

# Semantic Comparison of the Emotional Values Communicated by Destinations and Tourists on Social Media

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## Abstract

Emotional values play a key role in the creation of destination brands. Nowadays Destination Management Organizations (DMOs) want to make sure that they transmit a set of attractive, distinguishing values and that they are correctly perceived by their visitors. In this paper we present a new methodology for the automated, unsupervised semantic analysis of large quantities of tweets sent by the DMOs and the visitors of a destination. As a case study, we present the exhaustive results of the analysis of 60000 tweets related to 10 major European destinations, and we compare the emotional values transmitted from the official Twitter accounts of the destinations with those communicated by the tourists on their personal messages. The experiment leads to two important results: the examined cities do not communicate a personalized identity and there are strong discrepancies between the emotional values transmitted by DMOs and those reflected by the comments of visitors. The framework presented in this work constitutes the first semantic methodology for a large-scale automatic analysis of the communication of emotional values by destinations through social media.

*Keywords:* Destination branding, Brand communication, Social media, Emotional values, Semantic similarity

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## 1. Introduction

In the current globalised scenario tourist destinations need to differentiate themselves from their competitors to stand out from the crowd and attract more tourists, investors or residents (Morgan & Pritchard, 2004). To this end DMOs (*Destination Management Organizations*) manage their identity and brand. *Destination brands* associate emotional values

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and tangible attractions to territories, with the intention of identifying and distinguishing them (Blain et al., 2005; Morgan et al., 2003). Many attractive tourist destinations have similar strengths (e.g. five-star accommodations, cultural assets, or sun-and-beach activities), so it is the *emotional* side of the brand, its personality or identity, which may help them to capture the attention of potential visitors and beat their competitors (Morgan & Pritchard, 2004).

The great contribution of brands has been the establishment of relationships with tourists and the generation of connections and emotional ties with them (Laroche et al., 2013; Zhang et al., 2009). It has been argued (Morgan & Pritchard, 2004) that tourists mostly base their business decisions on these relationships and on the emotional bonds created with the territories rather than on rational decisions or on the physical attractions featured by destinations. Therefore, the first challenge for DMOs is to communicate these emotional values, its identity and brand, with the aim of generating this emotional differentiation.

In the last ten years *social media* have revolutionized the communication of tourist destinations (Xiang & Gretzel, 2010). It is now commonly accepted that the comments and experiences of other users (who are supposed to lack any personal interest on a particular location) have much greater credibility to the eyes of potential tourists than the official information provided by DMOs (Fotis et al., 2012; Litvin et al., 2008; Mack et al., 2008; Xiang & Gretzel, 2010) and they heavily influence their choice of travel destinations (Buhalis & Costa, 2006; Schmallegger & Carson, 2009; Yoo & Gretzel, 2010; Zhang et al., 2009). In addition, studies in the field of communication (Huertas, 2014; Macnamara & Zeffass, 2012; Valentini, 2015; Wigley & Lewis, 2012) have shown that social media allow creating a permanent dialogue with users and building a relationship with them. This process increases the identification of users with the destination and its brand and permits them the creation of a better picture of the emotional identity of the place (Govers et al., 2007; Mariné-Roig, 2013; Stepchenkova & Zhan, 2013). Social media also allow tourists to share their travel experiences and emotions through reviews, comments, photographs or videos (Hennig-Thurau et al., 2004; Senecal & Nantel, 2004). All this feedback directly impacts the emotional part of potential tourists and provides a better image of the destinations (Inversini & Buhalis, 2009; Marchiori & Cantoni, 2011; Xiang & Gretzel, 2010). Therefore, sharing experiences by other users via social media generates an emotional attachment to the destination and to its brand (Algesheimer et al., 2005).

Therefore, social media are key tools in the emotional communication of destination brands. Despite this fact, several recent studies (Huertas & Mariné-Roig, 2015; Huertas et al., 2015; Míguez-González & Huertas, 2015) have shown that destinations focus more on the communication of tangible tourist attractions than on the transmission of emotional values. In this paper we take a deeper look to the latter; thus, our first objective is to *analyze the communication of the emotional values of brands through Twitter* by some of Europe's leading tourist destinations. In order to perform a comprehensive examination of a large number of tweets we have developed and implemented a novel methodological framework in which an *automated semantic analysis* of the content of the tweets is made. In this analysis the adjectives used in the tweets are linked with the core emotional values of a travel destination, which have been characterized with a revised and adapted version of

Aaker's *Brand Personality Scale* (Aaker, 1997).

Furthermore, destination brands are key in building the image that public and potential tourists create from a destination and these images have a positive influence on the selection of the destinations to be visited (Kim et al., 2014). Thus, individuals who have created an image of a destination are more likely to visit it (Lee & Gretzel, 2012) and these chances increase even more if the image is positive. The relationship between brand and image of a destination is so close that many academics use the two concepts interchangeably. For some authors (Anholt, 2008) the brand is merely the public image of a territory created in the users' minds from their direct perceptions and external inputs of all kinds. Although the brand may be understood as the identity or image, which we believe are two sides of the same coin, from the communicative point of view it is of paramount importance that the identity that DMOs want to transmit matches with the image perceived by tourists. A positive matching will be a clear sign that the destination brand is well established and communicated and that the place has achieved the desired differentiated positioning (Huer-tas, 2014). Therefore, a second grand challenge for DMOs is to make sure that the brand identifies the territory and that it also matches with the image perceived by the public, that is, that there is a correlation between image and identity. Thus, the second objective of this research is to *analyze and compare the emotional brand values communicated through Twitter by DMOs with those described by their visitors through their personal tweets*.

In summary, the main contributions of this paper are threefold. First, we present a new methodology for the automated, unsupervised semantic analysis of large quantities of tweets sent by the DMOs or the visitors of a city. This framework may be useful for the researchers in the field and for the DMOs themselves, that may use it to make a self-assessment of the communication of their brand. After that, we present the exhaustive results of the analysis of 30000 tweets from 10 major European destinations, in which we study the number of *emotional adjectives* they use and how many times they employ them. Finally, we use the same methodology to analyze 30000 tweets from visitors of the same cities and we compare the emotional values transmitted from the official Twitter accounts of the destinations with those communicated by the tourists on their personal messages.

The rest of the paper is organized as follows. Section 2 includes a brief state of the art on the methods employed in destination branding studies to analyze messages in social media. The next section explains the new methodological framework defined in this work, which permits to associate adjectives to emotional values in a semantic and fully unsupervised fashion. Sections 4 and 5 present and discuss in detail the results of the automated analysis of 60000 English tweets, which reflect the transmission and the perception of emotional values by 10 major European destinations. The final section presents the conclusions and some lines of future work.

## 2. State of the art

In recent years there have been two main kinds of studies related to the evaluation of the communication of the identities and brands of territories. The first is based on numerical

analysis whereas the second one focuses on content analysis. These two types of works are commented in the following subsections.

### *2.1. Numerical Methods of Analysis*

This kind of evaluation methods perform a numerical analysis of the communication between DMOs and tourists, measuring aspects such as the number of followers/friends a destination has in social media, the number of comments they post and the number of reactions generated among users (e.g. replies, retweets, number of 'likes', etc.). There are already many automated tools that measure these purely quantitative aspects of communication.

An example of this type of analysis is the work reported in (Guerrero-Solé & Fernández-Cavia, 2015), which considered various quantitative communication aspects to analyze the brand *Spain* in three levels of diffusion of information. In the first level (the diffusion of messages by the state-level main touristic account, @Spain) they measured the number of messages published by this account and the number of times it mentioned other users. In the second level two analysis measures were used: the number of retweets of the messages posted by @Spain and the number of mentions of @Spain. The number of retweets of the messages in which @Spain was mentioned was analysed on the third level. Another example of this type of works is (Huertas & Mariné-Roig, 2015), which measured the average reaction to top posts per destination type by calculating the total posts and the average number of likes, comments and shares for 37 Spanish destinations located in five autonomous communities (Andalusia, Canary Islands, Catalonia, Galicia, and Madrid).

This kind of numerical studies are quite easy to make and they intend to provide a measure of the influence of a destination on social media; however, there are works such as (Guerrero-Solé & Fernández-Cavia, 2014) that show that there is not a direct relationship between the dimension of the communication of a destination and its importance, showing clearly the need of making more complex analysis of the communicated content.

### *2.2. Content Analysis Methods*

*Content analysis* refers to a family of procedures for the systematic, replicable analysis of text. These methods enable researchers to identify relevant properties of large amounts of textual information, such as the frequencies of the most used keywords. Within this category it is possible to distinguish between *qualitative* and *quantitative* techniques.

#### *2.2.1. Qualitative Methods*

Unstructured qualitative approaches, such as in-depth interviews, open questions and focus groups, provide rich data of a high quality but they are necessarily limited to a small sample, constraining the scope of the analysis and the generality of its results (Lai et al., 2013).

For example, (Zhou, 2014) employed a qualitative analysis methods to explore the representation of rurality in tourism by analysing 40 articles containing some description of Wuyuan and five online travel guidebooks using the qualitative analysis software NVIVO. The work introduced in (Marchiori & Önder, 2015) used a purely qualitative approach to try to understand how the exposure to a set of stimuli changed the most common topics

associated to a small collection of American destinations (Detroit, Kansas, Las Vegas, New Orleans, Orlando, Phoenix, San Francisco and Seattle). In that work the same qualitative research software was used to analyse the data in three stages. In the first one, the gathered data (before and after the exposure to the stimuli) were arranged into two files for each city. A word frequency analysis was conducted in the *before* files to identify the top five words (themes) in them. In the second stage, concurrence analyses of those words in the *before* and the *after* files were conducted separately to see the evolution of those terms after the exposure to the stimuli. In the last stage the conative component in the concurrence analysis was identified. In the work reported in (Hays et al., 2013) semi-structured interviews were used to examine the usage and impact of social media marketing strategies. Just to mention another recent example, in the work presented in (Oliveira & Panyik, 2014) a data analysis software (ATLAS.ti 7.0) was employed to perform a qualitative analysis on 20 online articles in which Portugal had been mentioned, with the aim to identify and understand the way tourists and travelers perceive the country as a tourist destination and explore how they could support the creation of a destination brand.

### 2.2.2. Quantitative Methods

Quantitative methods measure numerically a series of predefined attributes or properties of the destinations. There are two main types of quantitative content analysis: *thematic* and *semantic* (Roberts, 2000).

*Thematic analysis methods*: these methods just count the themes/categories/words that appear in the text, without interpreting them; thus, they provide limited information on the content of the analysed messages. Analyses of word-counts permit to identify the predominant themes in texts (Roberts, 2000). For example, the work reported in (Dickinger & Lalicic, 2015) aimed to evaluate the personality of the destination brand from the comments of its visitors in social media and to provide useful recommendations to destination managers about how to communicate a given brand personality. In that study the Word-Stat program was used to count the frequency of appearance of a list of words selected by the researchers. The work presented in (Huertas & Mariné-Roig, 2015) used the attraction factors, activities, services and brand values of the destinations as themes of study. The most frequently mentioned ones were identified, and then they were compared with those that generated more visitor reactions per destination type. In another recent example, the authors in (Chaykina et al., 2014) tried to identify the brand personality attributes ascribed to Portugal by Russian-speaking visitors. They divided the most frequent words used by tourists in the answers to a questionnaire into categories, and then they computed their frequency of mention.

*Semantic analysis methods*: these techniques try to discover the relations among themes. In a semantic analysis of text the researcher begins by constructing a template (a.k.a. a semantic grammar). Syntactic components of the text are then mapped into the themes in the template. Semantic methods use the actual meaning of the words (provided by some external knowledge repository) to make an analysis at the conceptual level, and not at the syntactic one. Some recent examples include (De Moya & Jain, 2013), which analyzed how two popular tourist destinations (Mexico and Brazil) communicate the personality of

their brand through Facebook, and (Serna et al., 2015), in which the authors developed a system that makes a semantic analysis of the image of the Basque Country taking into account cognitive, affective and conative aspects. Just to mention another example, one of the components of the Define-Measure-Visualize framework proposed in (Sevin, 2014) is a 'semantic network', which represents relationships between themes. These relationships are found by clustering the most frequently used keywords using the similarity between them and their frequency of co-occurrence. Another example of a 'semantic network' analysis is given in (Çakmak & Isaac, 2012).

There are several authors that combine thematic and semantic analysis, trying to overcome the limitations of plain syntactic studies (Andéhn et al., 2014; Stepchenkova et al., 2009). The first one can identify the topics that are more related to the brand (by finding the most frequently used words) and after that the second one can make a more profound analysis of their degree of association with the brand and their interrelationships. One of the most recent works that uses this kind of analysis methods is introduced in (Mariné-Roig & Clavé, 2015). In that work the authors use a website content parser, *Site Content Analyzer (SCA)*, to extract the keywords and count their frequencies, and then they group the most frequently used keywords for each attraction value. This combination has also been used to analyse the opinions about destinations posted on travel blogs. For instance, the study reported in (Pan et al., 2007) started by finding the most frequently used words and phrases in 40 travel blogs, which were used to perform a semantic analysis to uncover the view of Charleston as a tourist destination. In recent years some authors have gone a step further, trying to understand not only the basic themes associated to a destination but also the positive/negative view of the visitors towards them. For example, in (Költringer & Dickinger, 2015) the authors proposed a method to analyse and evaluate how DMOs project a destination brand through online web sources. They started by calculating the co-occurrence of the keywords of the data collected about Vienna from online Web sources (social travel guides, Anglo-American news media websites and DMOs websites) and then they tried to detect the positive/negative sentiment of the sentences by measuring the number of occurrences of a predefined list of sentiment words. It is important to note that in the work reported in this paper we are not addressing this issue. Our methodology analyzes the references to emotional values in the tweets sent by destinations or by tourists, but it does not classify them as positive or negative.

### 3. Methodology

Twitter and Facebook are the social media more commonly used by tourism destination managers for their promotion. This work has focused on the analysis of English tweets sent by official tourist destinations and by their visitors. Official tourist destination accounts provide a real-time view of how they try to communicate their brand to potential customers (Andéhn et al., 2014) and how they dialogue with them (Hvass & Munar, 2012), whereas tourists communicate their personal view about the cities they are visiting. The steps followed in the methodology of analysis have been the following:

- *Definition of the emotional values associated to a destination brand.* This step has involved the adaptation of a previous *Brand Personality Scale* to the specific study of destination brands.
- *Selection of the destinations to be analysed.* In this step we have chosen a set of well-known European destinations, specifying some constraints on the language they use and a minimum quantity of messages transmitted through social media.
- *Retrieval of the set of tweets.* This phase involves the use of a new tool that permits to retrieve sets of tweets that satisfy certain user-given requirements.
- *Pre-processing of the set of tweets.* This step applies some simple treatments on the content of the tweets to make them easier to analyse.
- *Semantic analysis of the content of the tweets.* This step is the core of the methodology. It uses a well-known ontology-based semantic similarity measure to compare the adjectives used in the tweets with the emotional values defined in the first step.
- *Interpretation of the results.* In the final step we can analyse the obtained results, comparing the performance of the DMOs of the different cities and also contrasting the values transmitted by the official DMOs with the ones reflected in the opinions of the visitors.

Figure 1 shows a graphical depiction of the main steps of this methodology.

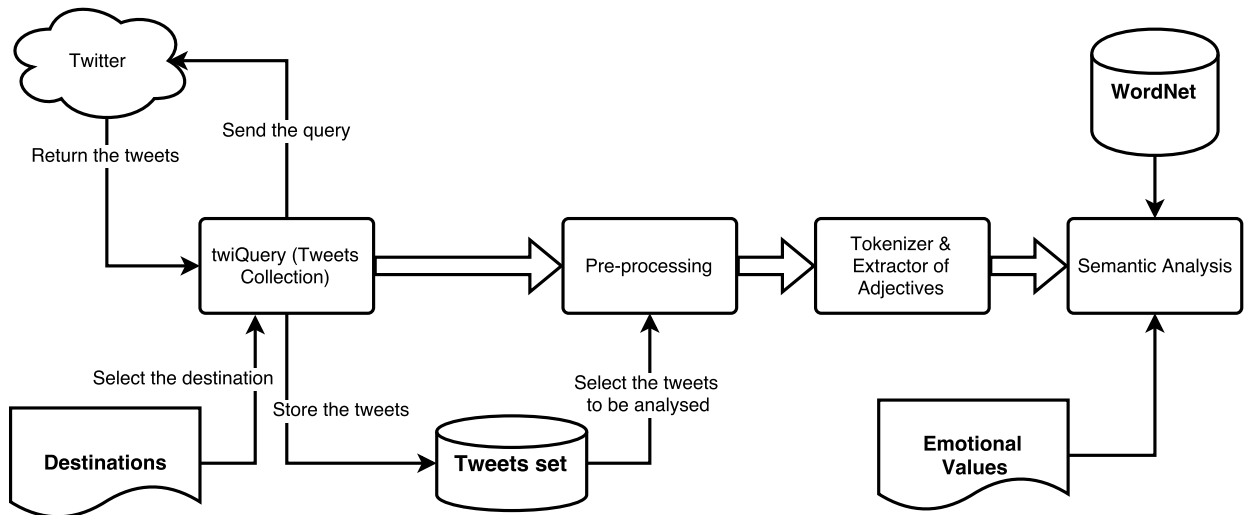


Figure 1: Architecture of the methodological framework of analysis

All this methodology, along with the computational system that implements it, has been fully designed and developed by the authors of this paper. In the remainder of this section we describe the technical aspects: the definition of the emotional values, how tweets are

pre-processed and how they are semantically analysed. The selection of the destinations to be analysed in a specific case study and the retrieval of their associated tweets are described in the following section. After that, the specific results of the semantic analysis of the case study are described and discussed.

### 3.1. Emotional values

Many academic studies have stressed the importance of the emotional values and the personality of the destinations in their branding (Henderson et al., 2000; Morgan et al., 2002). Destinations can be described using human personality values (Xiang & Gretzel, 2010). In this study we have updated and adapted the well-known *Brand Personality Scale* (BPS) of Aaker (Aaker, 1997) to the analysis of destination brands. In fact, Ekinci and Hosany were the first authors that applied this scale to the analysis of brand destinations (Ekinci & Hosany, 2006). They showed that personality dimensions have a positive impact on the preferences of potential tourists, as a strong and well-defined personality improves the image of the destination and the intentions to visit it. Thus, they concluded that a proper management of emotional values is vital for the effective positioning and differentiation of destinations. In this work Aaker's BPS has been slightly adapted to the analysis of the emotional values associated to a travel destination. The five main dimensions of analysis of the personality and the emotional values of a destination are *sincerity*, *excitement*, *competence*, *sophistication* and *ruggedness*. Each of them has been divided into a set of categories, which in turn have been refined into several sub-categories, represented by a set of terms. The whole template of analysis is shown on Table 1.

### 3.2. Pre-processing of the tweets

It is well-known that the language used in Twitter is very casual and noisy. Tweets contain numerous punctuation errors, spelling mistakes, abbreviations, slang terms, emoticons, etc. The tweets were pre-processed to mitigate these effects as follows:

- Tweets may contain URLs, usernames, hashtags and emoticons. All URLs, usernames and strange symbols were removed from the tweets.
- To reduce the dimensionality, all tweets were converted to lowercase and stop words were removed. Table 2 shows the list of stop words.
- Words with repeated letters were automatically corrected using an algorithm that performs a Breadth First Search and analyzes all the possible ways of eliminating repeated letters in a string, checking in Wordnet<sup>1</sup> if they are correct.

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<sup>1</sup>See <http://wordnet.princeton.edu>.

Emotional value	Category	Subcategory	
Sincerity	Down-to-earth	Family-oriented	
		Down-to-earth	
			Sustainable
		Honest	Calm
			Real
			Traditional
			Honest
		Wholesome	Original
			Wholesome
			Quality of Life
		Cheerful	Happiness
			Sentimental
			Friendly
	Excitement	Daring	Trendy
Daring			
			Exciting
			Exotic
			Fashionable
			Cool
			Spirited
			Spirited
			Dynamic
			Vital
			Fresh
			Young
			Sensorial
		Imaginative	Unique
			Imaginative
			Creative
		Up-to-date	Up-to-date
			Independent
			Contemporary
		Cosmopolitan	Cosmopolitan
			Tolerant
		Hospitable	
Competence	Reliable	Reliable	
			Hard-working
			Safe
			Rigorous
		Intelligent	Intelligent
			Technical
			Corporate
			Innovative
		Successful	Successful
			Leader
			Ambitious
			Powerful
Sophistication	Luxurious	Glamorous	
			Luxurious
		Charming	Seductive
			Smooth
			Romantic
		Magical	
Ruggedness	Outdoorsy	Outdoorsy	
			Get-away
			Recreational
		Tough	Tough
			Rugged
		Non-Conformist	

Table 1: Emotional Values

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### Stop words list

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i, me, my, myself, we, our, ours, ourselves, yo, your, yours, yourself, yourselves, he, him, his, himself, she, her, hers, herself, it, its, itself, they, them, their, theirs, themselves, what, which, who, whom, this, that, these, those, am, is, are, was, were, be, been, being, have, has, had, having, do, does, did, doing, a, an, the, and, but, if, or, because, as, until, while, of, at, by, for, with, about, against, between, into, through, during, before, after, above, below, to, from, up, down, in, out, on, off, over, under, again, further, then, once, here, there, when, where, why, how, all, any, both, each, few, more, most, other, some, such, no, nor, not, only, own, same, so, than, too, very, s, t, can, will, just, don, should, now

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Table 2: Stop words list

### 3.3. Semantic content analysis

In previous studies on content analysis of the communication of destination brands (Stepchenkova & Morrison, 2006; Stepchenkova et al., 2009) it was pointed out that *nouns* usually provide information on the particular tourist attractions, *verbs* describe actions and types of tourism, and *adjectives* communicate the emotional responses. Thus, as we want to measure the association between tweets and emotional values, we have focused the analysis on the *adjectives* used by destinations and visitors.

The objective of the semantic analysis is to associate the adjectives of the set of tweets to the categories of emotional values shown in Table 1. A standard natural language parser was applied to retrieve the adjectives and count their frequency of use. A direct syntactic mapping is not possible, as most of the adjectives do not appear directly as categories/subcategories of emotional values. The idea is to use a *semantic* similarity measure (Sánchez et al., 2012) between the adjectives and the categories/subcategories. This type of measures requires the use of some kind of external structured knowledge base (in our case, WordNet). Ontology-based semantic similarity measures (Sánchez et al., 2012) rely on the topological structure of an ontology to calculate the degree of resemblance between two terms. The length of the path between the terms (considering hyponymy and hypernymy relationships) and their position in the hierarchy of concepts (i.e. their degree of generality) are the basic points taken into account by similarity functions. In this work we have used a well-known similarity measure, defined by Wu and Palmer (Wu & Palmer, 1994) as follows:

$$Sim_{W\&P}(c1, c2) = \frac{2 * N3}{N1 + N2 + 2 * N3} \quad (1)$$

In this expression  $N1$  and  $N2$  are the number of hypernym links from the terms  $c1$  and  $c2$  to their *Least Common Subsumer* (LCS) in the reference ontology, and  $N3$  is the number of hypernym links from the LCS to the root of the ontology. This measure ranges from 1 (for identical concepts) to 0 (when the LCS is the root of the ontology, so the concepts do not have any common ancestor). The main difference of this function with respect to other edge-counting measures is that it takes into account the depth of the compared concepts

in the hierarchy (given the same distance, two concepts are more similar if they are more specific).

Algorithm 1 (*Semantic Similarity*) is used to calculate the semantic similarity between two words, where the GETSYNSETS function returns the list of synsets of a word in WordNet, and the function POS returns the part-of-speech tag of a synset.

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**Algorithm 1** Semantic Similarity

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1: function GETSEMANTICSIMILARITY(word1, word2)
2:   synsets1  $\leftarrow$  GETSYNSETS(word1)
3:   synsets2  $\leftarrow$  GETSYNSETS(word2)
4:   if synsets1 is empty or synsets2 is empty then
5:     return 0
6:   else
7:     max_sim  $\leftarrow$  0
8:     for each syns1  $\in$  synsets1 do
9:       for each syns2  $\in$  synsets2 do
10:        if POS(syns1) = POS(syns2) then
11:          sim  $\leftarrow$  SimW&P(syns1, syns2)
12:          max_sim  $\leftarrow$  MAX(max_sim, sim)
13:        end if
14:      end for
15:    end for
16:    return max_sim
17:  end if
18: end function

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In the case of this study, the main problem of this approach is that WordNet uses hypernymy relationships between nouns, and we wanted to compare the adjectives found on the tweets with the subcategories associated to the emotional values (which are also mostly adjectives). Thus, before applying the Wu-Palmer semantic similarity measure we had to transform its inputs into nouns. In the case of the subcategories, they were manually translated to the equivalent nouns (e.g. *friendly* and *ambitious* were transformed into *friend* and *ambition*). Concerning the adjectives appearing in the tweets, they were automatically transformed into nouns using their *derivationally related form* or their *attribute* property in WordNet.

Table 3 shows some examples of the automatic translation of the adjectives into nouns. It may be noted that there are some good translations (e.g. *wonderful* is translated into *wonder*) but also some bad results (e.g. *magical* is translated into *wizard*). It may be assumed that this is a bad translation because the *magical* adjective in the context of tourism usually means 'beautiful or delightful in such a way as to seem removed from everyday life', whereas *wizard* is a noun which may mean 'a man who has magical powers, especially in legends and fairy tales' or, in the context of computer science, 'a help feature

Adjective	Noun
New	Newness
Best	Goodness
Wonderful	Wonder
Famous	Fame
Creative	Creativity
Traditional	Tradition
Magical	Wizard

Table 3: Examples of automatic translations from adjectives into nouns

of a software package that automates complex tasks by asking the user a series of easy-to-answer questions’, and both of those meanings are not related to the standard use of the adjective ‘magical’ in a tweet of a tourist.

After this pre-processing stage it was possible to apply the Wu-Palmer similarity measure to compare the emotional subcategories and the tweet adjectives. In this way, we could assess if the destination communicates certain emotional values and if there is a strategy behind the communication of the brand (for example, a repeated use of terms like *love*, *honeymoon*, *passion* or *romance* could be interpreted as a strategy towards the promotion of a *romantic* destination).

The accuracy of the automatic semantic procedure that links adjectives to emotional values is hard to measure, since even a manual assessment is highly subjective. The common procedure to evaluate the performance of a semantic similarity measure is to calculate the correlation between its results and a human assessment of the similarity between some pairs of terms belonging to a golden standard. In the case of the Wu-Palmer similarity, Slimani (Slimani, 2013) obtained a 74% correlation and Budanitsky and Hirst (Budanitsky & Hirst, 2006) report 82.9% and 81.9% in two different benchmarks (using the Lin measure, of which Wu-Palmer is a particular case (Lin, 1998)). Moreover, we made a manual study of the 49 adjectives appearing in the case study described in the next section that have a higher similarity with an emotional value (over or equal to 0.91). We considered that 44 of them had been correctly classified (89.79%), whereas the other 5 could be debatable. These cases include words that are not actually adjectives (errors of the initial parser, like *taste* or *drive*) and adjectives difficult to associate to the available emotional values (*lucky*, *chic* and *able*). It also has to be taken into account that in our case study we only consider those adjectives that have a minimum similarity of 0.7 with an emotional adjective, so we discard those adjectives that are not very highly related to any of the values we are looking for.

The case study and the detailed results of the semantic analysis of the selected destinations are shown and discussed in the next sections.

## 4. Case study

In this section we describe how the destinations to be analysed were selected and how the tweets associated to these destinations and to their visitors were obtained.

### 4.1. Destination Selection

To select the destinations to be analysed we searched manually for the official Twitter accounts of the top 25 European destinations in 2014, according to Tripadvisor<sup>2</sup>. Table 4 shows the number of tweets and followers of these accounts. In 6 cases we were not able to identify such an account, and in 2 cases we had to resort to the account of the associated region (Tuscany for Florence, and Emilia Romagna for Rimini). In 5 cases, marked with asterisk, most of the tweets were written in the main language of the destination and not in English. It was finally decided to select the 10 destinations that had more than 3000 English tweets, which are highlighted on Table 4.

### 4.2. Retrieval of the sets of tweets

As we want to compare the communication of the destination brand with the analysis of its perception, in this study we consider two datasets: an *official set of tweets*  $O$ , which contains the tweets that have been posted from the official accounts of the 10 selected destinations, and a *tourist set of tweets*  $T$ , which contains tweets posted by the visitors of the destinations.

We have developed a novel tool, *twiQuery*, which has been used to collect the tweets to be analysed. *twiQuery* is a crawler that enables users and developers to make advanced search actions on tweets, such as retrieving sets of tweets posted by a specific user, written in a specific language, sent from a certain area determined by the name of a city or geolocation and a given radius, posted during a specific period of time, etc. The set  $O$  is the set of all the tweets written in English and sent by the 10 official destination accounts. The set  $T$  contains the tweets in English that have been sent within a radius of 15 kms. of the city centre of each of the 10 chosen destinations during the following periods of time:

- High tourism season of 2015: from 15-June-2015 to 01-September-2015.
- High tourism season of 2014: from 15-June-2014 to 01-September-2014.
- Low tourism season of 2014: from 15-October-2014 to 30-December-2014.

In order to make sure that we analyze only tweets sent by tourists, in the set  $T$  we kept only those tweets in which the location specified by the user in his/her Twitter profile is not the analyzed city. The tweets sent by local users or by users that have not specified their home location were discarded. We also removed the tweets sent by strangely prolific users (those that have sent over 1000 tweets in the considered time intervals). With this process we obtained between 18710 (Budapest) and 38116 (London) tourist tweets per each of the

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<sup>2</sup><http://www.tripadvisor.co.uk/TravelersChoice-Destinations-cTop-g4>

City	Twitter account	Tweets	Followers
Istanbul	-		
Rome (*)	@Turismoromaweb	4310	16694
London	@visitlondon	31358	394617
Prague	@PragueEU	1560	2408
Paris (*)	@ParisJeTaime	13900	78200
Berlin	@berlintourism	5466	22533
Florence	@DiscoverTuscany	1545	7203
Barcelona	@VisitBCN_EN	4843	8937
St Petersburg (*)	@VisitPetersburg	2142	363
Budapest	@VisitBudapest	3398	15689
Lisbon	@TurismoDeLisboa	1227	5829
Venice	-		
Madrid (*)	@Visita_Madrid	8895	30203
Amsterdam	@Iamsterdam	6174	147998
Krakow	-		
Vienna	@ViennaInfoB2B	4220	6631
Milan (*)	@turismomilano	6169	31197
Athens	@CityofAthens	4600	12387
Zermatt	@zermatt_tourism	2953	9645
Urgup	-		
Dublin	@VisitDublin	12402	63278
Moscow	-		
Dalyan	-		
Edinburgh	@edinburgh	26565	57984
Rimini	@ERTourism	18980	9942

Table 4: Selection of Destinations

10 cities. As we want to compare easily the references to emotional values among visitors and destinations, we finally analyzed 3000 tweets from the official destination account and 3000 tweets from visitors for each of the 10 cities. These tweets have been randomly chosen.

## 5. Results

The results of the semantic analysis are shown in Table 5. This analysis has only taken into account '*emotional adjectives*', which are those adjectives used in the tweets that have a similarity over 0.7 with at least one of the emotional subcategories (the adjectives that do not satisfy this condition have been discarded). The rows of the matrix are the subcategories of emotional values. The columns of the matrix are the 10 analysed cities, considering the tweets of the official Twitter accounts of the destinations (on the left) and the tweets of their visitors (on the right). At the top of each column there are two numbers, which represent

the total number of adjectives (on the right) and the total number of uses of those adjectives in the set of 3000 tweets (on the left). For instance, the cell at the top on the left indicates that, in the 3000 tweets sent by the official Twitter account of London, they have used 289 adjectives (that could be highly related to emotional values), and those adjectives have been used 3565 times in those tweets (1.18 emotional adjectives/tweet). Each cell in the matrix, associated to an emotional value and to a city, contains two numbers with the same meaning: on the right, the number of emotional adjectives associated to that subcategory used in the tweets of the city (tweets sent by the destination or tweets sent by its visitors) and on the left the number of times those adjectives have been used in the tweets. For instance, we can see in the table that the official Twitter account of London has used 21 different adjectives related to the *Traditional* value, and those adjectives have been used 106 times in the 3000 analysed tweets.

### 5.1. Adjectives used by the DMO and the visitors of each city

We can start the analysis by looking at the number of adjectives used by DMOs and by the tourists. It may be seen that the visitors of all cities employ a mean of 224 different adjectives, which are used (on average) 891 times in the 3000 tweets/city (the main exception is Rimini, that only has 163 adjectives which are used 681 times). In most cases DMOs have a smaller variety of adjectives, although they are used more times in the tweets; more concretely, on average they employ 170 different adjectives 1344 times on their tweets. The only cities in which DMOs have used a wider range of emotional adjectives than their visitors are London and Rimini. The city that employs less adjectives is Budapest (143), whereas London (289) is clearly the DMO that uses more different adjectives. These results are quite surprising, since if DMOs had a clear communication strategy of the emotional values of their brands they should probably use a richer variety of adjectives than tourists, which could be expected to use always the same kind of expressions. In this sense, it seems that London is the destination that is making a bigger effort on the selection of different emotional adjectives. The fact that English is the native language of this destination does not seem to be very relevant, because other cities with this property such as Dublin and Edinburgh do not exhibit this variety.

### 5.2. Emotional values communicated by adjectives

Let us now analyze in more depth the references to emotional values used by the DMO and the visitors of each city. In Table 5 the gray cells show the heavier uses of adjectives to refer to an emotional value, whereas the boxed cells indicate situations in which an emotional category has been referenced only in a few cities (for instance, *Cosmopolitan* has only been linked to Athens). Black cells highlight those cases in which a city is not communicating an emotional value that has been considered by most of the other cities (for example, Budapest is the only DMO that has not used any adjective related to the value *Spirited*).

#### 5.2.1. Analysis of the number of emotional adjectives

We will first consider the number of adjectives employed in the tweets (the numbers on the right in the cells of the matrix). As shown in the table, the emotional values that have

Subcategory	Official Account										Tourist									
	#	Lon	Berl	Dubl	Athe	Edin	Vien	Anst	Buda	Barc	Rimi	Lon	Berl	Dubl	Athe	Edin	Vien	Anst	Buda	Barc
Family-oriented	3565/289	1086/186	923/153	1495/197	1140/162	1251/202	1103/192	699/143	1054/171	1035/208	952/248	960/223	970/251	864/218	990/265	864/231	880/223	923/212	834/207	681/163
Down-to-earth	118/22	53/15	15/8	90/16	66/13	84/19	50/18	41/14	39/15	44/16	51/26	63/23	45/20	64/24	46/23	45/21	35/20	44/24	35/14	
Sustainable	15/9	12/4	1/1	12/4	2/1	8/1	9/4	7/4	4/2	4/4	3/2	9/5	7/7	2/2	1/1	5/4	8/6	3/3	1/1	
Calm	127/9	73/4	29/6	52/4	68/5	59/4	67/4	40/2	51/4	18/4	30/6	33/8	28/8	26/10	25/9	23/7	27/9	25/4	19/7	
Real	28/6	18/6	18/5	27/5	10/4	17/5	9/4	13/4	37/7	35/6	28/7	35/7	32/7	38/6	29/7	31/8	33/8	15/5	7/5	
Traditional	106/21	35/9	7/3	72/12	21/6	50/11	49/13	36/5	21/10	57/16	16/11	14/10	22/12	15/10	24/8	20/6	19/8	14/7	7/5	
Honest	399/10	163/5	178/7	328/7	146/5	124/8	135/8	104/6	285/5	157/9	150/10	144/5	168/8	155/8	158/6	142/6	132/6	194/8	148/4	
Original	114/23	42/15	13/10	50/15	16/9	59/19	32/13	19/14	41/14	38/18	48/22	79/20	36/16	43/20	34/17	47/18	50/20	48/13	38/13	
Wholesome	4/1	1/1	1/1	2/1	5/2	2/1	2/1	2/1	2/1	1/1	3/1	5/1	4/1	2/1	1/1	1/1	2/1	3/1	3/2	
Quality of life																				
Happiness	57/6	11/4	8/6	6/4	40/3	22/4	29/4	16/3	15/3	7/4	25/7	20/5	33/8	36/8	40/8	22/6	20/10	21/8	26/8	
Sentimental	25/10	10/4	12/5	12/8	10/4	8/5	6/4	8/5	3/3	18/7	24/12	17/7	14/11	15/7	25/15	22/11	13/8	33/11	21/12	
Friendly	20/7	5/3	4/3	5/2	5/3	7/4	17/5	2/1	8/4	6/3	3/2	7/5	12/6	7/4	3/3	2/2	10/6	3/3	11/5	
Trendy	23/6	13/3	12/2	31/3	18/2	17/3	17/3	55/2	39/2	6/2	3/3	7/2	7/2	2/1	3/3	1/1	1/1	1/1	2/2	
Dating	40/8	13/7	9/4	18/4	19/6	14/6	22/7	13/5	33/7	7/4	14/4	10/4	23/5	22/7	25/7	17/4	19/4	12/5	19/6	
Exciting	6/1	5/2	2/2	1/1	5/3	2/2	9/2	1/1	2/2	12/2	4/3	7/2	5/3	4/2	1/1	4/2	27/1	3/1	5/2	
Exotic	5/2	4/2	2/2	4/1	1/1	2/2	12/2	2/2	2/2	5/2	1/1	2/1	2/1	4/2	2/2	11/2	1/1	4/1	2/1	
Fashionable																				
Cool																				
Spirited	6/2	1/1	1/1	4/1	7/3	8/3	4/3	4/3	4/3	1/1	3/2	4/3	2/2	1/1	1/1	2/2	3/2	1/1	4/3	
Dynamic	3/3	9/3	1/1	1/1	2/2	20/4	4/1	1/1	23/3	4/3	1/1	5/3	2/2	2/2	8/4	2/2	2/2	3/3	1/1	
Vital			1/1									1/1	2/1			1/1				
Fresh	1141/6	208/6	70/7	210/6	131/4	224/6	218/6	123/3	56/5	148/6	115/5	90/3	99/7	96/5	92/6	76/6	76/5	77/6	66/5	
Young	11/2	6/2	2/2	2/1	2/1	15/2	5/1	2/1	4/1	2/2	1/1	9/4	8/2	8/2	11/1	4/1	2/1	5/1	1/1	
Sensorial	38/11	11/4	66/10	52/5	20/6	15/6	14/8	9/4	7/5	17/6	24/8	18/7	23/10	12/6	31/10	14/8	25/11	16/7	20/5	
Unique	124/5	25/4	14/3	33/4	41/4	42/5	53/3	20/4	36/5	38/4	13/4	7/2	13/3	9/3	9/3	13/3	13/4	12/3	10/4	
Imaginative						1/1														
Creative	29/7	35/6	10/5	21/7	3/3	20/7	13/2	4/3	4/4	19/8	12/7	12/5	9/6	7/3	9/7	8/5	9/3	7/3	6/3	
Up-to-date	30/2	7/2	3/1	27/2	1/1	50/2	11/2	12/2	20/2	58/2	1/1	5/3	4/2	3/1	2/1	4/2	6/2	6/2	2/2	
Independent	12/3	2/2	2/2	5/1	1/1	1/1	1/1	2/2	2/2	4/2	3/2	4/2	2/1	5/1	6/5	5/2	1/1	4/2	4/2	
Contemporary	333/9	63/9	42/5	32/10	71/9	60/7	43/7	31/6	45/5	46/6	49/9	57/9	66/11	43/9	67/8	54/9	50/9	49/9	50/9	
Cosmopolitan				1/1																
Tolerant			1/1	1/1				1/1					1/1	1/1	1/1			1/1		
Hospitable	1/1	1/1		5/2			2/1	1/1		8/2	2/2	2/2	1/1	3/2	4/2	2/2	3/2	2/2	15/4	
Reliable							1/1				2/2		1/1	1/1	2/1	1/1	1/1	1/1	2/1	
Hard-working	1/1		1/1		1/1						1/1									
Safe	63/14	21/9	39/8	56/11	24/10	51/12	40/11	20/8	37/9	47/8	44/14	33/11	38/16	20/13	43/15	33/16	39/11	34/12	24/10	
Rigorous	23/7	22/8	8/5	23/5	7/4	11/3	30/6	3/3	16/3	14/5	7/5	15/7	12/6	9/6	8/6	9/6	7/5	11/5	8/6	
Intelligent											3/2	1/1	2/1	2/1	1/1	2/1	2/2	2/2	2/1	
Technical											8/4	10/1	6/1	11/3	4/2	3/3	2/1	5/1	7/4	
Corporate	1/1	1/1	1/1	1/1	2/2		4/1	1/1	1/1	5/3	10/5	9/3	6/4	4/2	5/4	10/5	16/5	9/1	15/3	
Innovative	28/3	7/1	22/2	10/3	14/3	10/3	13/4	6/2	5/2	5/3	6/2	7/2	8/3	1/1	6/2	3/2	2/1	3/1	4/2	
Successful	3/2	5/2	5/2	5/2	11/2	7/3	8/3	7/2	1/1	2/1	6/2	7/2	8/3	1/1	6/2	3/2	2/1	3/1	4/2	
Leader	125/20	34/9	37/6	67/21	34/10	82/12	64/11	35/16	76/11	41/10	63/13	61/12	65/13	47/11	76/17	59/11	56/12	62/14	68/16	
Ambitious	4/3	2/1	1/1	1/1	1/1	2/2	1/1	5/4	5/4	5/2	3/3	3/3	3/3	2/2	2/2	1/1	1/1	5/4	2/2	
Powerful	17/4	12/4	10/3	14/4	8/3	7/2	9/4	1/1	3/1	11/4	3/1	14/5	12/6	3/2	12/3	4/1	10/3	5/2	7/2	
Glamorous	76/6	49/2	105/5	89/2	111/6	58/4	93/4	17/4	33/4	74/8	52/7	52/6	43/6	53/6	44/7	44/8	56/7	68/4	51/5	
Luxurious	7/2	6/3	2/2	1/1	7/2	7/3	2/1	1/1	5/2	4/2	5/2	3/2	6/3	8/2	6/2	4/4	2/2	7/3	10/3	
Seductive											1/1	3/1	2/2	3/2	2/1	1/1	2/1	2/2	2/1	
Smooth	17/4	9/3	18/2	28/3	8/2	12/5	6/2	11/2	46/3	8/5	19/3	23/4	16/2	16/4	20/9	19/4	28/5	17/3	18/2	
Romantic	3/1	2/1	5/1	8/1	3/1	2/1	2/1	2/1	2/1	2/1	2/1	4/1	4/3	4/1	5/2	6/1	9/1	9/1	4/1	
Magical	105/2	9/1	69/2	14/1	108/2	13/1	9/2	1/1	4/1	2/1	15/1	4/1	4/1	2/1	15/2	6/1	6/1	4/1	5/1	
Outdoorsy																				
Get-away	64/11	8/4	9/4	15/4	22/5	10/6	11/4	5/3	19/3	14/5	3/3	9/3	10/4	5/3	12/9	5/4	6/3	10/8	4/2	
Recreational	5/3	3/1	3/1	1/1	1/1	1/1	1/1	2/1	10/2	2/1	4/2	2/1	1/1	1/1	2/1	2/1	3/1	1/1	5/1	
Tough		1/1	1/1	1/1							2/2	2/1	3/1	1/1	2/1	2/1	3/1	1/1	1/1	
Rugged	192/7	69/9	65/6	58/7	76/7	46/8	56/6	30/4	27/7	49/8	53/10	42/7	39/10	55/6	60/12	52/9	37/9	53/9	39/9	
Non-conformist	6/4	1/1	4/4			2/2	2/1	2/1	2/1	2/1	3/3	4/3	2/2	6/3	2/1	5/3	4/1	1/1	5/1	

Table 5: Use of emotional adjectives by DMOs and tourists

been communicated with the highest number of different adjectives by DMOs are *Original*, *Down-to-earth* and *Leader*, followed by *Safe*, *Traditional* and *Sensory*. Almost all of the analyzed destinations communicate these values through their tweets with a large number of adjectives. It is remarkable that, although all destinations want to be 'original', it may be seen in the table that they communicate mostly the same values and they are not showing a distinctive personality.

We can observe that tourists also use the largest number of adjectives to refer to the values *Down-to-earth*, *Original*, *Safe* and *Leader*. However, unlike DMOs, they also use many adjectives to communicate values like *Sentimental*, *Rugged* and *Contemporary* (for example, Edinburgh visitors used 15 adjectives related to *Sentimental*, whereas the official tweets of this destination only used 4). This disparity is an interesting fact for DMOs which, given these values highlighted by their visitors, should analyze them and decide if they indeed belong to their identity and if they should be more heavily communicated on their tweets. DMOs should also take into account general values such as safeness, which are referenced by visitors of all cities, and stress them in the definition of their identities.

The emotional categories that are referenced with a medium number of adjectives by DMOs are *Honest*, *Calm*, *Real*, *Daring*, *Fresh*, *Unique*, *Creative*, *Contemporary*, *Intelligent* and *Glamorous*. They are also communicated in different degrees by tourists, showing a certain coherence between the transmitted and the perceived values. On the other hand, it also shows that all destinations seem to have many points in common in the communication of emotional values, without using specific strategies for brand personalisation.

Finally, the values that have been communicated with a low number of adjectives are *Wholesome*, *Exciting*, *Exotic*, *Spirited*, *Dynamic*, *Up-to-date*, *Independent*, *Cosmopolitan*, *Tolerant*, *Hospitable*, *Reliable*, *Hard-working*, *Rigorous*, *Technical*, *Seductive* and *Romantic*. Many of these values are very attractive, so it is surprising that they are only slightly communicated by a few destinations. For example, nowadays most destinations want to be regarded as *sustainable*, but cities such as Dublin, Edinburgh, Vienna or Barcelona use a very low number of related adjectives. Just to give another example, the number of references to a *family-oriented* destination is also strikingly low in all destinations; for instance, London does not use any adjective for this value, although its official website has a whole section dedicated to attractions and activities for families with children. This fact might be pointing out a lack of coherence between the values transmitted through different social media by a DMO.

It is also surprising that there are several values that have not been referenced at all neither by destinations nor by tourists: *Quality of life*, *Fashionable*, *Cool* and *Outdoorsy*. This fact should be checked more carefully, as it could be due to a poor choice of nouns to represent these values in WordNet.

As a conclusion of the analysis of the number of adjectives used to communicate emotional values by DMOs it may be seen that there are many commonalities in the results obtained for all the analyzed cities. Thus, we might conclude that, with some exceptions, there is a lack of a proper communication strategy of the distinctive points of each destination. The same result is observed in the analysis of the adjectives used by visitors, which does not show a emotional distinction of the destinations.

Figures 2a and 2b show the number of adjectives that have been used for each main category of emotional values by destinations and by tourists, respectively. In the comparison of these two charts, the first thing that can be noticed is that *Sincerity* is the emotional value most heavily communicated by both DMOs and tourists. However, the number of adjectives used to communicate this value by tourists is quite larger than the number of adjectives used by DMOs (with the exceptions of London and Rimini). This means that tourists give a strong importance to this emotional value and associate it with the destinations in their messages, whereas DMOs do not seem to have such a strong intention to communicate it.

The values *Excitement* and *Competence* are communicated by a medium number of adjectives both by tourists and DMOs, with minimal differences between them. Perhaps the cities that show a higher difference for these two emotional values are Dublin and Edinburgh, where tourists used significantly more adjectives than DMOs to communicate them. In this kind of situations it might be argued that it is necessary for the DMOs to take this fact into account in their brand communication strategy. If tourists employ many adjectives to communicate a value it may indicate that the destination is being associated to that emotion and it should probably be incorporated into its brand communication strategy.

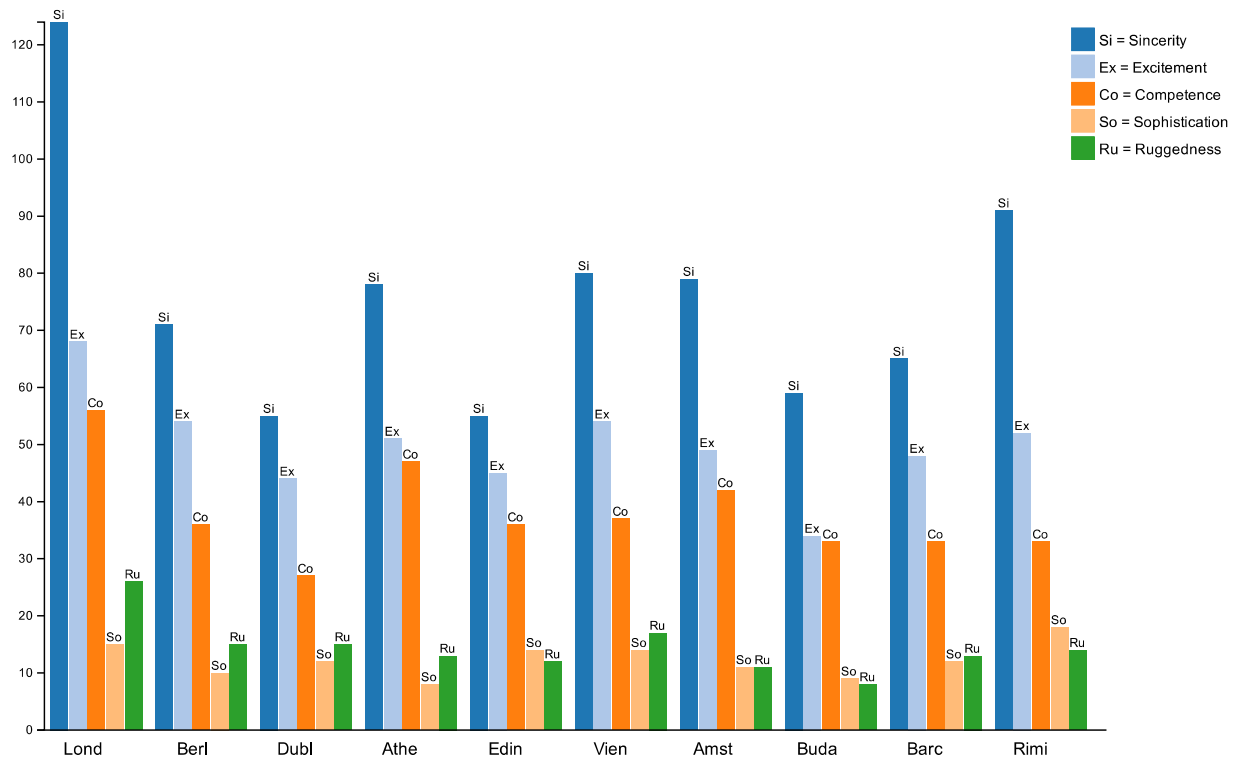
Notably, the number of adjectives that communicate *Sophistication* and *Ruggedness* are the lowest in both the tweets of DMOs and tourists, although visitors use them slightly more than destinations. For these emotional values Edinburgh is again the city with a higher difference between the number of adjectives used by tourists and those used by DMOs. However, there are not huge differences between them for these two kinds of emotional values.

### 5.2.2. Analysis of the frequency of use of emotional adjectives

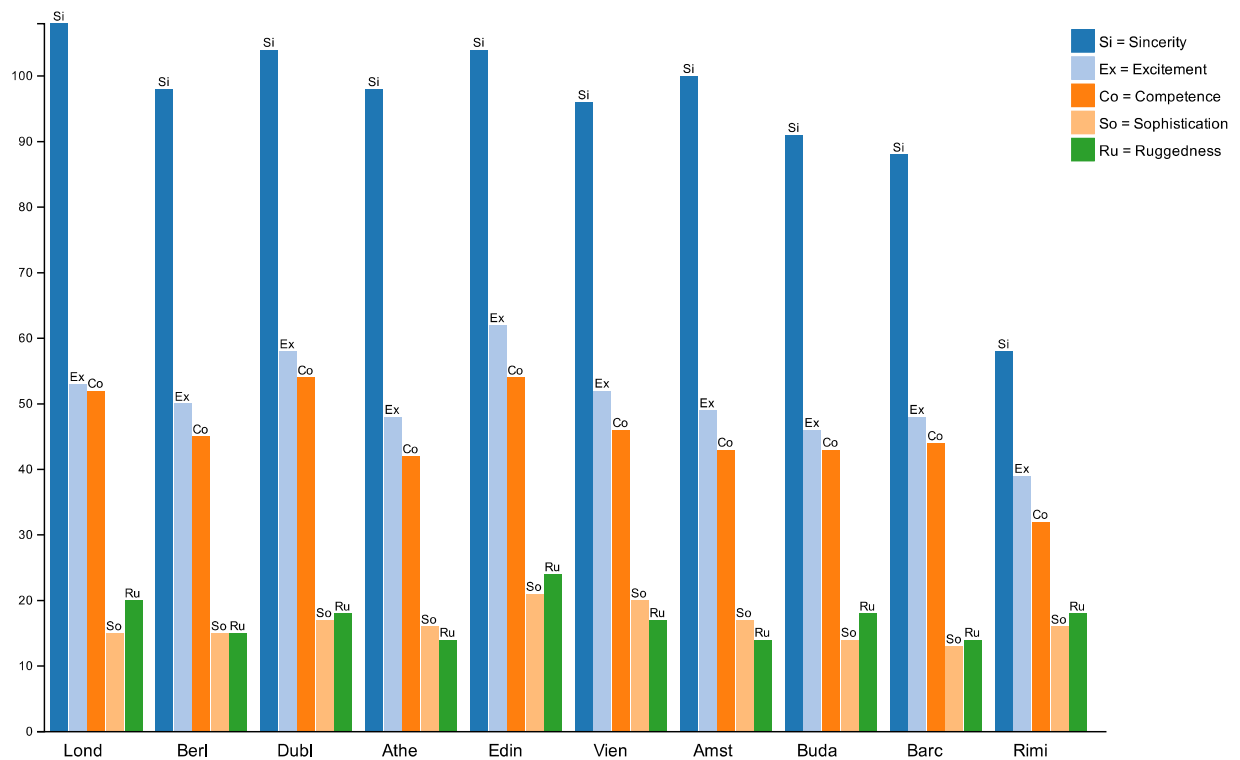
Secondly we turn to the analysis of the overall frequency of use of emotional adjectives (the numbers on the left in the cells of the matrix shown in Table 5). This measure is key in the analysis of the communication of the emotional values because it shows the total number of uses of all the adjectives related to each emotional value. At the end of the day this is probably the most relevant fact since a destination can communicate a value more effectively using countlessly a single adjective than using different adjectives very few times.

If we look at the absolute frequencies of use of adjectives by DMOs and tourists we can observe that the results are the opposite of the ones reported in the previous section. In this case destinations communicate the emotional values with a higher frequency than tourists (except Dublin and Budapest). This fact shows that DMOs have a higher communicative intention of emotional values than visitors, although the numerical differences are not very large. It is specially remarkable the case of the DMO of London, who has used 3565 emotional adjectives in the 3000 analysed tweets; this high value shows that this destination has incorporated the transmission of the emotional part of its identity in its communication strategy.

The emotional value that is mostly communicated by both destinations and tourists is *Honest*. All the DMOs and visitors use in more than 100 occasions adjectives that communicate this value, showing its importance for all of them. At the present time in which tourism development and the evolution of the destinations have led in many cases to the



(a)



(b)

Figure 2: Histogram of the number of adjectives used by destinations (a) and tourists (b)

increase of mediation, virtualization and artificiality, it is observed that the value of honesty is prioritized more than ever. This fact may be linked to another value highly communicated by DMOs and visitors, which is *Real*. It may be concluded that tourists search for and appreciate *real, honest, natural, local* experiences and they turn away from artificial, common, globalised ones.

Another value well communicated by all DMOs (except Dublin and Barcelona, that do not mention it so often) is *Fresh*. This value is intuitively associated to concepts such as new, natural, green, different, ... Tourists also make reference to these ideas on their tweets, but with much lower frequencies. It stands out the extremely high communication of this notion by the DMO of London (1141 times in 3000 tweets, with a short set of 6 adjectives), showing a clear strategy towards the intense communication of this emotional value.

The next level of communicated emotional values includes *Down-to earth, Calm, Traditional, Original, Sensory, Contemporary, Safe, Leader, Glamorous* and *Rugged*. As commented before, it is curious that interesting values such as *Family-oriented, Quality of Life, Fashionable, Cool, Imaginative, Cosmopolitan* or *Outdoorsy* are not reported at all neither by DMOs nor by tourists.

In order to study whether destinations have communication strategies of specific brands and if they use social media to communicate a differentiating personality, we may observe in Table 5 which are the emotional values reported by only one or two of them. London is the place that shows, for some values, a much higher frequency of use of adjectives than the rest of analyzed destinations. For example, it communicates with frequencies well above the rest values such as *Down-to-earth, Calm, Unique, Contemporary, Leader, Magical* and *Rugged*. Thus, a clear communication strategy of an identifying and distinguishing mark is observed again.

Other destinations also highlight specific emotional values, albeit with a lower use of adjectives. For example, London and Vienna communicate *Magical* much more than the rest, or only Dublin and Edinburgh communicate *Glamorous* with higher frequencies. This shows the existence of certain differential emotional values that some DMOs try to communicate to distinguish its own identity. However, there is a very small number of differentiated associations between destinations and emotional values, and sometimes the differences among them are not very significant. This shows that few of the analyzed destinations show a clear strategy to communicate their brands through their official tweets.

Figures 3a and 3b show the total number of times in which adjectives have been used by destinations and tourists, respectively, to refer to each main category of emotional values. It may be observed that the use of emotional adjectives by tourists is fairly homogeneous in all destinations, whereas its use by DMOs shows more diversity. For example, tourists communicate strongly the emotional value *Sincerity* in all destinations, but this value is communicated with very different strengths by DMOs. These figures show that visitors do not perceive at all a clear differentiation of the emotional values transmitted by destinations.

Despite the uniformity in the opinions of the visitors, the differences between the uses of adjectives in the destinations might indicate a differentiation strategy. If they had brand communication strategies clear differences should appear in all the cities in figure 3a, but it is observed only in some of them. The most prominent example is London, which shows a

very high level of communication of the values *Excitement* and *Sincerity*. Vienna and Athens also stand out with a high frequency of use of adjectives related to *Excitement* and *Sincerity*, respectively. Dublin and Edinburgh, unlike the other destinations, give more relevance to *Sophistication* than to *Competence* and *Ruggedness*. These specific cases may indicate the existence of a strategy to communicate a distinctive, differentiated brand. However, a deeper study of the tweets of these destinations should be made in order to corroborate this assertion.

### 5.2.3. Transmission and perception of emotional values

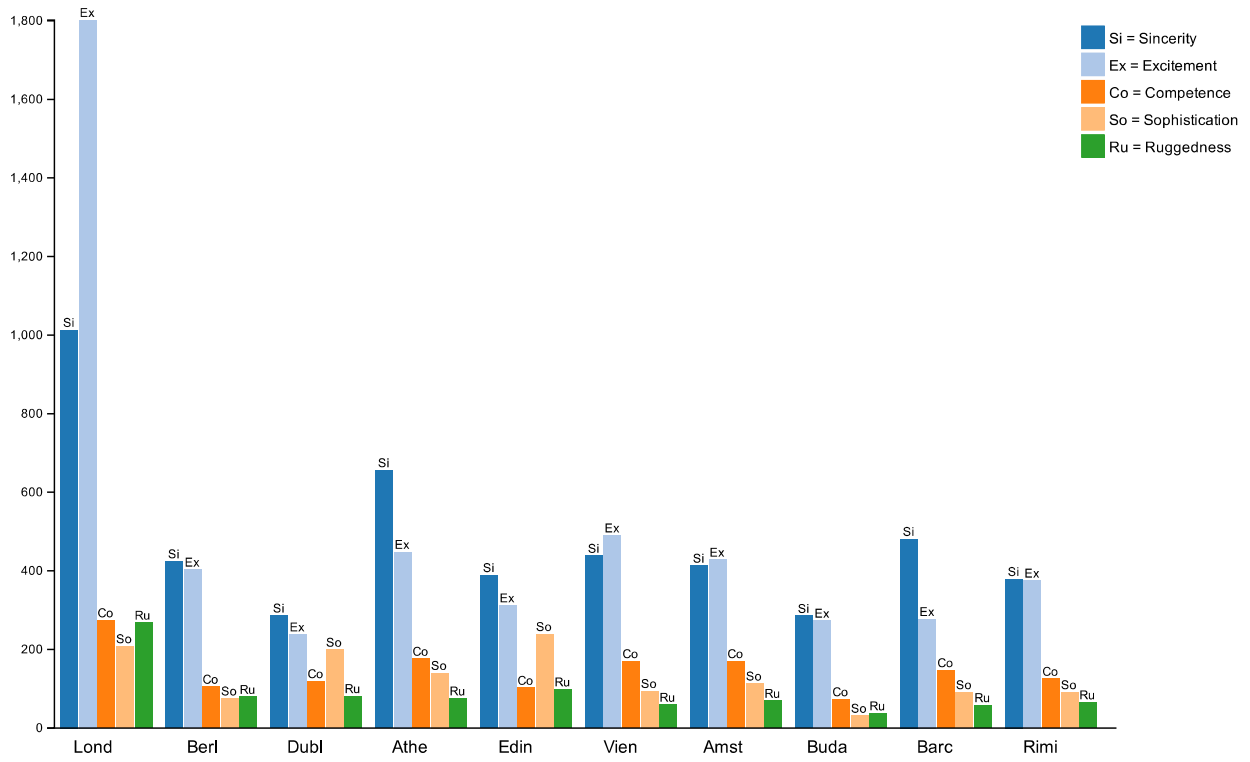
If we compare the emotional brand values communicated by DMOs and the ones referenced by the adjectives employed by tourists on their tweets we can detect a significant difference among them. For instance, even though the DMOs of Dublin and Edinburgh have stressed the *Glamorous* concept, it is interesting to note that the visitors of these places are the ones that have the lowest use of adjectives referred to this value. This fact may indicate a disparity between the values intended to be transmitted by DMOs and the ones perceived by tourists and transmitted in their tweets, which may be a very relevant information for destination managers in order to consider a reorientation of their public communication strategy.

The results reported in Table 5 show that the differences among the values communicated by the official DMOs through their tweets and the ones reflected by the messages of tourists are huge. In fact, numerous examples show that the coincidence of communication of values is the exception, rather than the rule. For example, the *Original* value is highly communicated (114 references) by London (as well as by other destinations), but its tourists only used 48 times adjectives related to this value. In contrast, Berlin communicated the same value only 42 times but its tourists used 79 adjectives related to this topic.

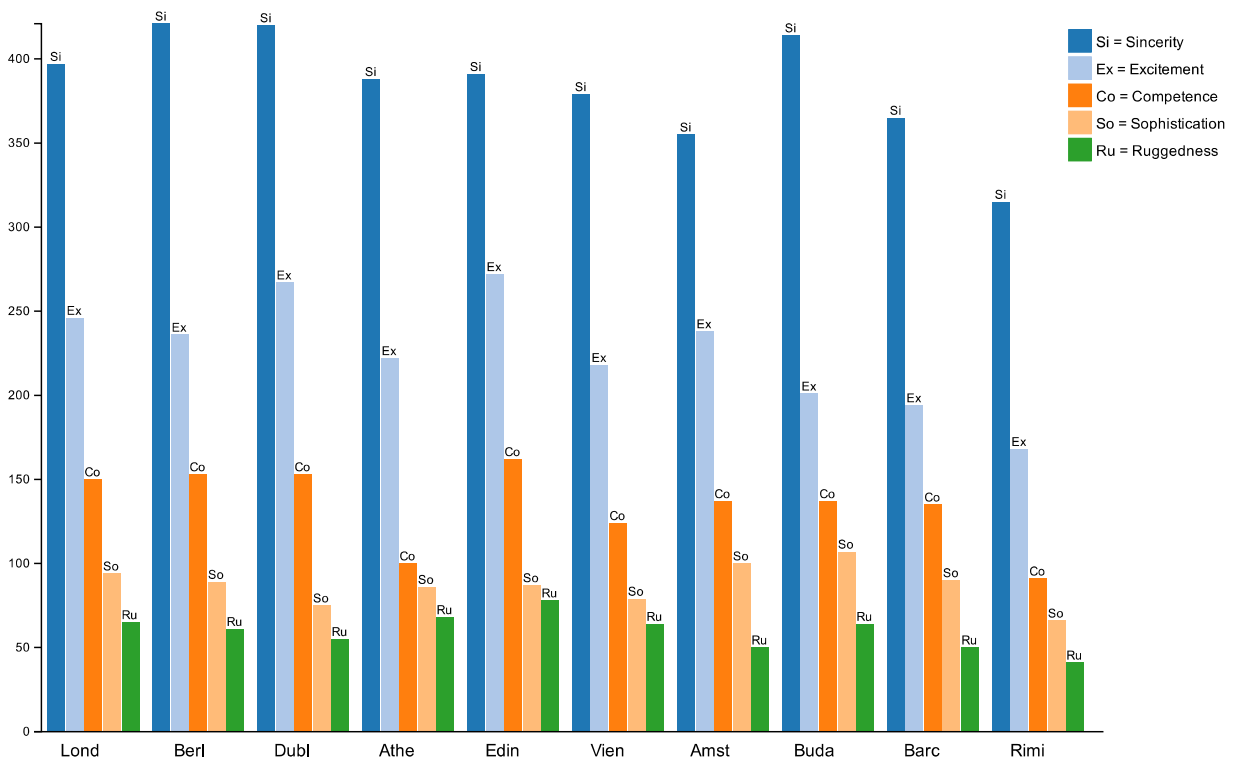
Other examples with lower frequencies show similar mismatches. For example the tourists of Dublin have one of the highest number of references (8) to the value *Young*, although the official DMO of this city did not use in 3000 tweets any adjective related to this characteristic. On the other side of the coin, Vienna communicated this value 15 times but it was only mentioned in 4 tweets of its visitors. These examples show that there is not much correlation between the communication of the identity of destinations and the images that tourists communicate through their tweets. These results provide interesting information to DMOs that might help them to improve the definition and communication of their brands and identities.

Finally, Table 6 shows the average number of emotional adjectives (and the average number of uses of those adjectives in the tweets) employed by DMOs and by tourists for each emotional value, and the difference between them. The larger differences are highlighted in the rightmost column.

This table confirms the previous findings, and the different use of adjectives to communicate destination brands between DMOs and tourists is shown clearly in the last column of the table. The values on the right of that column show the differences in the number of adjectives. Although these differences are not very high, it may be seen that most of them are negative, showing that tourists use a wider set of adjectives than DMOs in their tweets.



(a)



(b)

Figure 3: Histogram of the overall use of emotional adjectives by destinations (a) and tourists (b)

The emotional values in which these negative differences are stronger are *Safe*, *Happiness*, *Sentimental* and *Down-to-earth*. The values on the left of the last column correspond to the difference in the total number of times in which adjectives have been used by DMOs and by visitors on their sets of 3000 tweets. In this column most of the values are positive, showing that DMOs employ more emotional adjectives than tourists. There are some values for which there is a huge difference of use, especially *Fresh*, *Honest*, *Calm* and *Unique*. The only emotional value for which there is a high negative difference (*i.e.* it is way more referenced by tourists than by DMOs) is *Real*.

In conclusion, this table shows the difference between the communication of the emotional values performed by DMOs and by tourists, which coincides with the results of other studies. Recently (Mariné-Roig & Clavé, 2016) also showed differences between the brand communicated by DMOs through their official websites and the one reflected by tourists through social networks. Nowadays it is commonly accepted that tourists co-create the destination brand through their activities in social networks (Gensler et al., 2013; Hollebeek et al., 2014; Labrecque, 2014; Park & Kim, 2014); thus, the communicative differences between DMOs and tourists show a discrepancy that should be solved. Therefore, it is urgently necessary that DMOs analyze the way in which their visitors perceive their brand so that they can manage a coherent and strategic brand communication, trying to minimize those differences.

## 6. Conclusions

The communication through social media of the basic emotional values attached to a destination is a key aspect in the construction of a distinctive brand and personality. Up to now most of the studies on this communication have made manual, syntactic analysis of the transmitted messages. This paper has reported the definition of a novel methodological framework of analysis, which is both automatic and fully semantic. The basic idea is to use an external corpus (WordNet) to link the meaning of the adjectives used in tweets with the emotional values attached to travel destinations. Due to its automatic nature, this analysis may be performed by DMOs as a way of self-assessing the values they transmit.

This paper has also presented a detailed case study, focused on 10 of the major touristic cities in Europe, in which 6000 tweets have been automatically analyzed per each of them (3000 tweets from the official tourism office and 3000 tweets from visitors of the city). In this way we have been able to analyze how many emotional adjectives are used, how many times they are used and which are the emotional values they are associated with. The experiment has shown that most of the cities are referencing the same values, showing a lack of definition of a personalized identity. This conclusion coincides with the one of a very recent study carried out by Huertas and Mariné-Roig (Huertas & Mariné-Roig, 2016) in which they manually analyzed the content of the publications of Spanish DMOs through their main official social media. That study focused on the communication of both tourist attractions and emotional values. Its main conclusion, like the one reached in this paper, was that the transmitted emotional values were very similar across all destinations and, therefore, they were indistinctive. Although in this work the study was made on international destinations,

Subcategory	Official Accounts	Tourists	Difference
Family-oriented	0.7 / 0.5	1.9 / 1.4	-1.2 / -0.9
Down-to-earth	60.0 / 15.6	49.1 / 21.9	<b>10.9 / -6.3</b>
Sustainable	7.4 / 3.4	3.8 / 3.1	3.6 / 0.3
Calm	58.4 / 4.6	26.8 / 7.3	<b>31.6 / -2.7</b>
Real	18.4 / 5.1	29.8 / 6.8	<b>-11.4 / -1.7</b>
Traditional	45.4 / 10.6	17.2 / 8.7	<b>28.2 / 1.9</b>
Honest	201.9 / 7.0	152.3 / 6.5	<b>49.6 / 0.5</b>
Original	42.4 / 15.0	45.1 / 16.9	-2.7 / -1.9
Wholesome	1.6 / 0.8	2.4 / 1.0	-0.8 / -0.2
Quality of life	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Happiness	21.1 / 4.1	30.9 / 7.3	-9.8 / <b>-3.2</b>
Sentimental	11.2 / 5.5	19.4 / 10.0	-8.2 / <b>-4.5</b>
Friendly	7.9 / 3.5	5.8 / 3.6	2.1 / -0.1
Trendy	21.4 / 2.5	2.9 / 1.7	<b>18.5 / 0.8</b>
Daring	18.8 / 5.8	16.7 / 5.0	2.1 / 0.8
Exciting	4.3 / 1.6	6.1 / 1.8	-1.8 / -0.2
Exotic	3.5 / 1.4	2.8 / 1.2	0.7 / 0.2
Fashionable	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Cool	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Spirited	3.6 / 1.8	2.2 / 1.8	1.4 / 0.0
Dynamic	6.7 / 2.1	2.5 / 1.9	4.2 / 0.2
Vital	0.9 / 0.2	0.4 / 0.3	0.5 / -0.1
Fresh	252.9 / 5.5	85.0 / 5.1	<b>167.9 / 0.4</b>
Young	4.9 / 1.3	5.0 / 1.5	-0.1 / -0.2
Sensorial	24.9 / 6.5	21.0 / 7.6	3.9 / -1.1
Unique	42.6 / 4.1	11.2 / 3.3	<b>31.4 / 0.8</b>
Imaginative	0.1 / 0.1	0.0 / 0.0	0.1 / 0.1
Creative	15.8 / 5.2	8.3 / 4.6	7.5 / 0.6
Up-to-date	21.9 / 1.8	3.6 / 1.8	<b>18.3 / 0.0</b>
Independent	3.5 / 1.5	4.6 / 2.0	-1.1 / -0.5
Contemporary	76.6 / 7.3	50.3 / 8.8	<b>26.3 / -1.5</b>
Cosmopolitan	0.1 / 0.1	0.0 / 0.0	0.1 / 0.1
Tolerant	0.3 / 0.3	0.4 / 0.4	-0.1 / -0.1
Hospitable	1.8 / 0.8	3.2 / 1.7	-1.4 / -0.9
Reliable	0.1 / 0.1	0.7 / 0.6	-0.6 / -0.5
Hard-working	0.3 / 0.3	0.6 / 0.5	-0.3 / -0.2
Safe	39.8 / 10.0	33.7 / 13.1	6.1 / <b>-3.1</b>
Rigorous	0.4 / 0.2	0.5 / 0.2	-0.1 / 0.0
Intelligent	15.7 / 4.9	8.7 / 5.3	7.0 / -0.4
Technical	1.0 / 0.2	1.7 / 1.2	-0.7 / -1.0
Corporate	1.1 / 0.8	6.6 / 2.2	-5.5 / -1.4
Innovative	12.0 / 2.6	9.4 / 3.4	2.6 / -0.8
Successful	4.9 / 1.8	4.2 / 1.7	0.7 / 0.1
Leader	59.5 / 12.6	59.0 / 12.8	0.5 / -0.2
Ambitious	2.1 / 1.5	2.1 / 2.0	0.0 / -0.5
Powerful	9.2 / 3.0	7.0 / 2.5	2.2 / 0.5
Glamorous	70.5 / 4.5	49.3 / 6.4	<b>21.2 / -1.9</b>
Luxurious	4.2 / 1.9	5.4 / 2.5	-1.2 / -0.6
Seductive	1.0 / 0.6	1.9 / 1.3	-0.9 / -0.7
Smooth	16.3 / 3.1	20.1 / 3.9	-3.8 / -0.8
Romantic	2.7 / 0.8	3.8 / 1.1	-1.1 / -0.3
Magical	33.4 / 1.4	6.8 / 1.2	<b>26.6 / 0.2</b>
Outdoorsy	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Get-away	17.7 / 4.9	6.9 / 4.3	10.8 / 0.6
Recreational	2.4 / 1.0	2.7 / 1.1	-0.3 / -0.1
Tough	0.3 / 0.3	1.2 / 0.8	-0.9 / -0.5
Rugged	66.8 / 6.9	45.6 / 9.2	<b>21.2 / -2.3</b>
Non-conformist	1.7 / 1.3	3.2 / 1.8	-1.5 / -0.5

Table 6: Average number of emotional adjectives (and their use) employed by DMOs and by tourists for each emotional value

it could be argued that this coincidence of results corroborates them, shows their validity and also validates the semantic methodology of analysis used in this study.

The results have also shown strong discrepancies between the values transmitted by DMOs and those reflected by the comments of visitors, proving a lack of effectiveness of the official messages in the communication of a specific distinctive brand. This difference between the values communicated by the DMOs of destinations and what tourists communicate also shows the mismatch between the identity or the brand that the destination wants to convey and the image that tourists have of the place. This shows the limitations of DMOs in the communication of their destination brands and also shows the necessity of DMOs to improve the communication of their brand values through social media.

Considering these results, it looks like there does not exist a strategic communication of brands in most of the official Twitter accounts of the analyzed destinations. This idea also coincides with the conclusions of Huertas and Mariné-Roig (Huertas & Mariné-Roig, 2016), which showed that emotional values were not taken into account in the strategies of communication of content. This aspect is quite surprising, because all the studies show the importance of brand and emotional communication in building relationships with the public and the influence in their travel decisions (Laroche et al., 2013; Morgan & Pritchard, 2004; Zhang et al., 2009) and also the great potential offered by social media to communicate brands and emotional values (Govers et al., 2007; Mariné-Roig, 2013; Stepchenkova & Zhan, 2013).

Thus, the main conclusions of the work are twofold. On the technical side, it has been shown how it is possible to make a fast, automated and semantic analysis of a large number of tweets associated to a given location, avoiding the expensive cost of human manual analysis. From the communicative point of view we can analyze if DMOs make a strong effort on the definition of a personalized, distinguishing brand and if they define clear strategies on how to use social media to convey its main identity traits.

We believe that this study has relevant consequences for destination managers. The first one is related to communicative strategies. The destinations directors of communication should design clear brand communication strategies and they must make sure that community managers follow some specific guidelines for brand communication through social media. Given that social media have a great potentiality to communicate destination brands, it is necessary to make a strategic use of these new tools to obtain an optimal implementation of the brand communication strategy. To achieve this goal it is mandatory that directors of communication establish some brand communication guidelines to be followed by community managers, including not also wide content strategies but also concrete guidelines on how to write texts and how to use terms and concepts.

Another implication of the study reported in this paper is that community managers of DMOs have to know that their function is not only to inform about news or to show the main touristic attractions of the destination, but also to communicate identities, experiences and emotional values. In order to do that they have to take great care of the contents they publish, they have to be aware of the language and words they use, and also of the images and all audiovisual material they upload. As mentioned before, other studies show the prevalence of informative content over the emotional brand content (Huertas & Mariné-

Roig, 2015; Míguez-González & Huertas, 2015). A challenge for DMOs will be to address this issue. They must analyze if there is a brand communication strategy or not, if this strategy is clearly communicated to the community managers, and if the professional profile of community managers, generally journalists, can determine an undesired prevalence of mere information over brand emotional values.

This work also shows that DMOs should continuously analyze their communication through social media. They have to know exactly what they are communicating through these powerful new channels and to check if they are really communicating the intended identity and brand of the territory. In many occasions what you want to communicate is not what is actually transmitted, as the team that designs the brand does not include the social media manager. Moreover, it is necessary for DMOs to compare the destination brand they communicate with the image of the brand perceived by tourists, which they communicate through their personal social media and can have a very strong influence on the future travel intentions of potential visitors. This analysis can give two types of information to DMOs. On the one hand, they may discover which emotional values of the brand are not well communicated because they are not shared by the tourists. On the other hand, they must understand which emotional values are attached by tourists to their destinations and evaluate if it is necessary to add them to the brand or to redesign the brand communication strategy.

It is worth mentioning that the proposed system has several limitations, some of which might be palliated in future versions of the system. The system only analyzes English tweets, so it cannot process messages in other languages. It is restricted to the analysis of textual content, so it does not analyze pictures or videos linked to the messages, which may convey a high degree of information about emotional values that the system is not able to capture. We only consider the adjectives used in the tweet, discarding the rest of the message. We are not making any complex syntactic analysis of sentences nor any kind of sentiment analysis, so the system would not make any distinction among the tweets 'This is the most romantic city in the world!' and 'This city should definitely not be the destination of any romantic weekend'. As a future research it would be interesting to do a more detailed analysis of DMOs communication strategies, which complements and enriches the semantic analysis of content we have done. We should carry out in-depth interviews with directors of communication of DMOs to know the communicative guidelines they convey community managers in detail. At the same time we should also interview community managers to know their profile and the communication guidelines they have received from the director. With this qualitative information we should better understand the results of our study and we should be able to know the reasons of the limited brand communication through social media.

There are many other lines of future work which are currently beginning to be explored. We are considering the possibility of analyzing also the tweets of the local residents, so that we can try to understand which is their emotional perception of the city. We would like to categorize the tourists on different ways (e.g. depending on their origin), so that a DMO could study the differences on image perception from different kinds of visitors. We would like to explore how the use of nouns (especially named entities) in the tweets may be linked

to different types of tourist attractions. It would also be interesting to try to compare the emotional values communicated by the same DMO through different channels (e.g. Twitter, Facebook, official web page).

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