



Minding the Gap Between Perceived and Projected Destination Image by Using Information and Communication Platforms and Software

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ABSTRACT

The article examines a double case study framework for analyzing perceived and projected destinations by using ITC solutions. First, 22,362 photos tagged with “Brasov” were collected and analyzed using the Flickr API. Second, a descriptive-explanatory research was employed, applying an instrument for the analysis and to address the online identity of place brands where a proposed online platform generates an automatic score calculation. The spatial patterns of tourist activity revealed many similarities and differences compared to promoted attractions by the DMOs, as the results indicated that geotagged photos reflect the projected image of the destination as the data provided a hotspot distribution of popular tourist attractions. The article makes a theoretical and practical contribution: (a) visual imagery may be more fully implemented in research studies; and (b) the distribution of popular tourist attractions may be in synergy between the perceived and projected image of a destination. Implications for marketing managers are presented.

KEYWORDS

Brasov, Destination Image, Identity Characteristics, IT&C Applications, Place Brands, Tourism Websites, Transylvania, Visitor Generated Visual Content, Visual Data Analysis

INTRODUCTION

Although new technologies have been frequently implemented in everyday life by visitors at tourist destinations (by taking photos, uploading them on social networks and photo sharing platforms, leaving digital footprints on the Internet) and visitor-generated visual content (VGVC) is continuously created and uploaded. Official agents such as Destination Management Organizations (DMOs) are slow to

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implement new technologies to communicate a place's online identity, relying more on traditional tourism data collection methods (surveys, interviews and focus groups), that are both expensive and time consuming. When they do so, discrepancies may exist between what is perceived by tourists and the way the destinations are communicated by the agents involved.

The purpose of this research is to examine a proposed double case study framework for analyzing perceived and projected destinations by using Information and Communication Technology (ICT) solutions with the aim to minimize possible misunderstandings that can be made for the destination.

Regarding the perceived image, 22,362 photos tagged with "Brasov" City, Romania were collected using Flickr API (Application programming interface) for an 18-year period and were analyzed with the further aim to examine the way visitors 'see' the place via the lens. In the case of projected destination images, a descriptive-explanatory research was employed focusing on a methodology depository, applying an instrument for analysing and addressing the online identity of place brands via the tourism agents' eyes. A proposed online platform generates an automatic score calculation algorithm for place brands obtained by applying the analysis grid to websites based on a ranking system.

The findings highlight similarities but also discrepancies between the images created online by marketers for Brasov, Romania and how different the same place is perceived by visitors. The paper makes a theoretical and practical contribution on the way (a) visual imagery may be more fully implemented in research studies and (b) the distribution of popular tourist attractions may be in synergy between the perceived and projected image of a destination employing an online software platform that was developed making it adaptable to any type of smart device. Implications for tourism marketing managers are provided for image assessment.

This work aims to limit the gap and extend our knowledge in regard to ways specific applications and software may be useful to the analysis of visual images and websites.

The sections of the paper are as follows: the authors present in section 2 literature works that illustrates the significance of user-generated content (UGC) in relation to photos that may be used for the creation of destination image. Section 3 presents methodology for the both case studies taken into consideration and the authors in the last section present the conclusions and provide managerial suggestions for DMOs.

BACKGROUND

Photographs play a crucial role in the promotion of tourism destinations and they should be seen as legitimate agents of inquiry although tourism research has favored textual data over visual data (Balomenou and Garrod, 2019, Kavoura and Nechita, 2017). Researchers have been relatively slow to capitalise on the potential of visual data analysis techniques (Garrod, 2007) while researchers have brought out the benefits that exist when perceived online destination images are taken into consideration in the promotional efforts of managers in charge of projected online destination images (Stepchenkova and Zhan, 2013, Michaelidou, Siamagka, Moraes and Micevski, 2013, Mak, 2017). Research (Pan, Lee and Tsai, 2014) has indicated that photos are more suited to reflect the affective images of places from tourists' perspectives. Extracting and understanding tourists' point of interest from geotagged photos has been the focus of many researchers (Kisilevich, Mansmann, Bak, Keim and Tchaikin, 2010). The image-based content sharing platforms typically have higher rates of geotagging. For example, 80% of images in the now-defunct Google Panoramio were geotagged, and most Flickr photos are geotagged where Flickr is the second social medium mostly used where the extraction of useful content from images and videos is easier from tags from content sharing web sites (Bae and Yun, 2017).

The call for pluralistic approaches in the way tourism analysis takes place on both the destination image promotion but also on the way this image is perceived by visitors of one destination, has brought forth visitor-employed photography (VEP) as a method of study (MacKay and Couldwell, 2004); volunteer-employed photography that entails photographic data that has been collected by

tourists in a self-directed manner (Garrod, 2007); the combination of visitor-employed photography with content analysis and quantitative statistical techniques (Garrod, 2008); pictorial user-generated content (UGC) on social media websites, such as Facebook, Flickr, and Panoramio and other photo-sharing websites that reflects users' perceptions of a destination (Stepchenkova and Zhan, 2013); online visitor-generated photography and its comparison to marketers projected image for a destination (Michaelidou, Siamagka, Moraes and Micevski, 2013); the software that has been used to collect UGC and extract information from large UGC data sets (Lu and Stepchenkova, 2015); selfie-taking as a new way of touristic looking where the tourist gaze is facilitated by smart phones and social media (Diholp and Gretzel, 2016); visual content analysis of photographic data in tourist-generated content (TGC) (Mak, 2017); visuality in tourism and photography as part of the discourse of visual images (Park and Kim, 2018).

User-generated content (UGC) is defined as being the media content that is produced by the general public and is primarily distributed online via Web 2.0 technologies (Daugherty, Eastin and Bright, 2008). User-generated content for tourism is termed in many ways, two of them being "tourist-generated content" (TGC) or "travel-related consumer generated media" or the travel-related content created and uploaded by tourists on the Internet (Mak, 2017, Sun, Ryan and Pan, 2015, Yoo and Gretzel, 2011, Xiang and Gretzel, 2010). Travel photos are considered to be a starting point in order to understand thoroughly tourists' perceptions of a destination (Mackay and Couldwell, 2004, Stepchenkova and Zhan, 2013, Hunter, 2016).

User-generated content (UGC) in social media is gradually being acknowledged, as can now be seen from numerous studies published in the literature (Zeng and Gerritsen, 2014), although this issue is a subject that still needs to be explored in greater depth (Nechita, Demeter, Briciu, Varelas and Kavoura, 2019). Since UGC sources have an indirect effect on tourist satisfaction since most UGC sources have an influence on tourist expectations, which will later be compared with the real tourist perception (Narangajavana et al., 2017, Stock, 2018), geotagged photos generated by tourists should be taken into consideration for the projection of a destination.

At the same time, places compete with each other in order to obtain differentiation so that they can acquire competitive advantages. The concept of place branding refers to "branding and building brand equity in relation to national, regional and/or local (or city) identity. Because the Internet is an interactive medium, it enables social communication through forums, blogs, social networks and so on. As a result, the visibility of place brands has increased considerably (Alonso and Bea, 2012, p. 316). With the advent of new technologies, images of places have been part of research associated with image analysis. This has been the case via the provision of geographic information or image tags (Liu, 2011), or research by Yanai (2015) on web images, and image analysis to infer location in the context of Flickr or research on approaches to determine the location of photos (Luo, Yu and Gallagher, 2011). Zheng, Zha and Chua (2011) also discuss geo-referencing for location landmarks and locations from photos from an image point of view.

The simultaneous examination of the projected and the perceived destination image via visual images and photography generated content analysis has not been approached by many researchers (Stepchenkova and Zhan, 2013, Ji and Wall, 2015, Kavoura and Nechita, 2017, Mak, 2017).

There is continuous call on how user-generated content (UGC) depicts the image of a destination from both visitors' and managers' point of view; tourism visual research is mainly qualitative while the implementation of information and communication methodologies and software has a lot to provide as the framework for academic research (Lu and Stepchenkova, 2015, Balomenou and Garrod, 2019, Park and Kim, 2018). The abovementioned offer ground for this research to take place.

METHODOLOGY

The aim of this research is to examine the way perceived and projected images may decrease possible gaps by introducing innovative information and communication online platforms and

software that analyze visual content of destinations. For this reason, the authors describe two ways in which the authorities involved in place brand management can use new technologies to evaluate the perception of their online identity communicated by official websites (Briciu, Demeter, Nechita, Kavoura and Briciu, 2019) and to compare to the most popular attractions as they are perceived by foreign visitors.

For this purpose, the case study method was selected, as authors comment, “a case study is an intensive examination, using multiple sources of evidence (which may be qualitative, quantitative or both), of a single entity which is bounded by time and place. Usually it is associated with a location. The ‘case’ may be an organization, a set of people such as a social or work group, a community, an event, a process, an issue or a campaign” (Daymon & Holloway, 2005, p. 105). Also, the case connotes a spatially delimited phenomenon (a unit) observed at a single point in time or over some period of time (Gerring, 2007) and the case selection “is the rational selection of one or more instances of a phenomenon as the particular subject of research” (Bleijenbergh, 2010, p. 61). The two case studies where computational methods are presented are examined in the next sections.

CASE STUDY NO. 1

Research Setting – Brasov, Transylvania

The destination under study was chosen to be Brasov, Transylvania on the grounds of Brasov County was the second Romanian destination for foreign tourists in 2017, as 196.000 foreign tourists were officially registered (<http://www.bizbrasov.ro/2018/02/23/brasovul-ramane-primul-judet-dupa-capitala-ceea-ce-priveste-atragesrea-de-turisti-straini/>).

Brasov is located in the central part of Romania, about 166 kilometers north of Bucharest. It is part of historical region of Transylvania and it is surrounded by the Southern Carpathians mountains. According to the latest Romanian census (2011), Brasov City has a population of 290,743 (estimated at January 1st, 2016 and 253,200 at 2011 census), but its metropolitan area is home to about 400,000 residents (INSSE, 2016). Four hundred objects are on the List of Historical Monuments of Romania, with the Middle Ages, the Renaissance, the Baroque, the Classicism, and the modern period leaving their marks on the city.

The fact that VGVC can be employed, allows for synergies to be established in relation to DMOs that can use VGVC. This can be uploaded from tourists to illustrate that the projected and the perceived image of a destination is persistent.

Method

Data used in this study have been reclaimed by using photos uploaded on Flickr from January 1st, 2000 to July 1st, 2018 and tagged with “Brasov”. The most suitable language for data mining is Python 3.6, with countless modules that can be installed as needed pandas, folium, numpy, scikit-learn, matplotlib. Other programs like R, Java or Scala are used by the Data Scientist, but Python is the best choice because is quite simple to use and understood. Another important reason to be considered: Python 3.6 is free of charges.

Two types of API searches were used flickr.photos.search: after the “Brasov” tag and geographic coordinates. Precise results were obtained after looking for geo-coordinates, because the tags are later placed on the post, and the GPS coordinates come from the camera. In our case around 2% of the pictures are from other cities, which may mislead the classification if they are not filtered and eliminated. Specifically, for Flickr is that it can be downloaded pictures and information about pictures using different search options related to the period, location or tags. To operate the system, data is entered in a 4000-page bounding box on 16 pages of 250 pictures. The application considered this restriction of not exceeding 4000 pictures, using a recursive algorithm, and the data was collected at intervals of one year.

The photos with geolocation were collected for the city of Brasov from 2000 until now, but for this fact-finding data from 2006 until now were used. The target group of this study was the foreign tourists, from the total sample were removed the local users of Flickr and user with unspecified address. The number of geo-localized photos and tagged with *Brasov*, by year, is 22,362 for the period of 1st January 2000 – 1st July 2018. The numbers for every year are: 2000 – 13 photos, 2001 – 15, 2002 – 13, 2003 – 170, 2004 – 31, 2005 – 252, 2006 – 118, 2007 – 1657, 2008 – 2095, 2009 – 1922, 2010 – 2375, 2011 – 2017, 2012 – 2273, 2013 – 2434, 2014 – 1594, 2015 – 1886, 2016 – 1029, 2017 – 968, 2018 (until 1st July) – 500 photos.

It can be established if one user is tourist or local by using additional API calls for every user with unspecified location. Researchers counted the photos uploaded on Flickr in order to evaluate the attractiveness of one specific place, but it was eliminated the multiple photos that have the same GPS coordinates.

Since there are many geographic points, a classifier should be used in order to reduce the number of points. The most used classifiers are K-Means and DBSCAN. In python, these classifiers are implemented in the *sklearn* module. The most popular classifier for geographic points is DBSCAN, which uses two parameters to give the classification: 1) the minimum number of objects in a cluster and 2) an epsilon that specifies the distance in kilometers from points which represents the maximum distance in kilometers that points can be from each other to be considered a cluster. The K-Means classifier has a single parameter: the number of clusters. A comparison of the clustering algorithms in *scikit-learn.org* is presented in Table 1.

For the classification, the Council Square and the Black Church, two important and close targets, were detected and marked separately as points of interest, and epsilon was set at 100 meters and at least 5 objects in a cluster. Therefore, 91 clusters were obtained for 4233 points. In order to compare the two classifiers we have chosen 91 for the K-Means classifier. From the distribution of the geotagged photos for the last 3,5 years it can be observed that are very few differences on spatial distribution (Figure 1).

OpenStreetmap was used in order to view data (Figure 2). Classified points are represented with white circles. The centers of the clusters are marked with *OpenStreetMap* specific markers. *OpenStreetmap* is available to be downloaded for free and downloaded maps can be used offline.

For map generated with K-means (see Figure 5) it can be seen that a point of interest like Tampa Mountain was divided in 3 distinct 2-range point of interest: 1. start of Cable Station; 2. End of cable Station; 3. Tampa Belvedere, because K-means classify and use all points, compared with DBSCAN (Figures 3 and 4) which only groups points that are close to each other based on a distance measurement.

As shown from the map generated by the application on geotagged photos posted on Flickr by the foreign tourists, the following points of interest for Brasov have been extracted: Council Square, Black Church, White Tower, Tampa Belvedere, Railway Station, Rope Street, Muresenilor Street, Titulescu Park, Cable Station, Black Tower, Schei Gate, Republicii Street and First Romanian School.

Table 1. Comparison of the clustering algorithms in *scikit-learn.org*

Method Name	Parameters	Scalability	Usecase	Geometry (Metric Used)
K-Means	number of clusters	Very large n_samples, medium n_clusters with MiniBatch code	General-purpose, even cluster size, flat geometry, not too many clusters	Distances between points
DBSCAN	neighborhood size	Verylarge n_samples, medium n_clusters	Non-flat geometry, uneven cluster sizes	Distances between nearest points

Source: <http://scikit-learn.org/stable/modules/clustering.html>

Figure 3. Geographical points collected from geotagged photos for Brasov (left) and centers of the point of interest detected with DBSCAN for the photos uploaded between 1.01.2006 to 1.07.2018

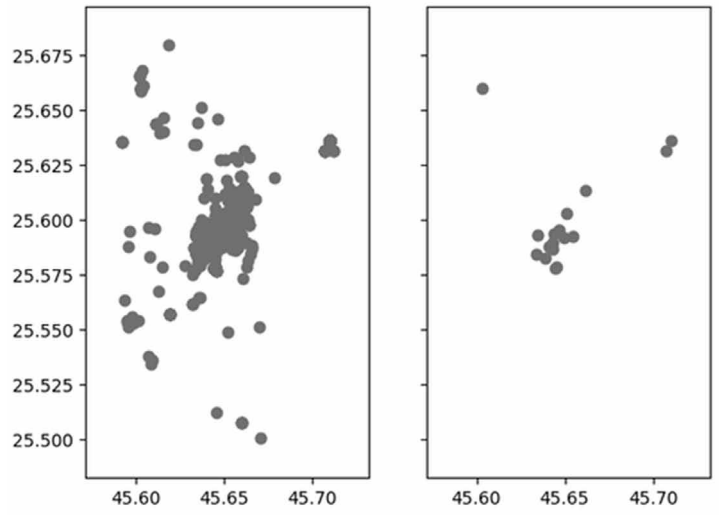
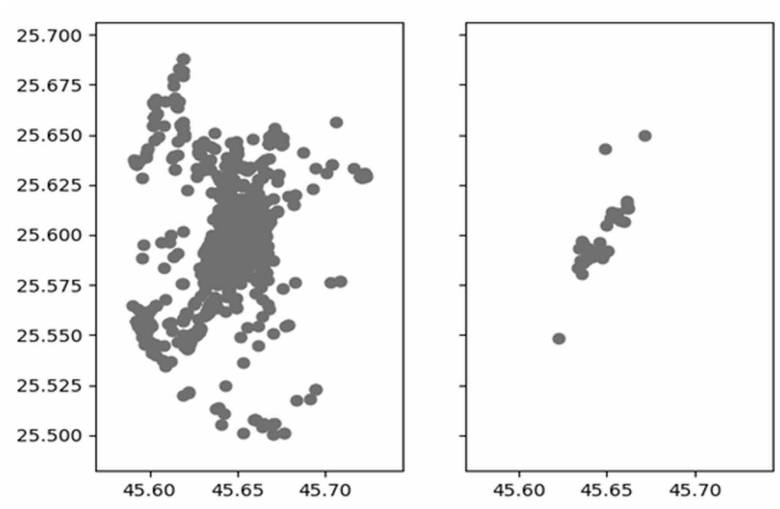


Figure 4. Geographical points collected from geotagged photos for Brasov (left) and centers of the point of interest detected with DBSCAN for the photos uploaded in 2017



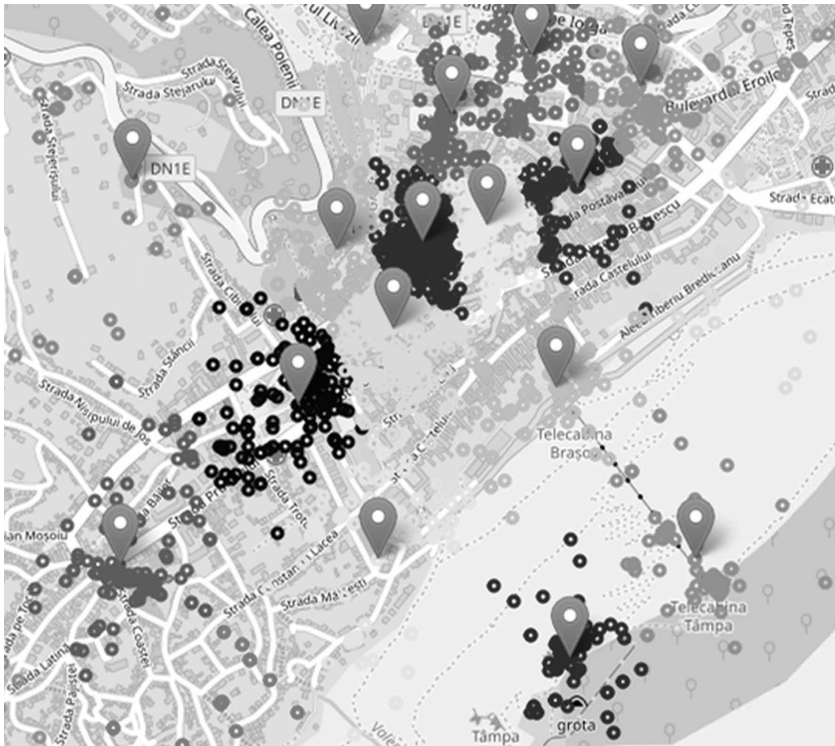
Other points of interest such as Poiana Brasov, Belvedere and Cetatua (Citadel) were identified using K-Means though not seen using DBSCAN classifier. So, in order to have an overview, both K-Means and DBSCAN classifiers should be used together.

CASE STUDY NO. 2

Research Setting

The purpose of this second case study is to identify how the authorities (i.e., governmental entities, central or local administration institutions or stakeholders) involved in place branding management

Figure 5. Geographical points collected from geotagged photos for Brasov and centers of the point of interest detected with K-means for the photos uploaded in 2017



use the internet's potential in order to communicate their online identity. Its purpose is to identify and analyze the characteristics of place brand online identity. In order to explore how the authorities involved in place brand management use the internet's potential as means to communicate their identity, a descriptive-explanatory research was conducted. The research's purpose is to answer the following questions: (1) Are there all the characteristics of a place brand's identity communicated through official websites by authorities? (2) Which are the most common characteristics of a place brand's identity used by authorities online? (3) Are the official websites of places passive channels of communication (informative) or active channels of communication (interactive)? Due to the fact that analyzing place brand online identity is relatively new as a scientific field (Florek, Insch and Gnoth, 2006, Alonso and Bea, 2012), an unanimously agreed model was not developed in the branding sphere. Therefore, the analysis methods used in other fields were adopted.

For this research the method of content analysis was chosen. Content analysis is an observational research method which aims to systematically evaluate the symbolic content of all communication forms (Kolbe and Burnett, 1991, p. 243). Gibson and Ward claim that "although content analysis in general, and of media sources in particular, has a long and established pedigree, analysis of Web sites is a recent area of study" (Gibson and Ward, 2000, p. 303).

The research's corpus is defined by the websites of places. These websites will be considered communication sources because "each activity on the website contributes to place branding which results as a certain imagine of a place" (Florek et al., 2006, p. 281). The sampling technique chosen for this study is the non-probability sampling, following the model offered by Fernandez-Cavia, Rovira, Diaz-Lupe and Cavaller (2014). The sampling of 10 national and international destination websites is the result of a combination of several criteria: "firstly, taking into account national and international

destinations; secondly, incorporating different kinds of destinations (cities, regions, countries and nations); and lastly, seeking variability in terms of geographical location, and the tourist-based potential, the maturity of the destination and the resources at hand to promote it” (Fernandez-Cavia et al., 2014, p. 11). According to the World Tourism Organization (UNWTO, 2017) the top ten countries visited in the world were: France, USA, Spain, China, Italy, United Kingdom, Germany, Mexico, Thailand and Turkey (<https://www.e-unwto.org/doi/pdf/10.18111/9789284419029>). For this study the top two countries reported above (France and USA) and several regions/ cities corresponding to those countries (Paris, Normandy, California, Los Angeles, New York City) were selected in order to answer the research’s questions. Alongside, three brands from Asia and the Pacific region which show major potential for tourism growth: Japan, Thailand and Bangkok (UNWTO, 2017).

Table 2 presents generic information about the selection of cases, the 10 authorities that own and manage the place brands and their website’s names.

In order to create viable categories and coding scheme on place brand’s identity online characteristics it is necessary to compare concepts and methodologies from other scientific fields because a calibrated, well-rounded methodology from one scientific field regarding place brand’s identity online characteristics does not exist. The closest available conceptual structure is the one provided by Florek et al. (2006). From the political communication field, the methodologies provided by Gibson and Ward (2000), Schneider and Foot (2002), and Brundin (2008) will be used. From the corporate marketing field, the structure provided by Okazaki and Skapa (2009) will be also taken into consideration. Lastly, from the place branding field the approached used by Florek et al. (2006) will be adopted. According to Gibson and Ward “the key utility of the scheme lies in the fact that it offers a standardized tool for entering information about Web sites” therefore any innovation and new features developed on the Web can easily be slotted on this scheme (Gibson & Ward, 2000, p. 308).

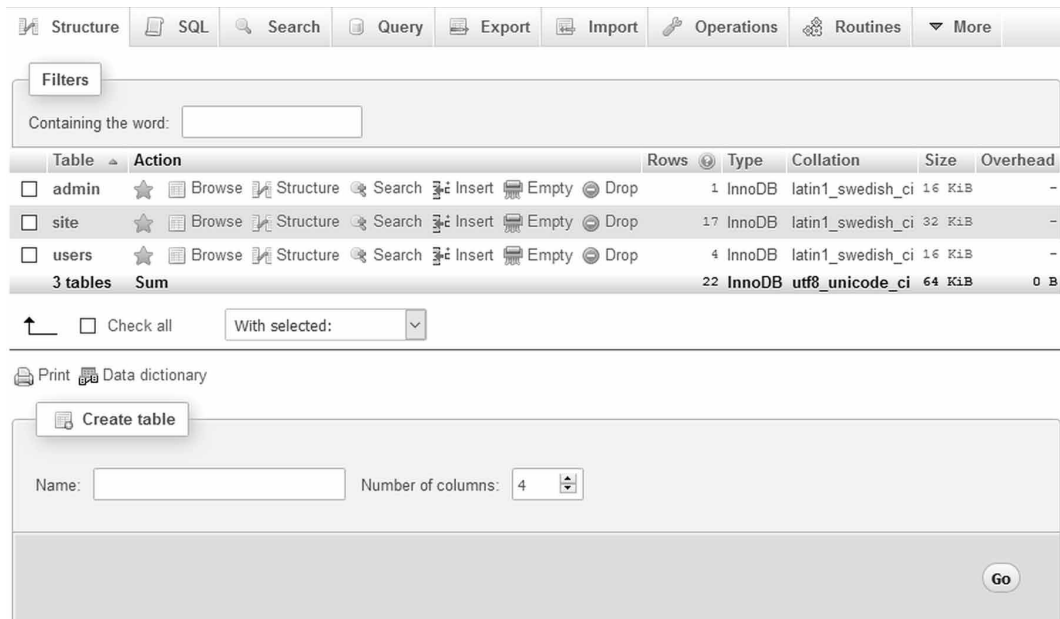
For the websites’ content analysis, a software platform has been developed using modern programming languages. Thus, for the creation of the database, the MySQL relational database management system was used together with the phpMyAdmin tool, with xampp included; to design the application, the PHP language was used and CSS, jQuery and JavaScript were used for stylization. The database has a visual interface. Each table in the database has an auto increment ID. The data of the application was divided into three subdivisions as follows: Admin, User and Site. The phpMyAdmin interface is shown in Figure 6.

This application was not design for general use or to be publicly available, as it was constructed to perform content analysis of user-rated sites and has solely research purposes. The application is divided into two parts: the front-end (user-side) and the back-end (administrator side). On the back-

Table 2. The 10 official websites and the names of the authorities involved in place branding management

	Name	URL
1.	Atout France - France	http://in.france.fr/
2.	The Paris Convention and Visitors Bureau - Paris	https://en.parisinfo.com/
3.	Normandy Tourist Board - Normandy	http://en.normandie-tourisme.fr/
4.	Brand USA - USA	https://www.visittheusa.com/
5.	Visit California - California	http://www.visitcalifornia.com/
6.	A Tourism & Convention Board - Los Angeles	https://www.discoverlosangeles.com/
7.	NYC & Company, Inc - New York City	https://www.nycgo.com/
8.	Japan National Tourism Organization - Japan	https://www.jnto.go.jp/
9.	Tourism Authority of Thailand - Thailand	https://www.tourismthailand.org/
10.	Asia Web Direct Co., Ltd - Bangkok	http://www.bangkok.com/

Figure 6. The phpMyAdmin interface



end side, the sites added by the predefined users are managed and also the users are managed. The administrator has access to all site information, user data, etc. It is able to use all the functions: Create, Read, Update, Delete. For each table in the database, there is a set of CRUD (create-read-update-delete) functions that are activated through forms with the POST method (in the case of update-delete-add it uses forms and for data retrieval, it uses the functions call). Regarding the front-end side, buttons and text fields were created for entering data, the user having to fill in the data according to the analysis grid. This grid has been implemented using aesthetic and intuitive design. The entire interface was made using the Bootstrap module, making it adaptable to any type of smart device.

In the Figure 7 above you can add generic information about the added website by filling in the following fields: Name, URL (Uniform Resource Locator), Country, Continent, Slogan. Next, you must enter the identity variables for each dimension. In Figure 8 the interface for the Brand Design

Figure 7. Add site template

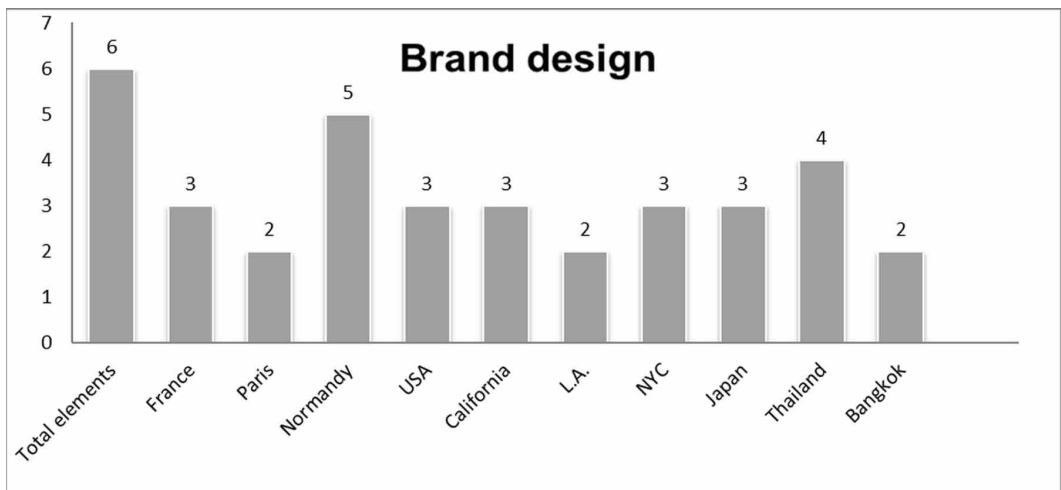
The screenshot shows the 'Add new site' form. It has a title bar 'Add new site' and five input fields with labels: Name, URL, Country, Continent, and Slogan. Each field contains a placeholder text matching its label.

Figure 8. Brand design form interface

form is displayed, the interfaces for the other dimensions being the same, the difference between them consisting only of the variables specific to each dimension.

The user can easily enter the variables using this form, since it was created with a user-friendly interface (see Figure 8). For example, if a brand has the “Slogan” variable in its composition, the user can determine the value by clicking the button next to the “Slogan” variable. The button initially has the value “0”, meaning “No”. Once accessed, the button switches to “1”, i.e. “Yes.” Connecting to the PHP database was resolved using PDO (PHP Data Objects). PDO provides an abstraction level for accessing data, which means that independently of the configured database, the same functions will be used to send queries and receive data. To insert the data into a table with PDO, the query is first determined using the prepare() function. Then, this query is executed with the execute() function. This practice prevents SQL injection attacks. Once added, a site receives a score that is calculated based on its features. This score is calculated for all four dimensions that need to be analyzed and saved in the database. Depending on the score obtained, the site of the place brand is added to the diagram of each dimension, to the position obtained. This information can be viewed on Column Bar Chart graphs in the current user Dashboard. As more sites are being added, the user can interpret the charts generated by the application, by obtaining a Top 10 hierarchy. The most common characteristics used by authorities online for the brand design are: the logo, the picture gallery and the maps. The following figure (Figure 9) shows how many of these characteristics were found on the websites of the place brands analyzed.

Figure 9. Brand design characteristics used by the websites analyzed



The most common characteristics used by authorities online for the brand behavior are: the events calendar and the name of the authority under which the place brand exists. The following figure (Figure 10) shows how many of these characteristics were found on the websites of the place brands analyzed.

The most common characteristics used by authorities online for the brand information and communication are: the general information, the customized information for target audiences such as brochures, the travel tips and FAQs (Frequently Asked Questions), the offers, the bookmarks and share, the cookies, the useful links, the internal links, the option to download pictures/pdf, the site search, the newsletters and the social media connections. The following figure (Figure 11) shows how many of these characteristics were found on the websites of the place brands analyzed.

The most common characteristics used by authorities online for the site delivery are: the presence of mobile icons/images/animate texts, the presence of video materials, the translation of the page, the home page button for each page, the main menu bar for each page and the site index. The following figure (Figure 12) shows how many of these characteristics were found on the websites of the place brands analyzed.

Authorities involved in place branding management use the internet's potential to communicate their online identity by showcasing the brand design; the brand behavior; the brand information and communication; and the site delivery. The results show that these official websites use an average of 22 characteristics of a place brand's identity which represent 48% of the total. Furthermore, these official website of place brands are used rather as passive (informative) channels of communication than active (interactive) channels of communication. In conclusion, branding is a complex phenomenon that can be applied anywhere: to a physical good, a service, a store, an organization, an idea or a place. Major changes occurred in the branding process because of the Internet. Because nowadays the foremost important influence in decision making in the most markets for customers is represented by the information found online, place brands should use the Internet in order to gain visibility. Websites are fundamental tools for communication for place brands. For this reason they should follow certain rules such as: be consistent in style, colors and language, be organized and most importantly be attractive.

Figure 10. Brand behavior characteristics used by the websites analyzed

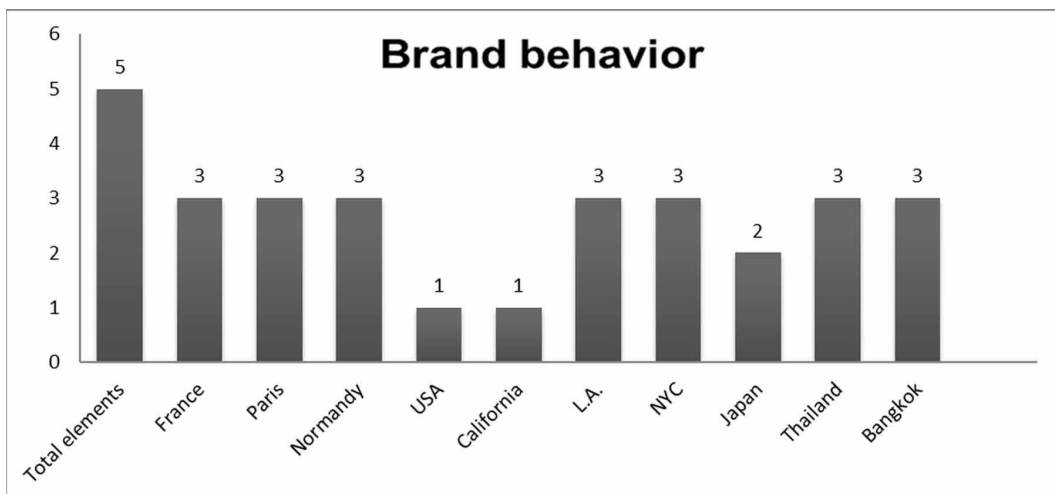


Figure 11. Brand information and communication characteristics used by the websites analyzed

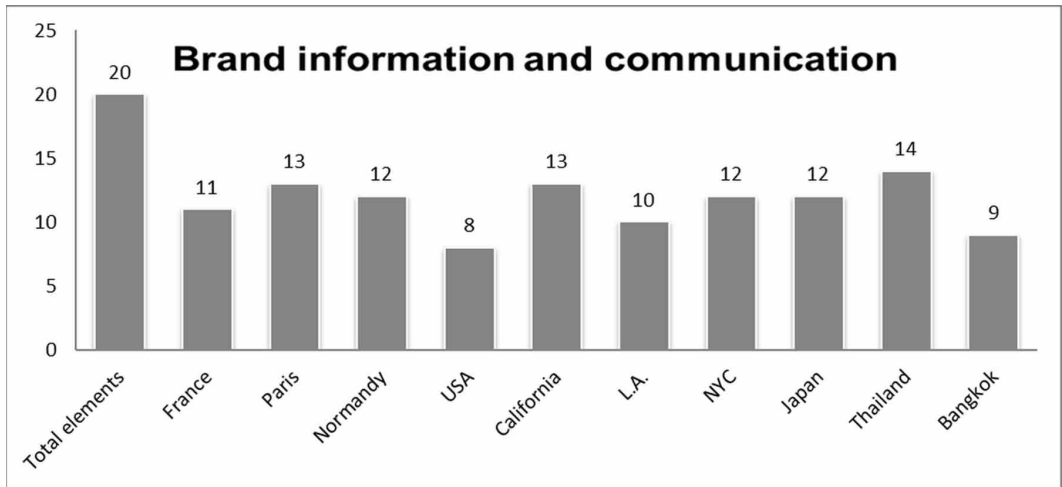


Figure 12. Site delivery characteristics used by the websites analyzed



DISCUSSION

Implications from analysis of visual material are associated with image assessment and what best captures the visitors' perceptions of the destination, a heritage site, etc. (Garrod, 2007), which then can be compared to pictures used in current promotional efforts by managers who should consider visitors' holistic images (MacKay and Couldwell, 2004). Tourist photographs both reflect and inform destination images (Garrod, 2008) theoretical integration of visitor-determined images with destination-determined images. MacKay and Couldwell, 2004, Michaelidou, Siamagka, Moraes and Micevski, 2013). Statistical differences that may exist between what DMOs project and what visitors perceive may contribute to the construction of maps that bring images together and allow tourism marketing managers to better capture images taking into consideration the visitors' point of view for the effective positioning and promotion of tourism destinations (Stepchenkova and Zhan, 2013, Michaelidou, Siamagka, Moraes and Micevski, 2013, Mak, 2017).

From the first analyzed case, the map generated by the application on geotagged photos posted on Flickr by the foreign tourists brings different points of interest for an area under study compared with what the official agents of a tourist destination have depicted as significant to promote. In that way, the spatial patterns of tourist activity revealed by geotagged photos can be associated with what the agents promote as part of the significant points of a destination. Such application in mobile devices can be convenient and easy to use by tourists and definitely needs to be promoted at the official webpages of the tourist destination. The second case shows that the official websites although they employ characteristics of a place brand's identity, are rather passive (informative) channels of communication than active (interactive) channels of communication which can be counterbalanced by visitors' user generated content.

CONCLUSION

Computational models used for analyzing big data provided by social media might assist destination managers to formulate the best scenarios for optimal management of tourist flows and find better promotional strategies. Models like these, presented in the paper, will help the improvement of destination's marketing communication strategies and model the dynamics associated with destination. Both methodologies for analyzing either input or output promotional data will generate predictive models and alternative destination brand communication scenarios.

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