11TH CTV

back to the sense of the city

READING THE SOCIAL PREFERENCES OF TOURIST DESTINATIONS THROUGH SOCIAL MEDIA DATA

Leticia Serrano-Estrada
Lecturer, University of Alicante
+34 965 903 400 Ext. 1323
leticia.serrano@ua.es

Pablo Martí
Associate Professor, University of Alicante
+34 965 903 400 Ext. 3982
pablo.marti@ua.es

Almudena Nolasco-Cirugeda
Lecturer, University of Alicante
almudena.nolasco@ua.es
+34 965 903 400 Ext. 1323

Department of Building Sciences and Urbanism
University of Alicante
Carretera San Vicente del Raspeig s/n 03690 - San Vicente del Raspeig - Alicante (Spain)
deu@ua.es
+34 965 903 652
+34 965 903 820

Taras Agryzkov
Researcher, University of Alicante
Taras.agryzkov@ua.es
+34 965 903 400 Ext. 1323

ANVIDA – Data Network Analysis and Visualisation.
University of Alicante
Carretera San Vicente del Raspeig s/n 03690 - San Vicente del Raspeig - Alicante (Spain)
deu@ua.es
+34 965 903 652
+34 965 903 820

Key words: public space, social networks, social preferences, Benidorm

Abstract

The social preferences of individuals have been traditionally identified through traditional means using field techniques such as direct interviewing, observation and people-counting. The virtual layer of the social system currently allows new ways to identify the most preferred urban areas or venues. With that in mind, this paper aims to study how data from two Location-Based Social Networks: Foursquare and Twitter can shed light on empirical and theoretical observations about the spatial patterns characterizing where people tend to be and socialise in a tourist city. The methodology proposed consists of three stages. First, a self-developed desktop application retrieves geospatial data from the selected social networks. Then, the dataset obtained is organised and sorted. Finally, the georeferenced data is visualised and analysed and the trends are noted and discussed. To that end, the city of Benidorm was selected as a case study and the data was collected during the off-peak tourist season. The results demonstrate a correlation between the empirical assumptions and the findings from the social networks analysis about people's preferred places. Foursquare provides a ranking of urban spaces and venues related to tourism, and the location of the tweets confirms the seasonal nature of Benidorm. Despite the fact that information from location-based social media has to be treated carefully, since each service has its own unique purpose, the method proposed has proven to be effective and reliable to depict a representative sample of people's social patterns and preferences in tourist cities.

Introduction

This study addresses the possibility of identifying social preferences in cities by using social media data. Particularly, the case study of Benidorm as the paradigm of a mass tourism destination in the Costa Blanca.

The Smart citizen, named as the user who connects to the surrounding reality via their mobile device, "interacting with all agents and city services" (Gowex, 2013, pp.45) is the leading role in the virtual city. Their interests and preferences are revealed online and this data provides information on how and when urban spaces are used. . Thus, social infrastructure of the city has long been involved in the fields of architecture and urban design and, recently, digital technologies have extended architecture and urban design's reach (McCullough, 2005, pp. 47). These networks —in this context, digital social-networks— contain fundamental information to discern the relationship between the virtual and the physical means by which citizen's exchange information and socialize. Authors like Chombart (1976, pp. 14) state that "the more the needs of mass communication are developed (...) the less person to person communication takes place" highlighting the fine line between socialization in the virtual context and what really happens in the physical context.

Digital social networks such as Facebook, Foursquare and Twitter are considered as new data sources (Adnan, et al., 2014; Gantz and Reinsel, 2011). This fact is a consequence of an emergent shift in the use of devices, browsing from PCs to mobile devices such as tablets and, more frequently, smartphones (Mazzocola, 2014). Thus, the consideration of social media data as a new source for the study of urban dynamics and analysis comes after the development of

devices that allow sharing location via GPS. Therefore, each activity can be shared online — with its location values (latitude and longitude)— as part of the physical place's digital overlay (Beltrán, 2012). Although in this paper the application of social media data is related to the study of preferences in tourist destinations this new sources of data could boost knowledge in diverse fields (Kim, et al., 2010) such as the scientific as it occurs in (Cranshaw et al., 2012; Noulas et al., 2013; Roick and Heuser, 2013; Serrano-Estrada et al., 2013; Williams, 2012) and even the marketing sectors (Beltrán, 2012; Reed, 2014)

This new sources add extra information to the analysis of urban phenomena and are useful as supplement to traditional methods used for the study of social patterns and organisation of the city. Specifically, these data, allows research on the relational aspects of social structures as well as GPS tracking methods have been used for research about human mobility flows in cities (Palmer et al., 2013; Shoval et al., 2014; van der Speck et al., 2009).

Even when we need to assume that this data source has not been developed for statistical purposes, this research evaluates some qualitative aspects in order to gain a wider perspective on the social preferences of people in a tourist destination. Therefore, although some limits must be recognised —not all people use smartphones and social media, not all tourists use roaming services during their travels and not all tourist landmarks are registered on social networks— results are very descriptive of what happens in the physical reality and work as a tool to understand social interaction and popular spaces in the city.

The case study, Benidorm, represents a sun and sea tourism model, which for the last 40 years has provided tourist services aimed at this niche market, which justifies its dynamic population and territorial growth (Vera Rebollo, 2011). Benidorm's population in 2011 was 47.722 national residents and 28.961 registered foreign residents. It offered 72.841 places —at hotels, hostels, guesthouses, tourist apartments and campings—, and achieved a hotel occupancy rate of almost 93% in August and September, during the high season, when the floating population sometimes even exceeds the permanent residents (Sanchez Galiano, 2013, pp. 64). In the December and January – off peak season- the occupancy rate was 60% (Benidorm Townhall, 2012, pp. 35; INE, 2013). This city has been widely studied by local researchers because of the interesting tourist model that it has developed. Relevant authors in the local forum -such as Mario Gaviria or José Miguel Iribas- have defended this model as one of the most sustainable in terms of urban development and also for its efficiency as a city that works as a tourist industry (Gaviria, 1971, 1974; Iribas, 1997, 2005). This popular destination in the southern east Spanish coast owes its tourist model to the development of one of the most innovative urban plans of the mid-twentieth century. This plan –Masterplan of Benidorm in 1956- designed an urban expansion where tourist accommodation and facilities could be developed in the nearest area to the seafront. For this reason, Benidorm is considered a paradigm for mass tourism (Claver-Cortés, et al., 2007; Iribas, 2005; Ivars i Baidal, et al., 2013; Obrador, 2012)

Methodology, materials, data sources and tools

Two models of interaction of the virtual citizen with the city of Benidorm are considered using data from two social networks. The first model of interaction studies the physical environment of the city through the popularity of their spaces. In this sense, the social network Foursquare

(2014) provides information to identify where people go, and which are the most visited places in the city —social preferences—. From these data it is possible to read out the synergies that exist between places that are predominantly visited and those which are not, as if it were a public cognitive map, thereby the city is "understood not as a material element itself", but in terms of how it is perceived by its inhabitants and visitors (Lynch, 1985, pp. 12). This approach comprises two facets: one composed of "people with their preferred places" in the city, instead of merely describing the identity of the place itself (McCullough, 2005, pp. 182). The second interaction model reveals the perception and ultimately the emotions that Smart Citizens share using text format in the virtual city by analysing data retrieved from Twitter (2014).

Table 1. Information obtained from Foursquare and Twitter

| Fousquare	Twitter	Information provided
Visits and check - ins	Tweet	Reviews and comments
Latitude	Latitude	Geographic reference about the place where the
Longitude	Longitude	information is provided from
Place of origin	Place of origin	Locals or tourists
Venue name	Date and time	
Category	Id number	Specific features
Sub - category	Username	

Source: Author's own.

The procedure used to address this research consists of three parts: data collection, data classification and data representation. First, a computer application extracts data from social networks —Foursquare and Twitter— found within the area defined as an area of analysis. Twitter geolocated points from which users have sent tweets are obtained through the social network, unlike Foursquare, where it is possible to know the number of people —Smart citizens— who have visited places in the city. The information offered from both social networks is summarized in the Table 1.

The geographical area of analysis is covered by the urban fringe given that most tourist attractions are located in this catchment area: 300m wide from the coast heading inland from the city of Benidorm and extending longitudinally covering both beaches; Levante —2.084 meters long— and Poniente —3,100 meters long— (Benidorm, 2012, p. 10).

To obtain the data, the computer application requires a list of coordinates —latitude and longitude— previously defined, from which the search is done on both social networks. For these sites 2141 coordinates have been specified, using a search radius of 25 meters, allowing the study area to be covered as a whole (Figure 1). Thus, for each coordinate a request is made to the corresponding API —Application Programming Interface—, each equivalent to a social networking search request. It is important to note that the net result of the serialization coordinates also includes the maritime area because the points Foursquare georeferenced, corresponding to the two beaches, are slightly away from the front of the promenade toward the coast.

Figure 1. Simple mesh: interaction between search radios
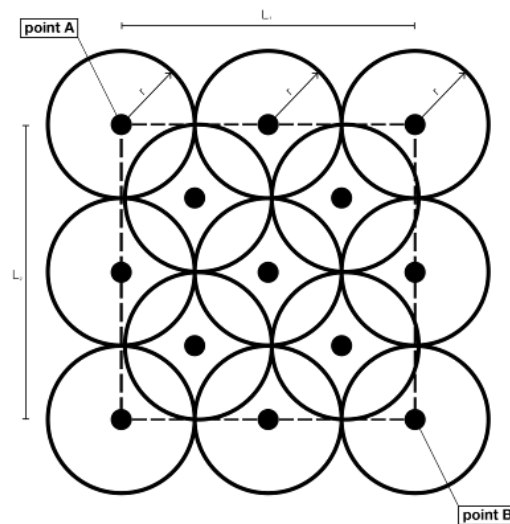
In the case of Twitter only the data of the last tweets — dynamic data — are obtained, not the most important, which are usually those that have been referenced more times — static data —. Thus, the data obtained from one day to another are completely different, which allows us to observe the evolution and participation patterns of users that otherwise would not be seen.

The time factor is taken into account in order to clarify the scope of the data search by requesting every day for four consecutive weeks-from 17 February to 17 March 2014, corresponding to the low season in the tourism sector.

In a second phase, the data obtained above are organized into two types of files: the first is a file format spreadsheet which for Foursquare are distinguished by the following headings: - venue- place name, number of visitors per location, category, subcategory, latitude, longitude, and the origin of users; and in the case of Twitter, the following: tweets, latitude and longitude of the point of origin of the tweets, plus the date and time in which they have occurred. The second file contains the geographic coordinates of the points in the city from which the visitors registered - Foursquare -; and shared tweets-Twitter-.

And finally, the geo-referenced colour coded data are represented on two separate Benidorm maps in order to visualize the results of the study. In the first map, each Foursquare venue is represented by a circle whose radius corresponds to the number of visitors. The colour code represents the category, i.e., the type of activity carried out at the place. In the second map, Twitter data is represented, specifically the origin point of tweets in order to detect the concentration of users in the aforementioned defined study area.

Results

Foursquare

The "Outdoors and recreation" category received the greatest number of visitors and the subcategory "beaches" was the most popular with more than 3,900 visitors. This fact highlights the relevance of this unique natural space within an urban environment as a place to spend time, enjoy and visit in the tourist city. Moreover, the second most relevant venues in terms of number of visitors are included within the category "food" and the subcategory "tapas restaurant" was the most preferred by more than 1,000 visitors. This is explained because restoration is considered here as a leisure activity. It includes sub- categories such as ice-cream shops and fashionable gastrobars.

Both results, together with the third category in terms of number of visitors —nightlife spots— explain the preferences for leisure and the wide variety of possibilities that a tourist sun and sea destination can offer.

Moreover, in the cartographic representation of the data (Figure 3) there is a higher concentration of visitors corresponding to the far end of the Playa de Levante seafront promenade away from the city centre as well as a notable diversity of categories of venues.

Figure 2. Relationship between the number of visitors by categories and subcategories of Foursquare (venues).
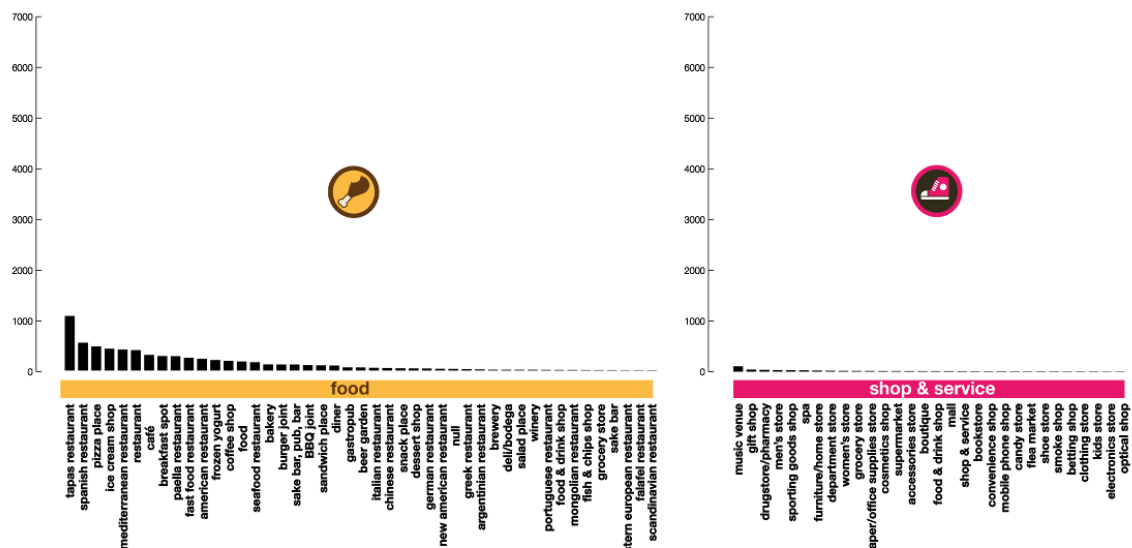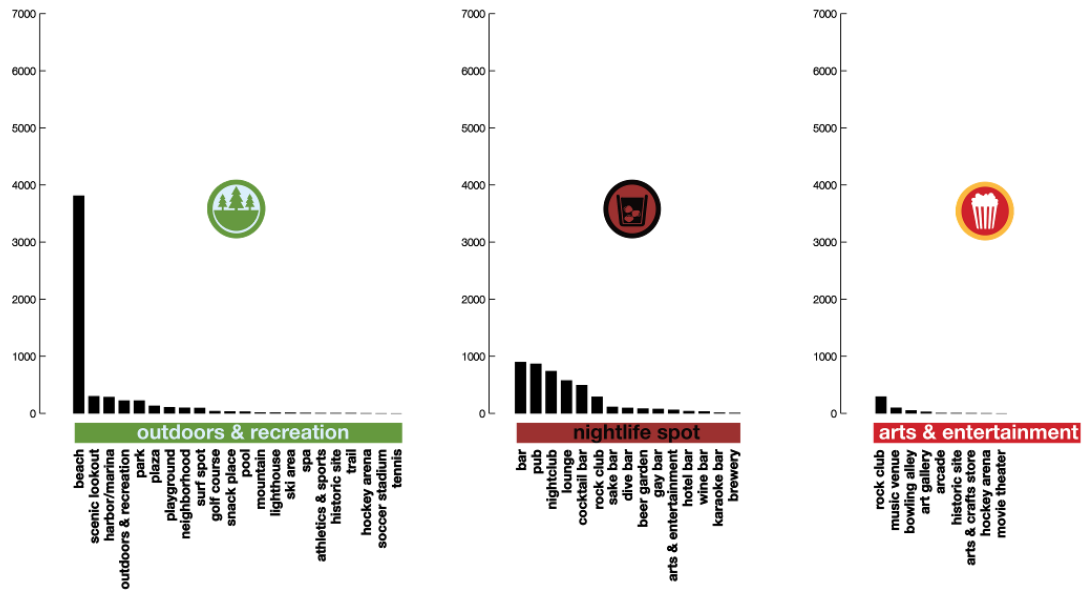
Source: Author's own

Figure 3 Representation of -venues- Foursquare places in relation to the colour of the category to which they correspond and the total number of visitors recorded in each place until 17 March 2014.
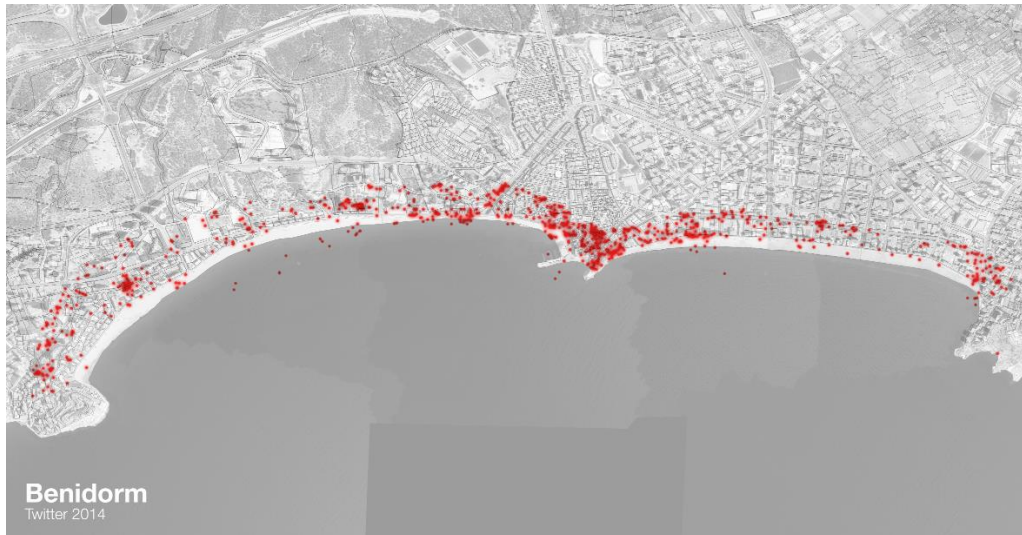

Source: Author's own

Twitter

The greatest number of Tweets (Figure 4) are located in the area where the two beaches, Poniente and Levante, and the historic city centre converge. This means that people

congregate in this area of the city at this time of year indicating the presence of virtual socialization and civic character.

Figure 4 Geolocation points of origin of the tweets shared by users of Twitter during the period from February 17 to March 17, 2014

Source: Author's own

Discussion

The city of Benidorm offers interesting results regarding the location of tweets sent: more tweets were produced from the historic downtown area of the city than from any of the beaches.

This may be due to seasonal demographic reasons, given that the data was logged during the tourist low season when the traditional centre has more permanent residents compared to the beach areas whose residents are mostly seasonal or tourists and, as you would expect, this area has fewer residents during the tourist low season. Additionally, many tourists may not have mobile internet access outside their hotel or apartment.

A further interesting result is offered by Foursquare in the case of Levante Beach where there is notable activity in terms of data logged regarding food, outdoor and recreation, and nightlife spots.

Regarding the disadvantages of the chosen social networks, on the one hand, we should note that Twitter text messages do not usually refer to specific places and many users use this network as a public chat forum and therefore we can only observe the presence and interaction of users in a particular place. Because coordinates of many tweets cannot be extracted, the master coordinate is considered valid to this research, that from a practical standpoint is estimated as valid as possible coordinates resulting from Twitter because it brings together the comments made in near locations. Moreover, the venues that Foursquare includes are mostly city spaces that are known, popular on the web, —i.e. Levante and Poniente promenades,

Plaza Triangular—, socially relevant, therefore, it is important to consider that there are other places that are not recognized by Foursquare.

Our grid conducts searches in circular areas, therefore the data located at its edges may not be comparable to data obtained elsewhere on the grid. For this reason, different measures are used for graphics, reaching the conclusion that the most appropriate scale is 100 meters of diameter (which guarantees more than one point grid).

Conclusions

The beach area of Levante seafront is the most frequented by visitors registered in Foursquare, mainly due to the variety and quantity of activities it registers compared to the Poniente beach.

Regarding the total number of visitors up to March 17, 2014, Levante Beach is the most socially relevant site, with a remarkable differentiation of all venues in Foursquare, confirming Benidorm's image as a sun and beach tourism model. Additionally, Twitter's results show that, in low season, the social activity of the city is concentrated in the historic downtown area, where the permanent population is mainly based.

This study has validated that social networks, such as Twitter and Foursquare, can be used as tools to identify, through virtual reality, what happens in the physical reality of cities. Twitter sheds light on the question about the location of social relations in the city, whereas Foursquare provides information on the preferred or socially relevant areas of a city.

References

Adnan, M. et al. A geocomputational analysis of Twitter activity around different world cities. *Geo-spatial Information Science*, 2014, vol 17(3), p. 145-152

Beltrán López, Gerson. *Geolocalización y redes sociales. Un mundo social, local y móvil.* Spain: Bubok. 2012. [Retrieved online at: http://www.bubok.es/libros/217103/Geolocalizacion-y-Redes-Sociales]

Benidorm Townhall. *Benidorm en cifras 2012*. Benidorm (Alicante): Intertraining S.L., 2012

Chombart de Lauwe, Paul-Henry**.** *Hombres y ciudades.* Barcelona: Labor, 1976.

Claver-Cortés, E. et al. Competitiveness in mass tourism. Annals of Tourism Research, 2013 vol. 34(3), p.727–745.

Cranshaw, J. et al. The Livehoods Project: Utilizing Social Media to Understand the Dynamics of a City. *Proceedings of the 6th International AAAI Conference on Weblogs and Social Media. 2012.* p. 58–65

De certeau, M. *La invención de lo cotidiano (vol.1: Artes de hacer)*. México, D.F: Universidad Iberoamericana, 1999.

Foursquare. *Foursquare Labs*, Inc. [Online API] https://foursquare.com, 2014

Gantz, J. and **Reinsel,** D. *Extracting value from chaos*, IDC iView, Massachusetts: International Data Corporation (IDC), 2011

Gaviria, M. Campo, urbe y espacio del ocio. Madrid: Siglo Veintiuno de España. 1971

Gaviria, M. España a go-go : turismo charter y neocolonialismo del espacio. Madrid: Turner.1974

Gowex. Informe WiFi 2013. [Retrieved Online at: https://www.esmartcity.es/biblioteca/informe-wifi-2013], 12 June 2014.

INE. National Institute of Statistics. [Online: http://www.ine.es/], 2014

Iribas, J. M. Benidorm: manual de uso. Vía Arquitectura, vol. 01 (Arquitectura en la costa). 1997

Iribas, J. M. Benidorm. The reasons for success. In M. Shamiyeh (Ed.), What People Want. Populism in Architecture and Design. Springer.2015

Ivars i Baidal, J. A. et al. The evolution of mass tourism destinations: New approaches beyond deterministic models in Benidorm (Spain). Tourism Management, 2013. Vol. 34, p.184–195.

Kim, W. et al. On social websites. *Information systems*, 2010, 35, p. 215-236.

Lynch, Kevin. La imagen de la ciudad. Barcelona: Gustavo Gili, 1975.

Mazzoccola, G. *The internet goes mobile: Nielsen and Audiwev respond with "Total Digital Audience".* 2014. [Retrieved online at: jttp://WWW.nielsenninsights.eu/articles/the-internet-goes-mobile-nielsen-and-audiweb-respond-with-total-digital-audience]]

McCullough, Malcolm. Digital ground: architecture, pervasive computing, and environmental knowing. Massachusetts: MIT Press, 2005.

Noulas, A. et al. Exploiting foursquare and cellular data to infer user activity in urban environments. *Proceedings - IEEE International Conference on Mobile Data Management*, 2013. vol 1, p. 167–176.

Obrador, P. The place of the family in tourism research: Domesticity and thick sociality by the pool. Annals of Tourism Research, 2012.vol. 39(1), 401–420.

Palmer, JR. et al. New approaches to human mobility: using mobile phones for demographic research. *Demography.* 2013, vol 50 (3), p. 1105-1128

Reed, R. *The SoLoMo manifesto or just about everything marketers need to know about the convergence of social, local and mobile.* Momentfeed (ed.) 2014.

Roick, O. and **Heuser**, S. Location based social networks – definition, current state of the art and research agenda. Transactions in GIS. 2013, vol 17, p. 763-764.

Sanchez Galiano, Juan Carlos. Estudio de la población estacional en áreas turísticas. Estudio de caso: Benidorm. Master Thesis (Unpublished). Alicante: Universidad de Alicante, 2013.

Serrano-Estrada, L. et al. Utilización de nuevas tecnologías en la revalorización de espacios públicos significantes para la sociedad. M. Cerasoli (Ed.), *Book of Acts of the 9th Congress "Virtual City and Territory."* Roma: Roma Tre Press, 2013, p.89-99.

Shoval, N. et al. The shoemaker's son always goes barefoot: Implementations of GPS and other tracking technologies for geographic research. *Geoforum*, 2014. vol.51, p.1-5.

Twitter. Twitter, Inc. [Online API] https://twitter.com/, 2014.

Van der Spek, S. et al. Sensing Human Activity: GPS Tracking. *Sensors*, 2009, vol. 9 p. 3033-3055.

Vera Rebollo, J. F. et al. Reestructuración y competitividad en destinos maduros de sol y playa: la renovación de la planta hotelera de Benidorm. In: D. López (Ed.), Renovación de

destinos turísticos consolidados. XIII Congreso Internacional de Turismo Universidad y Empresa 2010. Valencia: Tirant Lo Blanc, 2011.

Williams, S. We are here now. *Social media and the psycological city*. 2012 [Retrieved online at: http://weareherenow.org/about.html]