity.

**Table 7**  
Frequency of polarity by score and year.

	2014		2015		2016	
	+	-	+	-	+	-
Favorable	66	19	72	15	73	13
Unfavorable	75	25	57	29	63	19

percentage of GreenTip comments with positive and negative polarity associated with favorable and unfavorable scores of the overall satisfaction with the hotel; understanding as favorable a score of four or five points on a scale from one to five and as unfavorable, a score of one or two points. The results do not seem to indicate that the perceptions about the environmental policy are strongly related to the overall satisfaction, although there is a certain degree of relation in the sense that unfavorable scores show a greater frequency of negative polarity than

favorable scores.

## 5. Discussion and implications

### 5.1. Theoretical implications

This paper contributes to the extant literature related to the hotel guest's perceptions of environmental friendly practices, by filling some gaps highlighted by previous researches: Ballew et al. (2015); Kim et al. (2017); Lee et al. (2016); Yi et al. (2018); Yu et al. (2017). Specifically, we considerate different levels of the environmental commitment of hotels, while previous work just analyze the "top green" hotels (Lee et al., 2016; Yi et al., 2018; Yu et al., 2017), and they recognize that 'a variety of green hotels is necessary to produces more generalizable results' (Yu et al., 2017) (p. 1355). We also add to the literature by including in the analysis the perceivers' features about their experience in writing reviews and their mode of travel. Previous literature has included only some demographic characteristics (age, gender and nationality) (Chan, 2013; Chang et al., 2015; Han et al., 2009; Han and Hyun, 2018).

Another extent of precedent literature is on the context analyzed. According to (Lee et al., 2016) (p.195), destination influences in different perceptions of the environmentally friendly practices. Herein, we analyze tourists' perception of efforts made to adopt environmental practices in a sample of hotels in the Canary Islands, one of the main tourist destinations in Spain. Moreover, Spain is the second largest tourist country in the world (ISTAC, n.d.). The interest in focusing the analysis on this archipelago is justified by its insular regional condition.

Based on the above empirical study, main results are summarized. Firstly, results do not support hypothesis 1, that is, the hotel's communication of their environmentally friendly practices using social media in general does not increase the perception of those practices by their guests, specifically through the GreenLeader Program promoted by TripAdvisor. According to previous scholar results, some reviewers have pointed out that hotels do not inform guests about their green practices (Lee et al., 2016; Yi et al., 2018; Yu et al., 2017). This suggests that guest do not have a deep and realistic view of these environmental issues. Thus, this result might reflect an undervaluation of guests' perceptions on the hotels' green effort and suggest that more efforts need to be made by the hotels to communicate their practices. Additionally, the results in Tables 2 and 3 show little change in guests' perceptions over time, suggesting that during the period of analysis, the hotels studied had not implemented relevant changes regarding environmental practices or that their communication to guests has not been improved.

Secondly, a remarkable aspect of our research is to include all "GreenTip" comment from all 4 and 5-star hotels of the Canary Islands; so, information about all hotels is included regardless of their level of environmental commitment (Platinum, Gold, Silver and Bronze) and

hotels not on the GreenLeader Program. Thus, our work covers some limitations pointed out in a recent publication carried out by Lee et al. (2016); Yu et al. (2017) and Yi et al. (2018) in which authors focus on the most environmentally proactive hotels (Paltinum) in a sample of the top ten USA hotels. According to hypothesis 2, it is supposed that a greater effort leads to a higher perception of the environmentally friendly practices of the hotel. However, results show that a higher GreenLeader level or green effort does not bring benefits to the establishment in terms of greater recognition and perceived image, suggesting the rejection of hypothesis 2. There is no statistical evidence that customers of the hotels with highest GreenLeader level had a greater perception of the environmental policy of the establishment than those who carry out a minor "green" effort. According with Ballew et al. (2015), communication efforts would be particularly effective if such communication built trust and mutual collaboration with their audience. An internationally recognized green certification or eco-label (e.g., the GreenLeaders Program) could be an important strategy to raise the green image of a hotel and improve the confidence of customers in the ecological goods and services offered.

Thirdly, another contribution of this study resides in the comparative analysis of customers' perceptions of the green efforts made by an establishment into different areas (e.g. Energy, Water, Purchasing, Waste, Site, and Education & Innovation). Results summarized in Table 2 suggest that hotel guests discriminate according to the six green requirement practices predefined in TripAdvisor's GreenLeaders Program, thus, hypothesis 3 was confirmed. Water, Waste and Energy are the terms more commented on regardless of whether the hotel has the GreenLeader badge or not. Literature agrees that in the hospitality sector, the most widespread environmental management practices are those of low cost and those that can be carried out during the hotel's normal operating processes (Armas-Cruz, 2011). This finding is consistent with previous studies which have found that the top green comments from guests involved "recycling" and "energy" (Chan, 2014; Lee et al., 2016; Molina-Azorín et al., 2009; Yi et al., 2018; Yu et al., 2017).

Fourthly, the results suggest that guests' perceptions of hotel efforts in environmentally-friendly practices differ according to the mode of travel (Table 4) and, in accordance with a recent study of Yi et al. (2018), the reviewer's experience of travel platforms through web 2.0 (Table 5). However, these differences were not statistically significant in the proportion of comments. Therefore, both hypothesis 4 and hypothesis 5 were rejected.

Fifthly, the polarity analysis carried out suggests that, mostly, perceptions of all items were expressed in a positive way (Lee et al., 2016; Yi et al., 2018; Yu et al., 2017). Studies have found that positively framed green messages (from a credible source) were more influential in promoting environmental protection perceptions among customers than negative environmental messages (Kim and Kim, 2014). In accordance with previous results, the content analysis identified that all six categories received more favorable comments than unfavorable ones during the three years analyzed (Table 6). This is particularly true in the category Purchasing, as it did not receive any negative comments in either 2014 or 2015. It seems that guests appreciate that hotels purchase locally-produced food, organic products, biodegradable products, etc. This finding is consistent with results from other researchers who have also found that Purchasing was the category most frequently mentioned in a positive way (Yi et al., 2018; Yu et al., 2017). On the contrary, Energy and Water are two items of green practices that guests commonly complain about over the period analyzed. In general, negative polarity weights have reduced over the three years. This result supports the idea that messages with a positive framing might influence the confidence of potential customers towards such establishment.

Finally, based on TripAdvisor's scores related to the satisfaction of staying in an establishment, we found that comments analyzed differed in the degree to which guest perceived positively or negatively green practices and their overall hotel satisfaction. That is, messages from

guests who score their experience with higher satisfaction levels (4 or 5), generally have positive polarity. However, against our expectations, messages from less satisfied guests (score with 1 or 2 mark) also have positive polarity in higher percentages than negative ones (Table 7). This contradiction corroborates prior studies which evidenced that the "negativity effect" is more important than other features in predicting consumers' booking intentions (Zhao et al., 2015).

## 5.2. Practical implications

With regard to practical implications of the results provided by this analysis, despite that previous research shows that some customers are willing to pay an extra price to stay in Green Hotels (Chang et al., 2015; Han et al., 2011; Han and Hyun, 2018; Kang et al., 2012; Kim et al., 2017), our research show that hotels' managers' efforts to communicate their environmentally friendly practices using social media are not properly perceived by the guests. Therefore, the communication about these practices needs to be redesigned and intensified by hotel managers in order to take advantage of these.

Previous literature indicates the low frequency of managers' responses to customers' comments on environmental issues and the customer's complaints about the scarcity of information related to eco-friendly practices available on the establishments (Lee et al., 2016; Lee and Blum, 2015). Agreeing with Trang et al. (2018, p. 13), "... hoteliers should establish multiple communication channels for collecting guests' feedback, so that managers can explore how to evaluate the green-hotel attributes' performance for their guests and can learn what guests value during their stay". For example, apart from the public areas of the hotel and on the company website, through social media green hotels' managers can provide information about environmental issues and provide an appropriate response to address green comments. A detailed, timely and quick response from the manager staff could help current and potential guests concerned about environmental issues to become aware about hotels' effort to avoid environmental damage caused by hotels' daily operations (e.g., solid waste generation, water consumption or pollution).

This online response may help to change non-ecological consumption behavior of contributing guests to said damage (e.g. reducing the excessive water or energy consumption of the rooms). Such response is bound to increase guests' eco-friendly perceived value. The feedback through travel platforms is also transcendent in cases of customers who have expressed a negative opinion in order to recover their trust and positive perceptions toward hotels' environmental efforts. Thus, this strategy based in responding "GreenTip" reviews could be integrated as part of a green program.

The results also suggest that it would be advisable for hotels to reinforce communication regarding those areas of environmental protection less known by customers, such as Water, Purchase, Site and Education & Innovation. In the same way, more proactive hotels could increase the visibility of that greater effort through certifiable green standards. Finally, although the differences of guests' perceptions by their mode of travel and their experience as a reviewer are not statistically significant, it is positive for hotels management to move towards the design of environmental communication that take into account specific characteristics of the customers receiving this information, trying to adapt it to the interest that these customers demonstrate for hotel's green practices, as well as their own level of environmental involvement. This is particularly important for hotels with a higher level of commitment and investment in environmental matters.

## 5.3. Limitations and suggestions for future research

From a theoretical point of view, this exploratory study extends previous proposals (Lee et al., 2016; Yi et al., 2018; Yu et al., 2017) providing a roadmap for future research. Specifically, from the result obtained testing hypothesis 1, we propose deepen the analysis of the

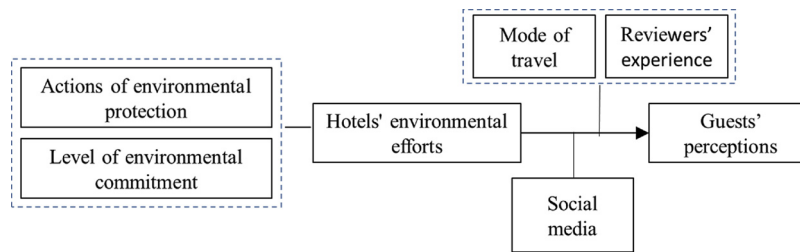


Fig. 2. Theoretical bases for the development of a conceptual model of guests' perceptions of hotels' environmental efforts.

influence of hotels' environmental efforts on guests' perceptions. To this end it is suggested to be explored structural equations methodology as used in recent studies in hospitality and tourism (Han et al., 2018, 2015; Han and Hyun, 2018; Han and Yoon, 2015; Trang et al., 2018). In Fig. 2 we draw a conceptual model which represents a proposal to explore the intensity and sign (positive or negative) of the relationship between guests' perceptions and hotels' environmental efforts. Following the results obtained from hypothesis 2 to 5, we add in this model the moderator effect of "level" and "actions" of environmental protection, as well as "mode of travel" and "reviewers' experience".

Additionally, it is worth remembering that in this study the analyzed sample represents guests' reviews that have a GreenTip comment when writing a TripAdvisor's review. Our results show that 12% of 4 and 5-star hotels in the Canary Islands were members of TripAdvisor's GreenLeaders Program at one of the four levels defined by TripAdvisor (Platinum, Gold, Silver and Bronze); only 2% of the reviews written in English for those 48 hotels had a GreenTip comment. Further research should explore the relatively low interest in green issues by guests' reviews and the relationship between regions and city types.

Before concluding, it is also important to underline some limitations of this study to provide direction for future research. Firstly, only one travel platform (TripAdvisor) was used to gather data. Capturing data from other social media platforms would be a more comprehensive way to study guests' perceptions. Additionally, analysis of results and interpretation of data allow us to deduce an increasing evolution of commentaries made by TripAdvisor users over time. Accordingly, further studies might compare to what extent, hotel guests' perceptions of environmental practices change and whether a positive correlation exists between such perceptions and hotels' green efforts. A second limitation is that the study exclusively analyzes hotels located in the Canary Island archipelago, so future research might be extended on guests' perceptions analysis of environmental practices in other insular regions or similar tourism destinations.

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