Article

The Maintenance of Monuments as the Main Trigger to Negative Feelings in Tourists

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Abstract: Tourists' perceptions of monuments influence their feelings about the country and the possibility of returning or recommending their visit to other tourists. TripAdvisor is one of the most popular websites for sharing travelling experiences and plays an important role when choosing a travel destination. But what are the factors that can provoke negative feelings in tourists? The maintenance of monuments is essential for their conservation; however, active maintenance can trigger negative feelings in tourists, compromising their connection with the cultural heritage of the country. This study reveals how some maintenance actions can influence tourists' expectations regarding two relevant architectural monuments in the Iberian Peninsula by applying VADER (Valence Aware Dictionary for sEntiment Reasoning) to 13,000 TripAdvisor reviews written in the last decade and in three languages. Other variables, such as weather conditions and changes in climate, tourists' country of origin and their style of travel, are evaluated to eliminate the possible mediating effects of these variables. This study reveals that the maintenance status of monuments seems to be the variable with the greatest impact on tourists' perceptions and on their evaluations on TripAdvisor, propagating negative feelings towards the monument, from which it takes some time to recover.

Keywords: maintenance; architectural heritage; sentiment analysis; TripAdvisor; social media; climate data; travel style; Lisbon; Seville; tourism management

1. Introduction

The image of a country as a tourist destination is defined through a cognitive and sentimental evaluation by tourists. Currently, competition is fierce regarding tourist destinations, with this sector having a strategic weight for the economy of many countries. The tourism industry is a major sector and a key pillar of economic development for the Spanish and Portuguese economies. In 2019, Spain was the second most popular tourist destination in the world, while Portugal held 17th place [1]. According to recent reports, 13.4% of tourists that visit Lisbon choose the destination due to the influence of social networks and 18.4% due to travel-related websites [2]; therefore, these media play an important role in each country's economy.

A positive image on social media and on the main means of publicizing travel experiences, such as TripAdvisor, influences travel choice decisions [3]. To create a competitive position amongst tourist destinations, a favourable image should be conveyed to potential tourists in target markets [4].

The analysis of tourists' reviews on social media is very useful and offers opportunities for Destination Management Organizations (DMO) to obtain relevant information about tourists, their behaviour, and their experiences. Consumer-generated content (CGC) is playing an increasingly important role as an information source for tourists [5], who are usually influenced by social media opinions or feedback written on different websites or platforms, such as TripAdvisor. These platforms can improve and expedite tourists' capacity and efficiency to access, elaborate, distribute, and share information, which is constantly

updated [6,7]. Usually, consumers adopt these platforms due to the lack of time and background necessary to understand social and cultural issues. Free, instantaneous feedback that is accessible and rated by other tourists reinforces the idea that users, by following these suggestions, can also enjoy a cultural experience that fulfils all their expectations.

There are several factors which explain why consumers might fail to discriminate quality regarding destinations: (i) the kind of people, their motivations, cultural and social background, and their level of demand and expectations, (ii) credibility perception of tips and advice on social media by users, and (iii) the crowd's efficiency as a whole in discriminating quality, which implies establishing your choice based on what the majority have valued positively, which means a guaranteed success in their choice without the implication of any risk instead of trying to investigate on their own or plan an adventure trip [7]. There are wide ranges of false reviews from users who intend to improve their position on the web platform or to simply reduce the prestige of their competitors' businesses. To avoid providing biased reviews, various techniques for detecting fake reviews have been implemented [8–13], and many of the reviews posted are rejected daily, or removed between pre-posting and after-posting moderation [14].

Social media is changing the way people perceive countries, cities, places, locals, and even architectural heritage, with significant implications for the organization of the spatial flow of tourists between and within destinations [15]. TripAdvisor is one of the most important travel destination and accommodation websites, and it is a well-researched site for tourism-related issues [7]. From 2014 to 2020, the total number of reviews and opinions written on TripAdvisor has gradually increased worldwide, reaching approximately 884 million reviews in 2020 [16]. This specific social media platform allows tourists to share their experiences and provide their peers directly with information without any interference from DMOs.

Previous studies examined the effects of social media on the development of products and services [7,17] using many analytical techniques, including content analysis [18,19], machine learning methods [17], and Convolutional Neural Networks (CNN) [20]; identifying the critical factors to which future visitors pay attention [18], or try to assess the effect of the platform TripAdvisor on decision making regarding accommodations [21–24], world natural heritage [25], and gastronomies [6,26]. Other works also analysed the over-touristic heritage cities [27], the link between social media platforms such as Facebook or Twitter and tourism [19,28], or even the impact of COVID-19 on tourism throughout social networks [29,30]; but it is not common to approach the study of architectural heritage based on what is reflected in social networks [31].

There are a large number of works exploring the sentiments of tourists [32–39] that analysed the expectations and motivations of tourists who use social media [40,41], but almost none performed a Sentiment Analysis of different languages to assess the factors that can influence tourists' appreciation of architectural heritage, and none included the statistical analysis required to evaluate the results.

Most studies applied the Sentiment Analysis tool to analyse reviews written mainly in English, which may be biased, since other languages may also be relevant, especially for heritage sites located in non-English speaking countries. This last aspect is important, as DMOs often expend a lot of effort, funds, and resources in an attempt to better rank their destination through differentiation and highlighting its uniqueness [15].

This study intends to understand how maintenance actions affect the satisfaction of tourists' expectations and can influence both the polarity (positive/negative) and intensity (strength) of tourists' feelings. The perception and feelings of tourists expressed on social networks have a multidimensional nature. Therefore, other factors, such as the weather conditions, the tourists' country of origin, and the style of travel, are also analysed to identify some potential mediating effects. In this sense, VADER (Valence Aware Dictionary for sEntiment Reasoning) was applied to TripAdvisor reviews of two monuments clearly marked by the design of their facades, Padrão Dos Descobrimentos in Lisbon, Portugal, and Torre Del Oro in Seville, Spain, and taking into account three languages; Portuguese,

Spanish, and English. The study also validates the VADER by ratings indicated by TripAdvisor users, assessing the rebound period after monthly mean negative emotion and evaluating the correlation with the sentiment analysis of the reviews.

The methodology applied considers the following main hypotheses:

Hypothesis 1: *Maintenance works carried out in the monuments or in the surroundings, linked to a difficult access to the monument or the impossibility of taking a good photo, as the façade can be covered by scaffolding or big screen, compromise the visitors' perceptions and the way they evaluate and remember the monument;*

Hypothesis 2: *The weather conditions within the framework of changes to the climate (e.g., unexpected extreme weather conditions, such as very hot temperatures or heavy rain) affect the visitors' perceptions and sentiments about the monuments, i.e., are people constrained by meteorological conditions when visiting the surroundings of architectural monuments?*

Hypothesis 3: *The tourists' country of origin and their cultural background may lead to differences in the monuments' rating, i.e., since these two monuments are related to Spain and Portugal Age of Discovery, they can be related to colonialism, which could trigger negative feelings;*

Hypothesis 4: *The style of travel, Business, Couples, Family, Friends, and Solo, can have an impact on the state of mind with in the monument is visited and, on the assessment made of it;*

2. Materials and Methods

2.1. Monuments Analysed

In the last decade, Portugal and Spain have been working together in the Tourism sector, taking several actions meant to enhance the visibility of the Iberian Peninsula as a tourist destination. Reviews offered by tourists on social media and international trip websites, such as TripAdvisor, could mirror a general overview of the appreciation, which enables more tailored promotional measures for these two destinations. The Padrão dos Descobrimentos in Lisbon (Portugal), and the Torre del Oro in Seville (Spain) (Figure 1), are two well-known monuments selected to apply and validate the methodology proposed. These monuments have similar geographical locations, as both are on the river banks of the Tagus River and the Guadalquivir River, respectively, and similar historical backgrounds, which are linked to navigation and maritime trade with Africa and South America (i.e., Age of Discovery)—the basis for the working hypothesis #3.

Figure 1. Geographical location of Padrão dos Descobrimentos in Lisbon (Portugal), and the Torre del Oro in Seville (Spain).

The Padrão dos Descobrimentos (Figure 2A) was built in 1940 as part of the Portuguese World Exhibition during the dictatorship (later called Estado Novo—New State), being a tribute to Infante D. Henrique, and an homage to the Portuguese overseas epic. The monument was designed by the architect Cottinelli Telmo and by the sculptor Leopoldo de Almeida. Initially, it was built with perishable materials, but in 1958, it was dismantled and totally rebuilt with a reinforced concrete structure and cladded by limestone plates. The interior of the building was remodelled in 1985 and was then inaugurated as a Cultural Centre of Portuguese Discoveries, being managed by the Lisbon Municipality. Two relevant events took place in the last decade: in 2016 (from June to November), an intervention was performed, which focused on stone conservation and restoration of the exterior cladding (Figure 2B), and later, in August 2021, one of the sides of the monument was vandalized with graffiti, in an extension of around 20 m, with the sentence 'Blindly sailing for money, humanity is drowning in a scarlet sea', maybe related to the historical past and symbolism of the monument.
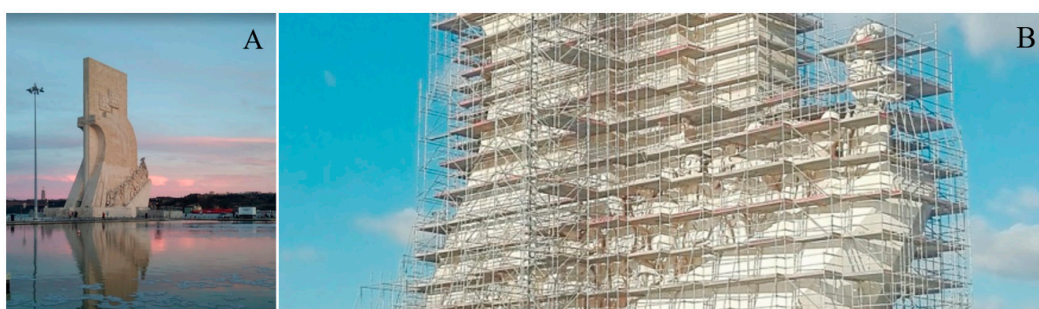
Figure 2. Photographs of the case of study: (**A**) Padrão dos Descobrimentos in 2021 and (**B**) Padrão dos Descobrimentos in 2016 (retrofitting). Sources: Images by authors and STAP.

Torre del Oro (Figure 3A), which is property of the Ministry of Defense of Spain, is the most representative monument of the city, together with the Giralda, and the only documented building from the first half of the 13th century. Originally, the Torre del Oro was used as a defensive tower and was the main maritime entrance to the city during the Discovery of America, providing to the city precious goods brought from the area commonly known as the 'New World'. Years later, Torre del Oro was used as a chapel, prison for nobles, gunpowder warehouse, offices of the Harbour Master and Naval Command, and since 1944, as a maritime museum.

The monument, which was built with rammed earth and masonry, has been retrofitted in different periods (e.g., in 1760, in 1900 [42], and in 2005). Additionally, from March 2015 to April 2017, the promenade located around the Torre del Oro was restored, which was not very well received by citizens and tourists due to the negative impact of the modern constructions and the removal of existing vegetation that was seen as a natural patina (Figure 3B–D).

In addition to this background information about the history, use, and meaning of both monuments, prior data that contextualizes the number of visitors and the weather conditions from 1970 to 2020 is required, as described in the next sections.

2.2. Methodology

In this section, the main steps of the methodology applied and the data used are described, as well as the specific details related to each of the case studies.

Figure 3. Photographs of the case of study: (**A**) Torre del Oro in 2014, (**B**) Torre del Oro in 2020, and (**C**) Torre del Oro during works in-site in August 2015 and (**D**) February 2016. Sources: Images by authors.

2.2.1. Number of Visitors

The temporal evolutions of the visits received, between 2010 and 2020, by the Portuguese and the Spanish monuments will be analysed based on a monthly sold tickets database, retrieved from their management departments (Lisbon municipality and the Ministry of Defense of Spain).

The mean monthly number of tickets sold of the two monuments, together with the maximum and the minimum number tickets sold will be calculated. For a better comparison of trend patterns of monthly tickets sold for the two monuments, a z-score normalization is going to be applied, allowing the measurement of the number of standard deviations of the monthly data from the mean. Additionally, the correlation between the number of reviews and the number of tourist incomes per month, as well as the implication of these data in relation with the climate conditions will be analysed.

2.2.2. Climate Data

The effect of changes to the climate in the weather conditions is a relevant topic to consider due to its repercussion on tourist destination choices. Governments and institutions have been working on adaptation strategies according to the impact of climatic changes [43–45], since tourists tend to avoid travelling during wet or warmer seasons. The attractiveness of a monument or site can be influenced by weather conditions, as they can affect in situ conditions. For the assessment of normal weather conditions, historical records from 1970 to 2020 will be used to estimate the monthly precipitation mean and monthly maximum and minimum mean temperatures, and to calculate the anomalies of the last 10 years [46]. Data were retrieved from National Weather Organization from Portugal, Instituto Português do Mar e a Atmosfera (IPMA)—meteorological station (38°46′ N; 09°08′ W; 104 m.a.s.l.) and from the Agencia Estatal de Meteorología from Spain (AEMET)—meteorological station (37°25′0″ N; 5°52′45″ W; 34 m.a.s.l.).

2.2.3. Scrape from TripAdvisor Platform

A Python web scraping technique was used to automatically extract data from TripAdvisor reviews of the Padrão dos Descobrimentos and the Torre del Oro since 2010 to

2020. The reviews were collected in three languages, Portuguese, Spanish, and English, from different links available according to the TripAdvisor domain, and considering the variables/filters mentioned (Table 1).

Table 1. Extracted fields from TripAdvisor's reviews.

DESIGNATION	FIELDS	DESCRIPTION
V1	Username	Name of the user registered on TripAdvisor website
V2	Review	Personal opinion of the user about the monument
V3	Title *	Title that the user indicates for its review
V4	Date *	Date on which the contribution was made
V5	Location *	Country where the user comes from
V6	N° Contributions	Number of times the user has made a contribution
V7	Likes	Number of likes the contribution receives
V8	Observations	Indicates if the user was in a couple, with friends or with family
V9	Rate	Rating (10-20-30-40-50/50)

* Sometimes customers do not indicate this field.

These data allowed us to analyse the tourists' sentiments regarding the monuments studied, considering their origins, the date of the visit, the rating registered, and the method of travel. To work with a significant/representative number of reviews, scraped comments in English—(ENG) (the language preferred by TripAdvisor's customers), Spanish—(SP) and Portuguese—(PT) (native languages of the countries where the cases of studied are located) were considered, since these reviews represent more than the 80% of the total reviews in both case studies: 8930 of 11,149 total reviews in the case of Padrão dos Descobrimentos and 1892 of 2272 reviews in the case of Torre del Oro. The number of reviews written in Portuguese in the case of Padrão dos Descobrimentos is slightly higher than the reviews written in Spanish or English. The number of Spanish reviews written in the case of Torre del Oro represent more than half of the total comments collected.

2.2.4. Sentiment Analysis

The extraction of sentiment from a text is often called Sentiment Analysis or opinion mining [47]. Rule-based and machine learning based broad approaches can be used for calculating the sentiment of a text [48]. Recent studies usually employ algorithms from Python like TextBlob (Simplified Text Processing), NLP (Natural Language Processing), BERT (Bidirectional Encoder Representations from Transformers), Flair or VADER to analyse sentiments and feelings expressed by users. In terms of accuracy, VADER is considered the best option when analysing reviews from social media [49–51] mainly because: (i) does not require any training data; (ii) supports emojis for sentiment classification; (iii) does not severely suffer from a speed-performance trade-off; and (iv) can be used online [49].

The VADER sentiment lexicon is sensitive to both the polarity and intensity of sentiments expressed in social media contexts. However, the accuracy of the analysis depends on the language used by the customer: misspellings and grammatical mistakes can cause the analysis to overlook important words; sarcasm and irony may be misinterpreted; and discriminating jargon, nomenclature, and memes may not be recognized; non-significant stopwords that disfigure the word frequency analysis; and punctuation marks may modify the polarity [52]. Additionally, VADER has been offering accurate results when texts are written in English [53,54]. All these aspects are considered by other works that modify codes to improve the results obtained [55,56]. The TripAdvisor reviews obtained for each monument in the previous step will be analysed using a Python code that implements the VADER method in the case of English reviews [49]. The standard VADER code was modified and adapted to analyse Portuguese [57] and Spanish lexicons [58] to obtain accurate results.

VADER collects the sentiment scores associated with the words from a lexicon and adds them up to find the score for the sentences [48,49]. The compound score is computed

by summing the valence scores of each word in the lexicon, adjusted according to the rules, and then normalized to be between −1 (most extreme negative) and +1 (most extreme positive). This is the most useful metric when a single unidimensional measure of sentiment is needed for a given sentence. Thus, a standardized threshold for classifying sentences as either positive, neutral, or negative is obtained [49,59]:

- Positive sentiment: compound score ≥ 0.05;
- Neutral sentiment: compound score > 0.05 and compound score < 0.05;
- Negative sentiment: compound score ≤ −0.05.

The number of reviews analysed will vary depending on the parameter analysed (Table 1) since users sometimes do not fill some fields.

2.2.5. Validation of VADER Analysis Applied to TripAdvisor Reviews

To verify and validate the results obtained from VADER analysis, a 3 × 3 confusion matrix will be calculated (Table 2) for each monument and each language. TripAdvisor 1–2 bullets rating reviews will be defined as negative emotions, 3 bullets as neutral, and 4–5 bullets as positive emotions [60]. Similarly, compound values are classified in negative (≤−0.05), neutral (from −0.05 to 0.05), and positive (≥0.05) [49].

Table 2. Scheme of the 3 × 3 confusion matrix used in this study.

		Compound Values from VADER		
		Positive (+)	Neutral (~)	Negative (−)
Ratings Values	Positive (+)	a	b	c
from	Neutral (~)	d	e	f
TripAdvisor	Negative (−)	g	h	i

Several metrics can be obtained from the confusion matrix, such as: precision, i.e., proportion of positive classifications that are actually correct (Equation (1)); recall, i.e., the proportion of actual positives that are classified correctly (Equation (2)); F1-score, i.e., harmonic mean of precision and recall (Equation (3)) [49], and accuracy, i.e., the proportion of correct labelled messages in the entire sample (Equation (4)) [61].

$$P\ (negative) = \frac{i}{c + f + i} \tag{1}$$

$$R\ (negative) = \frac{i}{g + h + i} \tag{2}$$

$$F1\ (negative) = \frac{2\,P\ (negative) \times R\ (negative)}{P\ (negative) + R\ (negative)} \tag{3}$$

$$A = \frac{a + e + i}{a + b + c + d + e + f + g + h + i} \tag{4}$$

3. Results

3.1. Number of Visits

In the case of Padrão dos Descobrimentos, the number of visitors exceeds 3 million during the last decade and reaches just over a million in the case of the Torre del Oro in the same period. According to resources from DMOs, the number of national tourists who visited the Padrão dos Descobrimentos was around 14% per year during the last 10 years. Torre del Oro received 60% of national tourists and 40% from other origins.

A temporal pattern of visitors can be observed in the case of the Padrão dos Descobrimentos, with a general decrease in April and September and an increase during the months of March and August. In the case of the Torre del Oro, the entrances did not show a clear trend, which might be due to the number of tourists, since the visits to this Spanish monument did not even reach half of the visits of the Portuguese monument (Figure 4).
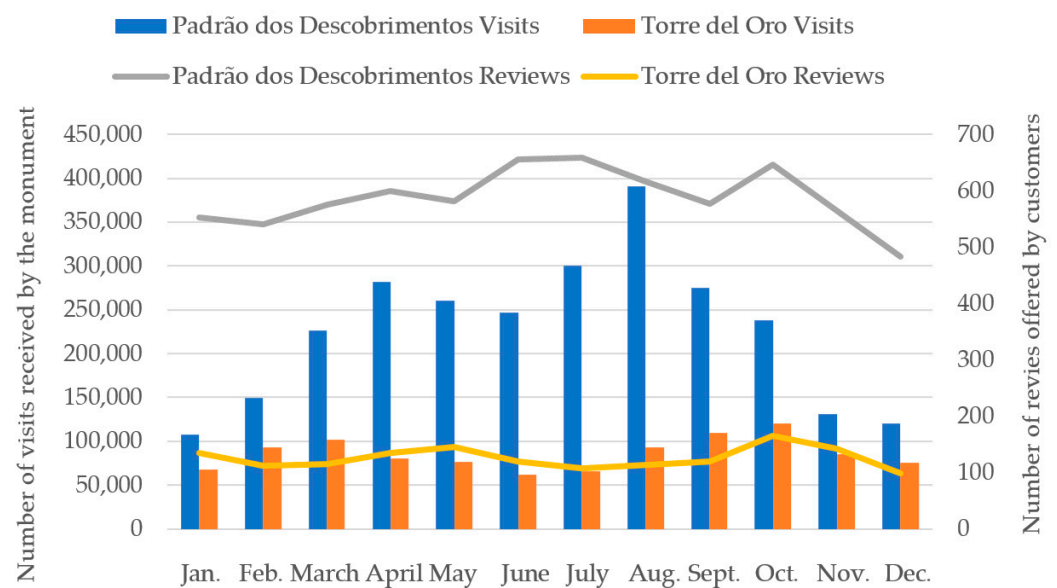
Figure 4. Monthly analysis during the last decade (Visits received vs. Reviews written on the website).

The relation between the number of visits and the number of reviews written in the TripAdvisor website was not straightforward. In the case of Padrão dos Descobrimentos, December and January were the months with the fewest visits and reviews, and August and July were the months with the highest number of visits, although August had a decrease in the number of reviews (Figure 4). In the case of Torre del Oro, October was the most preferred month for tourists to visit Seville, mainly due to mild weather conditions; however, the number of visits increased in March, likely due to the Holy week. Although in August 2015, the promenade next to the tower was under construction (Figure 2C,D), the monthly average of tickets sold was not affected by this event. However, in the case of free visits to the monument, there was a substantial decrease, representing only 0.6% of the total visits.

The results reveal that the total number of TripAdvisor reviews can be influenced by the time of year, since for the two case studies: the number of reviews decreased from October to January—the coldest months—and started to increase in February and March up to May, in the case of the Spanish monument, and July in the case of the Padrão dos Descobrimentos.

3.2. Weather Conditions

The temperature increased during summer months in both locations, between 1–4 °C, and slightly increased in winter months in reference to the average calculated for the past 30 years (Figure 5A,B). Precipitation has not changed significantly over the last decade in Lisbon (Figure 5C,D). However, the same pattern did not occur in Seville, where precipitation decreased considerably between September and May, except for a few months when precipitation was particularly intense (e.g., February and December 2010, March 2013, and May 2016). This last result is in line with previous works that established the winter as the wet season and found a reduction in precipitation during the wintertime [58].
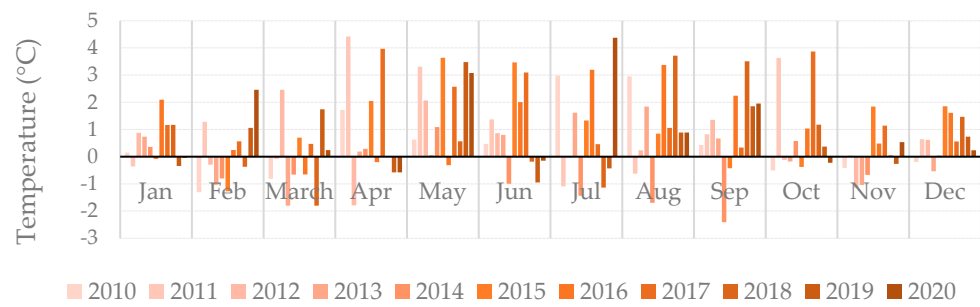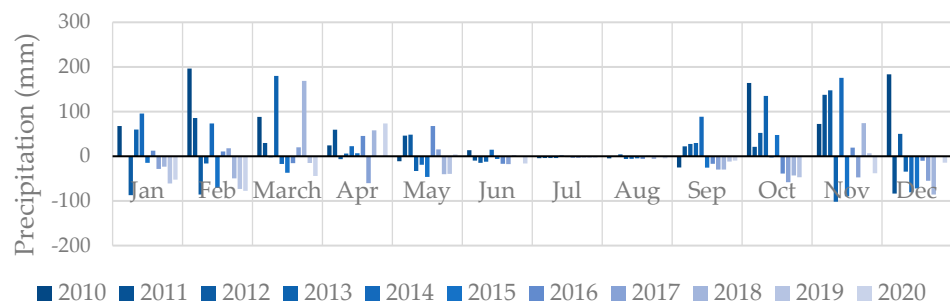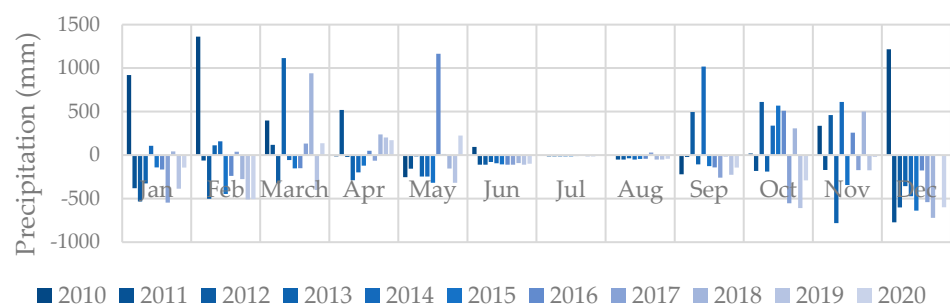
(**A**)
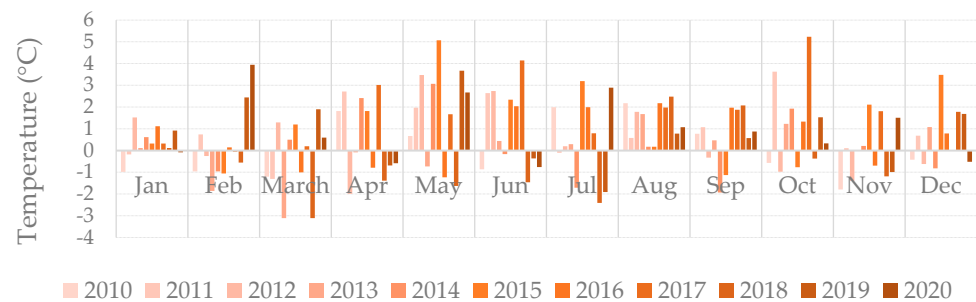
(**B**)

(**C**)

(**D**)

Figure 5. Anomalies registered in maximum temperatures from 2010 to 2020 in (**A**) Lisbon and (**B**) Seville; Analysis of rainfall during the last decade in (**C**) Lisbon and (**D**) Seville.

The rating given by tourists on the website varies depending on the month considered. In the case of Padrão dos Descobrimentos, the month that received worst evaluation in rating throughout the year is August, while May seems to be the month with the best

evaluations (4* and 5*) and almost no comments with 1* and 2* evaluations. Results obtained in August could be linked to three factors: (i) the increase of temperatures in Lisbon during this month; (ii) the fact that tourists prefer the outside landscape instead visiting inside (Table 3)—this hypothesis arises when considering that August is the month in which the monument receives the greatest number of visits (Figure 4), or (iii) some negative event taken place in this specific month throughout the years or one specific year. By analysing the negative reviews offered by consumers in August, the main peak given was related to the retrofitting carried out in August 2016 and the consequent scaffolding (Table 4).

Table 3. Quotations that manifest the preference for outside visits instead of entering the Padrão dos Descobrimentos.

Comment on TripAdvisor	Username	Date	Rating
"Now it is not really worthen to walk there... They are reconstructing there, and we can't see much. But you can walk a bit and enjoy some fresh air."	M. O.	2013	20/50
"Nice for a stroll along the waterfront but not worth looking inside. I thought it was going to be about explorers but it's about tourists."	K. C.	April 2019	20/50
"Interesting when passing by to have a quick look from the outside. Not worth going up to the top for 4 euros. Better go up Tower of Bellem instead. It's nice view from the very very narrow spacings on top but not worth the entrance fee."	Genericperson	April 2017	30/50
"You can probably skip going inside and just admire the design from the outside. 5 euros pp for an elevator ride and the view. We came towards the end of the day and they stopped showing the film, still had to pay full price. Lovely view but probably not worth going inside (unless the video is amazing)."	P.R.	July 2018	30/50
"Interesting to look at from the ground and look at the world map in the square. Disappointing to pay to go to the top (10€ for two adults) to stand on a small patio. Albeit with views but really not worth the price."	d4rkly	September 2015	30/50

Table 4. Quotations regarding negative ratings due the maintenance actions carried out in the monument.

Comment on TripAdvisor	Username	Date	Rating
"The monument is currently being renovated, and under scaffolding Aug-16. I've seen it before, and it's worth a visit once the scaffolding comes off!"	StHR	2016	10/50
"Don't visit until January. Currently covered in scaffold. Spent 45 min on a bus to visit but couldn't see any of it. Area is nice but not really worth the trip without seeing the main attraction!"	Deh085	2016	20/50
"That's right. Totally not worth getting out of your car, taxi or bus for a closer look. Why? Because there's really nothing to see—especially with the scaffolding shrouding the entire monument! Even without the shroud, it would be pretty hard to see why this place is special unless you're a direct descendant of Henry the Navigator or Vasco de Gama. Enough said."	Sig79	2016	20/50

Table 4. *Cont.*

Comment on TripAdvisor	Username	Date	Rating
"I have visited this previously and I find it very impressive. However, at the time of writing it is covered in scaffolding, so much so that you cannot really see any of the figures. Unfortunately, it's therefore not worth making a separate trip to see it."	Paul W.	2016	20/50
"It was a shame that this monument was completely covered in scaffolding when we visited, meaning we could not see the details. You could still go inside and up it but only for a view so we went to Belem tower instead. Had been looking forward to this so it was really disappointing."	Lauren P.	2016	20/50

In the case of the Torre del Oro (Figure 5), two relevant conclusions can be found: (i) the main period in which ratings are low is from April to June, perhaps due to the fact that in this period, the DOMs are totally focused on the Holy Week and the April Fair, and (ii) tourists preferred the months of September and October for visiting the monument, avoiding the hottest months (July and August) and the rainy months.

3.3. Tourists' Profile

Based on the three languages (PT, SP, and ENG), the visitors' countries of origin were identified, showing users from different parts of the world, such as the United States of America, South America, Europe, Australia, India, and China. The results indicate that more than 25% of the users who had given their opinion on the TripAdvisor website travelled from South America or Europe—in the case of the Padrão dos Descobrimentos (8930), and more than a half were from European countries—in the case of the Torre del Oro (1829) (Figure 6).
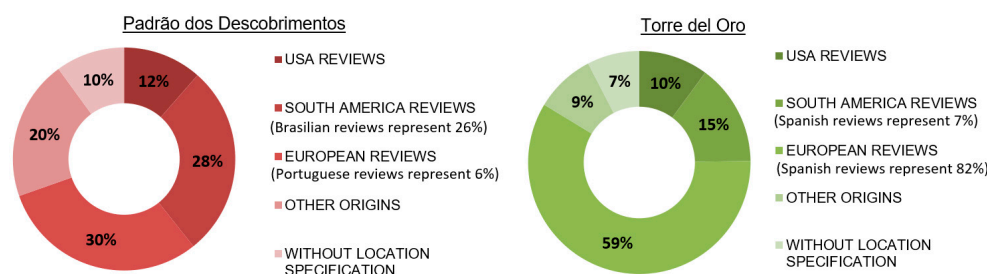

Figure 6. Number of TripAdvisor's users in relation to their precedence in each case of study.

Regarding Padrão dos Descobrimentos, 36.7% of the reviews were written in Portuguese, followed by 33.3% in English, and 30.1% in Spanish; 26% of the reviews were from Brazil and only 6% were from Portugal. Regarding Torre del Oro, 57.9% of reviews were written in Spanish, followed by 29.4% in English, and 12.7% in Portuguese. For this monument, 48.3% of the reviews were from Spain, whereas the Spanish-speaking countries of South America only represented 7% of Latin America.

TripAdvisor's overall rating reveals that reviewers tend to give good feedback, as the number of poor or terrible reviews was very low in both case studies, i.e., 3% of the ratings in the case of Padrão dos Descobrimentos and 5% of the ratings in the case of Torre del Oro (Figure 7). The Portuguese monument received better evaluations than the Spanish monument (Figure 7), where Portuguese and English users gave excellent ratings. While in the case of Torre del Oro, the Spanish users were the ones that gave excellent ratings.
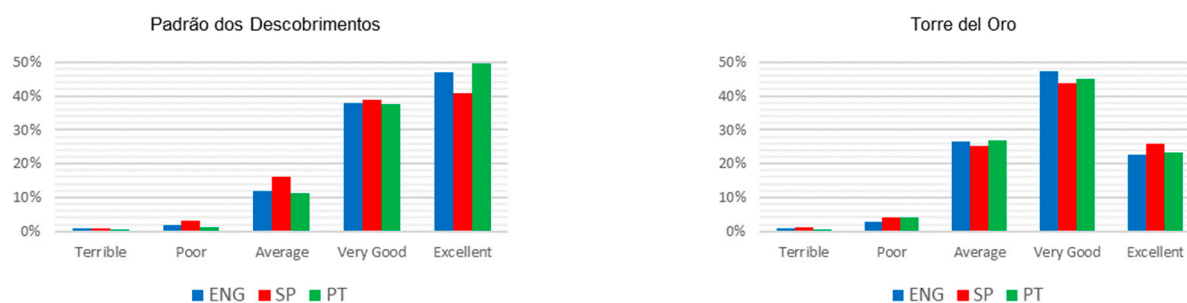
Figure 7. Rating values given on TripAdvisor for each case of the study.

As TripAdvisor is mainly used to reflect positive comments [16]—more than eight out of ten reviews received a 4 or 5 bubble rating in 2020. In this respect, a higher number of reviews reflect a better rating for the monument. In the case of the Torre del Oro, the rating is lower probably because the number of feedback is almost five times lower than that received by the Portuguese monument.

3.4. Maintenance Actions

The ratings are analysed by year to get the motivations behind the worst evaluations. The years that received the highest number of reviews for both monuments were 2016 and 2017, and the ratings decreased over the following three years. The comments and ratings reveal that something was wrong in Lisbon 2016, and something displeased the tourists in Seville 2017, because the 'Terrible' and 'Poor' bubbles exceeded the 'Very good' and 'Excellent' ones, which is not the pattern observed elsewhere during the analysed period (Figure 8).
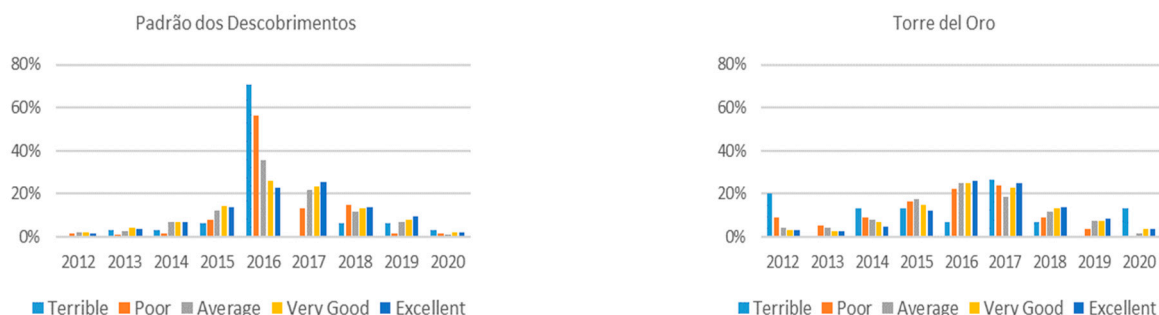

Figure 8. Normalized percentage of ratings offered in each case of study.

In the case of Padrão dos Descobrimentos, the tourists' displeasure is related to the scaffolding that covered the entire monument during the retrofitting carried out during this period. This could be appreciated on the quotation included in Table 3. In the case of the Torre del Oro, the tourists are unhappy with the works, during 2017, to repair and renovate the promenade parallel to the Guadalquivir River, which made access to the monument difficult and transformed the surrounding area; although it is interesting that the evaluations rated 'Excellent' were of the same order of magnitude (about 25%) as the evaluations rated 'Poor' (27%).

3.5. Travel Style

Regardless of the monument or the language of the TripAdvisor users, the percentage of ratings based on travel style is very similar (Figure 9). The most relevant aspect of this survey is that couples are, in both cases, the largest customers when offering ratings (Padrão dos Descobrimentos, *n*: 8930 and Torre del Oro, *n*: 1829). No significant differences were observed in ratings regarding travel style.
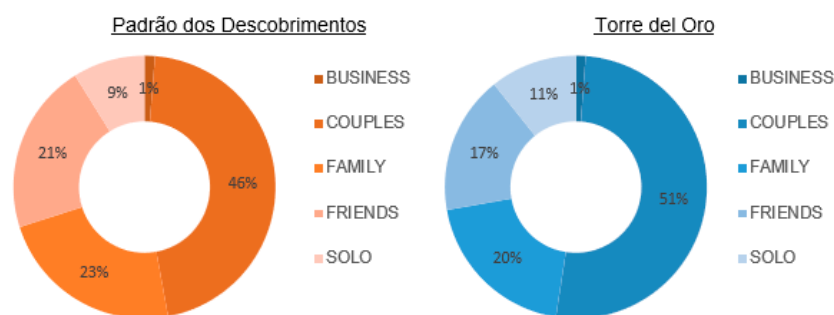
Figure 9. Number of TripAdvisor's users in relation to their style of travel.

Ratings assigned by most of the customers are Very good (4*) or Excellent (5*) (Figure 5A). Overall, the main difference between ratings offered in both case studies is that customers prefer to evaluate as Excellent (5*) the Padrão dos Descobrimentos, while the Torre del Oro receives a higher score as Very Good (4*).

4. Discussion of Results Using Sentiment Analysis (VADER Method)

In general, most of the reviews are positive or well-rated, so what should interest the DMO are the reasons why customers offer negative reviews and the nature of their complaints. A great dispersion in the assessment of feelings is observed (Figure 7). However, several instances of positive feedback on these monuments are detected, and presumably, more than 80% of the total could be considered positive.

Thus, in the case of Padrão dos Descobrimentos, customers criticize the price of admission, the long queues to access, the absence of shaded spaces to sit in the surroundings, and the narrow space available once the top floor is reached. However, what frustrates them the most is the scaffolding covering the entire monument due to restoration works, to the point of suggesting covering only half of the monument and leaving the other half visible and photographable, or placing a scaffolding cover that respects the hidden monument.

On the other hand, in the case of Torre del Oro, users' complaints are usually related to the price of admission, accessibility via stairs to the top of the tower, the treatment of employees, and the impossibility of taking good photos from above due to the provision of security barriers. Tourists also regularly complain about the lack of information in other languages, but this fact was fortunately corrected by DOMs and the related negative reviews ceased. Customers usually like to see both monuments from outside and they really like to seem them during night hours when they are illuminated and when the panoramic views next to the rivers are astonishing.

Figure 10 shows an increase in negative feelings expressed in the reviews during 2016 in Padrão dos Descobrimentos, probably because in that particular year, the monument was hidden behind scaffolding, as it was being restored. In the case of the Spanish monument, sentiments fluctuated, although a negative trend was observed during the remodelling period of the promenade. Since Torre del Oro had fewer ratings per month, the Vader results were aggregated by trimester mean, corresponding the first trimester to January, February, and March. As Brazilians represent most of the reviews written in Portuguese, and considering the historical background of the Padrão dos Descobrimentos associated with the Age of Discovery and colonialism, their reviews have not been backed up by a different feeling polarity from the other users.
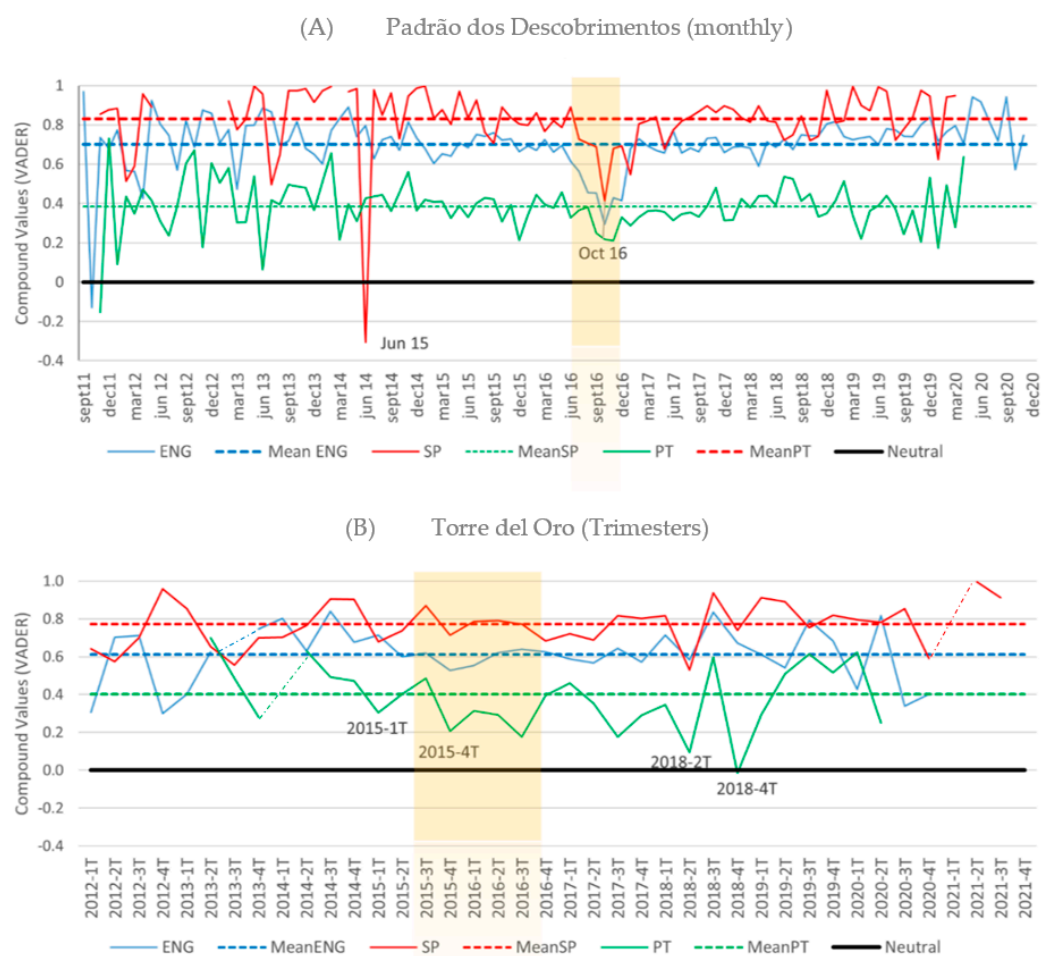
Figure 10. Compound results from VADER analysis from 2010 to 2020. Rectangular shadow represents the period when there were interventions (**A**) on the façade and (**B**) on the promenade.

Independently of the language used, both monuments showed some common patterns in the temporal polarity and intensity of the feelings. In 2016, all three languages (around 1/3 each of the reviews) showed a negative feeling related to the covering of Padrão dos Descobrimentos. In the three languages, in October 2016, the most frequent words were related to the retrofitting of this monument. In Portuguese, the word meaning 'retrofitting' was used 11 times in 33 comments. In English, the word 'scaffold' was used 28 times in 45 comments. 2016 and 2017 were the years that received the highest number of reviews. After this low peak in 2016, values started to increase, but it took five months to recover the average intensity of feelings for Spanish and English speakers. In the case of Portuguese speakers, the rebound period was longer, lasting 11 months. In terms of the historical background, five reviews from Brazil addressed the topic of Age of Discovery in 21 comments on August 2015, which was the date with the greatest number of visits, but not reviews.

In the case of Torre del Oro, it was still possible to find a pattern of common sentiment for the three study languages, although the number of reviews was unbalanced, since the largest number of reviews were in Spanish (57.9%) and the number of reviews was much lower than Padrão dos Descobrimentos. Concerning the comments written in Spanish with origin in Latin America, for 11 reviews made in 2019 (the year with more visits), only one review referred the Spanish Golden Age. Generally, the pronounced peaks are directly related to the number of comments that were registered on that date, since the lower the number of comments, the greater the weight that the user has offered, i.e., if there is only one negative review in a specific trimester, the mean of the compound value is linked

directly to that specific comment, indicating a negative peak on Figure 10, and the same vice-versa.

For both monuments, the Spanish reviews showed a larger intensity of feelings, followed by English and Portuguese. This could be attributed to differences in the Lexicon used. In terms of percentages, the number of negative, positive, and neutral reviews is similar for both cases studies. The results obtained from VADER analysis are different from the ratings given by users (Figure 8). For instance, the VADER method indicates that a significate percentage of Portuguese speakers use negative or neutral lexicon despite being punctuated with 'Very Good' or 'Excellent' bubbles. Thus, a comparison analysis between the results obtained from the scraping of the rating section and the results generated by applying the VADER method in Python is carried out.

The VADER method is based on written language used by customers. Therefore, negative or nonsense reviews are frequently written by users, which do not respect the policies established by TripAdvisor, i.e., correct comments that employ a neutral vocabulary or comments that do not criticize but use negative words or characters [62]. Thus, a validation of the VADER method is required to establish the limitation of the analysis. In fact, some inaccuracies, subjectivities, and non-concise language can be found in the reviews [63–65] (i.e., Table 5). In these quotations, even when the star rating is high, the sentiment score may reflect disappointment in the overall touristic experience, influenced by the different cultural backgrounds of the tourist reviewing the travel experience, the expression styles, and the service expectations [38]. It is possible to check the feasibility of the method by applying a 3 × 3 confusion matrix that verifies the relation between reviews and ratings offered by users (Table 6).

Table 5. Quotations whose ratings are not linked to the compound value obtained by VADER method.

Monument	Comment on TripAdvisor	Username	Rating	Compound
Padrão dos Descobrimentos	"great monument to the explorers..the area is lovely, lots of other sights in belem to spend a whole day."	weenie47	1 in 5	0.836
Torre del Oro	"A small museum in a tower by the river. It has some interesting items to view. A different slant on Spains maritime history, only mentioned trafalgar once, a famous Spaniard got killed there. You get the impression that perhaps the British have underestimated Spain's maritime achievements. Very educational."	richard g	5 in 5	0.459
Torre del Oro	"Luckily we visited on a Monday which is free to enter. We were very disappointed with our experience. The view was nice however due to the plastic barriers, it wasn't really possible to take photos."	Jason D	1 in 5	0.719

The closer the F-1 score is to 1, the better the performance of the model. If the performance is not acceptable, the sample size should be increased or a new method should be developed (e.g., bigrams) [66]. In this case, the 3 × 3 confusion matrix shows better results for all the reviews written about the Portuguese monument, reaffirming the fact that the higher the number of reviews used in the VADER analysis, the better the results obtained. The language that had higher performance was English (F-1 score equal to 0.908), although the number of reviews in Portuguese was around the same magnitude (3.5% larger). This can be explained by the fact that English Lexicon is more refined. In the case of Torre del Oro, when comparing the results obtained in relation with the language, the best result in the F-1 score obtained is for reviews written in Spanish, explained by a larger

number of reviews. In any case, the F-1 score is usually over 80%, so in these cases, the matrix results could be considered acceptable.

Table 6. Results obtained from 3×3 confusion matrix.

Metrics Obtained	Padrão dos Descobrimentos (Lisbon)			Torre del Oro (Seville)		
	ENG (*n*: 2964)	SP (*n*: 2690)	PT (*n*: 3276)	ENG (*n*: 556)	SP (*n*: 1095)	PT (*n*: 241)
PRECISION	0.873	0.819	0.892	0.723	0.732	0.700
RECALL	0.945	0.942	0.765	0.907	0.961	0.721
ACCURACY	0.815	0.768	0.684	0.653	0.698	0.527
F-1 SCORE	0.908	0.876	0.824	0.805	0.831	0.710

5. Conclusions

The tourism sector has a very relevant economic impact in most European countries, particularly in the Iberian Peninsula. In such a competitive sector, it is important that countries convey a positive image. The popularity of the TripAdvisor platform is increasing (more than 884 million of reviews registered in 2020) and has empowered tourists, allowing them to share experiences about tourist destinations, thereby influencing the choices of the target market.

This study analyses the main reasons negative feelings are triggered in tourists visiting the two monuments in the Iberian Peninsula. The VADER analysis of TripAdvisor reviews works correctly, i.e., despite subjective appreciations and non-concise language observed in several cases, the statistical analysis indicates a strong relation between the ratings assigned by customers on the website and the compound value obtained by VADER analysis. TripAdvisor comments in English, Spanish, and Portuguese analysed in this study are focused on constructive reviews and feedback for the stakeholders, without mentioning racism or politics, and highlighting the positive comments. Notwithstanding, it should be noted that this analysis only considers public comments, ignoring possible firewall actions performed by the platform.

The results obtained reveal the veracity of Hypothesis 1 of this study, i.e., the maintenance actions carried out have a very significant impact on the reviews posted on TripAdvisor, as shown in Figure 10. The tourists' reviews reveal that they prefer to visit both monuments from outside, enjoying the sights and walks around the monuments. DMOs should consider all the negative reviews detected in this analysis to deal with and correct them whenever possible. According to the comments analysed, in the future, the DMOs should avoid covering the views and hiding the whole monument during retrofitting to avoid the wave of negative comments that were observed for the year in which these maintenance actions occurred, which required some time to recover. The situation of maintenance or temporary closure of certain heritage sites must be disclosed in official tourist guides and social networks. In addition, maintenance work should, whenever possible, be scheduled for the least visited months.

The statistical analysis of the climate conditions registered from 2010 to 2020 does not reveal a direct correlation between climate conditions and touristic preferences. Notwithstanding, tourists prefer to visit the Portuguese monument in August and the Spanish monument in October, probably expecting a warm month in the first case and avoiding the hottest month in the second case. Overall, weather conditions do not seem to influence the visits to monuments since they were carried out during vacation periods, even in Seville, during the hottest months of July and August. Between 2012 and 2020, August had the highest frequency of mean intensity of feelings for the three languages, suggesting that weather conditions might be not important to tourists' appreciation.

The ratings obtained do not demonstrate a significant difference in the polarity and intensity of feelings related to the style of travel, i.e., family, business, couples, friends and

solo. For instance, looking at the reviews in English for Padrão dos Descobrimentos, which correspond to roughly 1/3 of the total reviews, the mean feeling for couples and families was 0.68, and 0.70 for friends.

The application of VADER's sentiment analysis to extract tourists' feelings from TripAdvisor reviews can be an important tool for automatically monitoring the temporal evolution of tourists' satisfaction. Based on this analysis, DMOs can adopt predictive maintenance strategies, avoiding the disruption of the monument's view during precise periods of time, and adopting more rational decision-making on future restoration and repair works and landscaping interventions.

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