Establishing Influence Areas of Attractions in Rural Destinations

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This research provides a critical approach to the assessment and evaluation of tourism destinations from the perspective of traditional administratively-based boundaries. It suggests that researchers and managers should abandon their focus on destinations as all-inclusive administratively-defined areas, readjusting to a more flexible model tied to tourists' travel patterns.

Given the centrality of attractions to the leisure tourism process, the flows that an attraction is able to generate from neighbouring accommodation hubs explains an important share of the way a destination is consumed and offers a means of identifying more 'natural' destination areas. The analysis also explores how several factors affect the influence areas of attractions, and how the elements of conjoining destinations can be interconnected due to tourism flows representing overlapping influence areas and traversing administrative boundaries.

Based on three rural case studies, this research investigates the movements of tourists within and between destination areas, focusing on the relationship between accommodation hubs and attractions as represented by visitor flows. The graphical representation of such flows has enabled the identification of influence areas of attractions which traverse administrative boundaries, and overlap with those of other attractions. The application of a distance decay curve approach clarifies the relationship between accommodations and the visiting of attractions in the three selected rural areas. Furthermore, the overlapping of several attractions influence areas allow the detection of unexploited cooperation within the destination.

Keywords: destination planning; destination management; within a destination travel patterns; tourist attraction management; accommodation management, rural areas

Introduction

Researchers and practitioners alike still disagree on how a destination should be defined depending on their disciplinary background and perspective: be it economic geography–oriented, historically-politically oriented, marketing management–oriented or customer-oriented. Commonly, a destination is considered to be a unit of action where different stakeholders, including public-sector organizations, private-sector companies, hosts, and guests interact through co-creation and consumption of experiences (Saraniemi & Kylänen, 2011). In practice, many national, regional and local authorities have established destination areas based upon administrative boundaries for the planning and managing of tourism within the area.

Tourists, by way of contrast, do not restrict their visits on the basis of administrative boundaries (Dredge, 1999). Furthermore, as assistive and mobile technologies become more widespread in their application, tourists are more empowered to organize their own itineraries on the basis of more personalized criteria using a wide range of information sources outside of traditional channels and with both the media and social media playing an increasingly prominent role (Llodrà-Riera, Martínez-Ruiz, Jiménez-Zarco, & Izquierdo-Yusta, 2015). Destination areas may transcend political boundaries, thereby individual tourism actors may be limiting development initiatives between tourism actors through ignoring how tourists geographically consume the destination (Gunn, 1993; Ioannides, Nielsen, & Billing, 2006; Lovelock & Boyd, 2006, Yang, 2018).

Recognising the need to rethink tourism destinations, authors such as Beritelli, Reinhold, Laesser, & Bieger (2015), Dredge (1999) and Paulino & Prats (2013) suggest the need to abandon the view of tourism destinations as static all-inclusive geographical areas, distinguished by prescribed boundaries, to move to a more dynamic model of

tourism destinations based on how tourists actually consume the space. Going a step further, Yang (2018) conceptualizes the shape, dimension and structure of the cooperation between attractions inShanghai on the basis of tourists' mobility and travel notes, as opposed to the government's perspective.

Leask (2010) has identified several key challenges to be addressed regarding tourism attractions, including evaluating the effect of visitor attractions within a destination area, identifying the supply elements related with visitor attractions and moving away from descriptive work towards empirical work in order to lead to the development of models applicable to the attraction sector. In order to fill these gaps and in meeting the demand to understand tourists desires and needs, the aim of this paper is to rethink tourism destinations by considering how tourists consume destinations, with the focus on the visitation of tourism attractions. Given that attractions are considered to be the central element of the leisure tourism process and the basic elements around which a tourism destination develops (Gunn, 1993; Kušen, 2010; Leask, 2010; Leiper, 1990; Lew, 1987; Richards, 2002), this paper seeks to clarify the territorial influence of tourism attractions once the tourist is at the destination, extending the sphere of analysis beyond administrative boundaries. To do so, the extent to which attractions generate visitor flows from surrounding centres of accommodation and the factors which can be identified as affecting their territorial reach are analysed. Understanding the demand side constitutes an opportunity to plan and manage more effectively the destination and to shed light on opprtunities for cooperation between attractions themselves, as well as between attractions and accommodation providers.

As a secondary goal, this study seek to bring rural destinations back into research debates. The logistical complexities and extra effort needed when collecting data in a rural context, has left these destinations overlooked (Orellana, Bregt,

Ligtenberg, & Wachowicz, 2012; Zoltan & McKercher, 2015); whereas urban and mature coastal destinations have been quite extensively studied (Bujosa, Riera, & Pons, 2015; Caldeira & Kastenholz, 2017; Mckercher & Lau, 2008; Shoval, McKercher, Ng, & Birenboim, 2011).

Several conceptual papers have set out to describe the spatial patterns of tourists' movements at the destination level (Lew & McKercher, 2006; Lue, Crompton, & Fesenmaier, 1993; Oppermann, 1995), setting a precedent of case studiy analysis seeking to distinguish latent destinations within wider areas beyond administrative boundaries through the analysis of tourist flows (Baggio & Scaglione, 2017; Beritelli et al., 2015; Raun, Ahas, & Tiru, 2016). These studies, however, tend to focus on the movement of tourists, ignoring the territorial relationship between accommodation and attractions whilst others have highlighted such territoriality, but focusing on the accommodation hub in line with Lew & McKercher's (2006) territorial model (Caldeira & Kastenholz, 2017; Mckercher & Lau, 2008; Shoval et al., 2011; Smallwood, Beckley, & Moore, 2012).

Truchet, Piguet, Aubert, & Callois (2016) have attempted to fill this gap by analysing the extent to which tourists' attractions influence the spatial development of tourism through the use of econometric analysis. They demonstrate that the influence (or catchment) area of attractions frequently operates on a supra-local level or even regional scale and consider the effect of attractions on tourism development. Tourism, however, is a complicated phenomenon due to the number of variables affecting tourists' flows; thus, in common with gravity models, estimating an attraction's influence area without considering tourists' patterns of visitation to attractions may lead to inaccurate assumptions regarding the scope and influence of attractions.

Here, a different stance is adopted, and the purpose of this research is to identify the spatial territoriality of attractions when considering aggregated travel patterns between accommodation and attractions. Initially, we consider the influence areas of an individual attraction by identifying the range of accommodation points from which tourist flows emanate. At this stage, we focus on factors explaining the particular visitation patterns. Secondly, we overlap the influence areas of several attractions through the identification of shared accommodation hubs of several attractions, highlighting the potential for the clustering of attractions.

The study cases are drawn from three European destinations: 1) a Mediterranean coastal Natural Park, 2) a Mediterranean mountain Natural Park and 3) and a British upland National Park. The intrinsic characteristics of rural destinations tend to lend themselves to a predominance of car-based trips, thereby encouranging multi-destination patterns of movement, rather than single attraction travel patterns (Blasco, Guia, & Prats, 2014; Connell & Page, 2008; Lue et al., 1993; Smallwood et al., 2012). The plurality and relative distinctiveness of the study cases can hopefully ensure the wider representativeness of the results and applicability to other similar rural destinations.

Data collection consisted of visitor questionnaire surveys at the main accommodation hubs and attractions. The data was analysed using a network analysis program and then represented in graphs and maps. The results are presented and discussed in terms of six main thematic areas: time distance, attraction characteristics, accommodation hubs, infrastructure, administrative boundaries and multiple attractions.

A main contribution is a deeper understanding of the role of tourist attractions in how a destination is consumed, and of their spatial relationship with and to points of accommodation. From the perspective of the planning and management of a particular

individual attraction, it is of great utility to know where the tourists visiting are actually staying overnight, in what volumes and which factors influence such flows. The managers of attractions managers can gaina clearer picture of the influence areas of similar or neighbouring attractions, not only providing a potential catalyst for collaboration between attractions and accommodation providers, but also between attractions themselves. The conclusions of this paper are equally of value for regional and local administrations and for the managers of Destination Management/Marketing Organisations (DMOs) and may contribute to improvements in the managing and planning of destinations beyond the view of destinations as political/administrative constructs by taking into account the actual movements and patterns of consumption of tourists.

Literature review

Influence area of an attraction

Attractions are considered the basic element around which tourism develops (Lew, 1987) and as the core element in generating demand and in shaping destination appeal (Weidenfeld, Butler, & Williams, 2010). Leask (2008, 2010 & 2016) provides areview of the literature addressing visitor attractions and the debate aroundwhat constitutes a visitor attraction. Here, however, we consider the essence of the demand-side perspective, tourist attractions are those elements of a "non-home" place which motivate travellers to visit them (Lew, 1987).

The concept of influence/catchment area considers the spatial relationship between attractions and their relative tourist generating-areas, (Chancellor & Cole, 2008; Eagles, Johnson, Potwarka, & Parent, 2015; Swarbrooke & Page, 2002), generally ignoring flows from accommodation to attractions within a destination. During the 1960's, Gravity models popularized a probabilistic formulation for predicting spatial interaction, which were also applied in tourism research.Despite their widespread implementation, these became neglected in the tourism literature during the 1980's due to a lack of theoretical underpinning and the need to consider a host of assumptions about individual choice behaviour(Morley, Rosselló, & Santana-Gallego, 2014; Sen & Smith, 1995). Although gravity models have re-emerged recently with improvements in tourism demand modelling, such probabilistic approaches can still overlook the complexity of travel flows, and there are few studies which consider the influence area or territoriality of flows with the focus on the accommodation side, (Shoval et al., 2011, Lew & McKercher, 2006; Smallwood et al., 2012). Despite a lack of empirical grounding, the influence area within a destination can be theoretically conceptualized through the Model of Attractions developed by Gunn (1993) who

recognized the centrality of attractions (or a nucleus) which need to include an outer zone with services and facilities able to support tourism.

The existence of a major attraction tends to stimulate the development of destinations by encouraging the establishment of support services and amenities required by tourist (Swarbrooke & Page, 2002). Despite their centrality, tourist attractions are merely one part of a complex tourism network within the destination and are interdependent with the wider tourism industry (Leask, 2008). Yang (2018) demonstrates how tourists' mobility affects the shape, dimension, and structure of cooperation in the destination, which is not always aligned with the arrangements supported by governement. Service components are also an essential part of the attraction system, of which accommodation supply is the most important. If there is a lack of accommodation supply in the influence area of an attraction, intensive tourism activity is not likely to develop, even if there is a unique attraction (Lew & McKercher, 2006; Mckercher & Lau, 2008). Fundamentally, locations which provide the requisite infrastructure for visitors are more likely to attract a greater number of visitors than those without (Chhetri & Arrowsmith, 2008).

As attractions constitute a key motivation for visiting a particular destination (Gunn, 1993; Kušen, 2010; Leiper, 1990; Richards, 2002), tourists' logical decision-making process first entails deciding upon an attraction to visit (whether it is a specific site, or a wider area) and then choosing a proximal site of accommodation (Gunn, 1993; Leiper, 1990). Furthermore, in multi-destination trips, where several attractions form the objective of the trip (Lue et al., 1993), tourists must consider the spatial dispersion of the different attractions and their attractiveness level as well as selecting their accommodation base. Moreover, once the tourist is at the destination, unplanned visits to attractions may occur as further information is received in-situ (Leiper, 1990; Prats &

Marin, 2014). As a result, each attraction is able to generate flows from a range of surrounding accommodation, potentially extending their influence area beyond administrative boundaries.

In the case of single-destination travel patterns, tourists tend to choose accommodation and other services close to the attraction they intend to visit (Krakover & Wang, 2008). Attractions, however, are not isolated elements and flows within a destination cannot be explained by focusing upon a single attraction. A far more common situation is that each tourist engages with a range of attractions: that is to say, a nuclear mix (Leiper, 1990; Weidenfeld et al., 2010). In fact, multi-destination trips are especially common in touring destinations (such as rural areas) due to the spatial dispersion of tourism attractions and the degree of freedom allowed by the predominance of own car use. Thus, the logical single-destination pattern becomes more complicated in the case of multi-destination (or attraction) travel patterns. The literature suggests that tourists will choose accommodation which is located in the influence area of the attractions forming the key objective of the trip, and following the base-camp travel pattern (Lew & McKercher, 2006; Lue et al., 1993). In a nuclear mix, flows are affected by the cumulative effect of attractions (Connell & Page, 2008; Lue et al., 1993),with clustered attractions offering a critical mass that cannot be achieved individually, resulting in an increased market penetration of the influence area and in a better capacity to attract people from further afield (Lue et al., 1993; Weidenfeld et al., 2010).

Accordingly, individual attractions depend heavily on each other to create a complex system that is greater than the sum of its parts (Leiper, 1995; Yang, 2018). As the literature on cooperation networks demonstrates, stakeholders within a destination usually work together to reach the same goals, seek market opportunities and find

common points of interest (Jesus & Franco, 2016; Yang 2018). However, government often coordinates collaborative marketing and management activities between attractions, but without considering the actual behaviour of consumers (Yang, 2018).

Factors affecting attraction consumption

Several factors affect the distances that tourists are willing to travel from their accommodation to visit attractions. Tourist are driven by their own motivations to visit tourist attractions, generated by information received from a range of markers (Richards, 2002). Regardless of their intrinsic motivations, tourists may feel obliged to visit renowned or well established attractions (Lew & Mckercher, 2006), and are influencedvariously by destination branding efforts, guide books and word of mouth (both traditional and electronic) (Prats & Marin, 2014; Xiang & Gretzel, 2010). Thus, regarding within-destination travel patterns, such renowned attractions are likely to generate greater flows and from further away than more local scale attractions (Lew & McKercher, 2006; Pearce, 1989; Shoval et al., 2011).

The level of interest in a particular attraction is moderated by the Distance Decay law; this suggests that demand for activities decreases as the distance travelled, time, cost, or effort increases (Mckercher & Lew, 2004). In rural destinations, the physical characteristics and dispersed nature of attractions across a destination may increase such time distances. As tourists are 'outcome' oriented, transit time is seen as a friction factor (Dietvorst & Ashworth, 1995; Lew & McKercher, 2006; Paulino & Prats, 2013).

Service and infrastructure components also exert a significant influence over the evolution of destinations and their spatial structure (Dredge, 1999). Given that accommodation is essential, the spatial relationship between the attractions and

accommodation supply considerably affects the way a destination is consumed (Lew & McKercher, 2006; Mckercher & Lau, 2008). Rural destinations are commonly characterized by more dispersed and lower levels of service components compared to more 'massified' urban or resort destinations. Truchet et al. (2016) found that whilst green areas generally have a positive and significant effect on tourism development, they do not foster any further tourism development beyond a certain point and are rather more associated with diffuse forms of tourism. Thus, spatial patterns may be less predictable in rural areas and may largely rely on neighbouring accommodation provision.

The distances that tourists are willing to travel also depends on each tourists' personal or intrinsic factors. Lew and Mckercher's (2006) territoriality model demonstrates that Psychocentric tourists, at one end of the spectrum, tend to remain in close proximity to their accommodation; whereas Allocentric tourists, at the other end, exhibit more unrestricted destination-wide movement. Moreover, attractions can seek to capture tourists' interest by appealing to their specific characteristics, values and motivations (Dredge, 1999). Personal factors aside however, the specific geographical nature of rural destinations tends to encourage tourists to establish a base-camp and subsequently explore attractions located within the concentric area (Connell & Page, 2008; Lew & McKercher, 2006; Lue et al., 1993).

Many factors affect motivation and distances that tourists are willing to travel within a destination. Some factors relate to tourist characteristics, i.e. personal motivations, group composition, previous experience of the destination, length of stay, distance travelled from home to the destination or socio-economical characteristics. Other factors relate to the characteristics of the destination itself, i.e. attraction

characteristics, attraction accessibility and spatial characteristics, and level of intermediation, amongst others (Lew & McKercher, 2006).

In the case of a nuclear mix, the number of variables increases as consideration must be given to the specific characteristics of each individual attraction as well as to the spatial relationship within and between them and the exogenous accommodation supply (Dredge, 1999; Mckercher & Lau, 2008). Given the long list of factors influencing travel patterns, this paper adopts an empirical approach by analysin within - destination travel patterns with the focus on attractions, in order to examine how tourist geographically consume a destination and explore the main factors affecting patterns of territoriality.

Case Study Areas and Methods

Case Study Areas

Three rural areas with quite varied attributes and features were selected to provide the basis for comparison between quite different destinations, yet allcharacterized by the spatial dispersion of both attractions and hubs of accommodation. In each case tourists demonstrate a high degree of freedom of movement and a tendency for touring behaviour.

The Ebro Delta is a coastal Natural Park featuring lagoons, marshes and natural beaches located at the Catalan Mediterranean coast (Spain). Tourism activities range from bird-watching to beach tourism including a wide range of rural, active and adventure activities and gastronomy. This area is divided by two supra-local administrations, with the Ebro river forming the dividing line between the two. The Natural Park delineation encompasses both sides of the river, but its functions with regard to tourism are limited. At the regional level, the Natural Park forms part of a larger branded destination area called the Terres de l'Ebre. This branded destination area also includes part of another selected case: The Ports area. The proximity of the two areas was one of the reasons for their selection, given that the identification of cross-boundary activity by tourists was a key focus of the study.

The Ports area is mountainous and is located just 70 km away from the Ebro Delta. The area is known for its rivers, trails and cultural heritage mostly linked to local gastronomy and rural towns. The Ports mountain range is divided into 3 Autonomous Communities (Catalonia, Aragon and Valencia). In this area there are several DMOs, each having coverage delineated by the relevant administrative boundary, with none having coverage of the entire mountain range in terms of either marketing efforts or in the planning and management of tourism. Equally, the natural protection of the area is

not managed by one individual entity, and each autonomous community manages its natural environment separately. The study in this case focuses on the western side of the mountain range, as the slope works as a geographical border impeding flows of visitors from one side to the other (Paulino & Prats, 2013).

The third case, the Peak District National Park in the UK is reknown for its heritage and its wide range of nature-based activities. This constitutes an interesting case, representing a different administrative, topographical and climatic context. Moreover, in contrast with the other areas, the Peak District is surrounded by some of the most populous cities of the UK, and is one of the most visited National Parks in Europe. Although there are different administrative regions across which the National Park is spread, tourism is managed by one individual DMO: Visit Peak District and Derbyshire.

Methodology

Data collection at the three destinations sought to capture the range of accommodation points generating flows to attractions, and the frequency of such flows. The rural characteristics of the destinations restricted the use of innovative methods of data collection, partly due to a lack of mobile telephone network coverage (Paulino, Prats, Blasco, & Russo, 2016). Instead, direct surveys to tourists were selected as being a reliable and orthodox method.

Surveys were conducted in pre-selected places of attraction and accommodation hubs within the selected destinations. The pre-selection of attraction sites was carried out through content analysis of guide books and DMO websites for the attractions and of official registers for accommodation providers. A minimum of 4 generalist guide books of different scope were selected for each destination and content analysis considered the size and frequency of pictures, the amount of textual description,

highlighted text and repetitions to classify the attractions into 3 categories of attractiveness or prominence: high, medium and low.

A pre-planning exercise was carried out to calculate the total amount of survey-days to be conducted in each location, based on the perceived level of attractiveness of attractions and the number of bed spaces available at accommodation hubs and to equally incorporate the number of weekends, holiday and working days in each location.

The selection of survey participants was carried out randomly but in order to meet with accepted definitions of 'tourist', focused exclusively on leisure tourists excluding day visitors, those visiting for business purposes, tourists who had just arrived at the destination area, and tourists with a length of stay exceeding 60 nights (Ono, 2008). The selected respondents where then asked where they were currently staying overnight, and the attractions visited during that stay. To capture the demand-side perspective of the destination, tourists were allowed to freely identify tourist attractions, rather than selecting from a list. In total, more than 150 attractions and 60 accommodation points were identified in each destination area.

There is a wealth of literature using a wide range of methodologies and techniques to analyse the spatial patterns of tourists (Paulino et al., 2016). This paper uses mixed methods including geographical analysis, network analysis and summary statistics.

The individual survey data for each destination was aggregated into three single asymmetric matrices representing attractions (rows) and accommodation hubs (columns). Each cell represents the frequency of flows from a single accommodation to an attraction. The three matrices were input to the *Ucinet n*etwork analysis program and then graphically represented though *NetDraw* to provide a general overview of the

results. *Network graphs* represent accommodation hubs (peripheral nodes around attractions) connected to an attraction (round red nodes) through tourist flows (links among nodes). Each *g*raph represents aggregated individual flows by weighted links.

From this, a table for each attraction was created including the number of flows and distance to each of the identified accommodation sites. Distance calculations were carried out using the driving time distance following the quickest route according to Google maps, as differences in road quality and topography in rural areas may lead to anomalous results using geodesic or road distances. This data was used to classify accommodation with regard to time distance from an attraction, to calculate average time-distances and to graphically represent the distribution of time flows.

Graphs, tables and matrices were analyzed in order to select the most representative cases illustrating the concept of 'within destination' influence areas and to help in the identification of influential factors. The selection represents the diversity of attraction characteristics considered in the literature as set out in the following table (Leask, 2010; Swarbrooke & Page, 2002; Wall, 1997):

Table 1 - Selection of represented attractions and its characteristics

Figure 1 - Concentric circles representing distance of flows from accommodations to attractions

The final outputs presented in this study consist of ego-networks graphs, maps, distance decay graphs, tables and multi-network graphs. Ego-network graphs represent the influence area of a single attraction, where accommodation nodes are categorised according to Lew & Mckercher's (2006) concentric circle model, showing time distance between the attraction and accommodations (Figure 1). Maps represent the spatial distribution and frequency-flows of attractions' influence areas represented in municipality-based maps using ArcGis. Distance decay graphs show the decay curve

representing time distance and its frequency from an attraction to points of accommodation used by visiting tourists. The table shows a summary of the accommodation concentric categories and the main statistical calculations of the most representative attractions. Finally, multi-network graphs were constructed by combining several ego-networks to show the influence areas of multiple attractions. Lower visitation frequencies in these graphs have been cleared up to make it easier to identify the main patterns.

Results

Here we present the results from the data analysis. Six main thematic areas were identified, which are presented and discussed below.

Time distance

The classification of accommodation hubs using concentric circles regarding time distance to attractions shows that attractions draw tourists mostly from the narrow and immediate accommodation points in a minimum of 50% and a maximum of 93% of the cases (Table 2), with 80% of the flows coming from accommodation situated within 30 minutes' driving distance from the attraction and a time distance mean under 30 minutes in most cases. This clearly demonstrates that tourists tend to base their accommodation within the immediate area of the attraction they visit regardless other factors.

Table 2 - Proportion of flows from accommodation according to concentric categories and the average time distance to selected attractions

Considering distance decay to be a universal law, the decay curve of flows generated from accommodation to attractions should follow a similar pattern. An idealised distance decay curve should tend to resemble figure 2, where the closest accommodation generates most tourists' flows, which then tend to decrease as the time distance increases. The spatial distribution, however, is not uniform and several factors can have a bearing on the influence areas of attractions. As a result, the distance decay curves examined in this study do differ depending on the characteristics of a particular attraction, related infrastructure or the distribution of accommodation hubs.

Figure 2 – Distance Decay graph of Beseit influence area

Although not uniformly so, tourists do tend to base themselves close to the attractions they visit showing that tourists' flows are constricted by travel time and highlighting the centrality of accommodation hubs. Furthermore, the frequency of flows in the decay curves falls off quite markedly at around 30 minutes, which means that most visits to attractions are by tourists lodged within such a time-distance from the attraction in question.

Characteristics of attractions

The overall level of attractiveness of attractions has been identified as a significant factor affecting the territoriality of influence areas. Here, the main differences identified between differing attractions consist of the number of flows and the number of accommodation points, rather than the maximal distances that tourist are willing to travel. The more attractive or unique the attraction is, the greater the number of flows received, and from a wider range of accommodation points. (Figures 3 & 4).

Figure 3- Concentric circles of accommodations generating flows to Vall-de-Roures

Figure 4 - Concentric circles of accommodations generating flows to Mam Tor

Evident differences can be noticed in the volume of flows and diversity of accommodation points between a 'high-level' attraction (Figure 3) and a 'medium-level' attractive attraction (Figure 4). This is not to say, however, that that medium and low-level attractions are not able to generate flows from further afield, and the results show that both medium and low-level attractions still receive flows from accommodation situated in the intermediate and distant areas. In fact, distance flows average and mean distance are similar in all the cases and differences cannot be attributed to the identified or perceived attractiveness level (Table 2).

With regard to other attraction characteristics such as accessibility, physical location or attraction characteristics, the results do not suggest clear differences in territoriality. Although attractions' influence areas show some distinct patterns of territoriality, they are not conclusive and many other factors may account for these differences.

Accommodation hubs

The accommodation offer is not uniformly distributed across the space. It tends rather to be concentrated in specific locations creating accommodation hubs, the specific location of which and its' spatial relationship with the attraction strongly influence flows. Indeed, the specific location of accommodation hubs appears to account for the main differences between distance decay curves and influence areas.

Figure 5 shows the impact of an accommodation hub situated 29 minutes' time-distance from Creuers Delta Ebre. This site generates substantially more flows to the attraction than more proximal ones by simply offering more bed spaces.

Figure 5 – Distance Decay graph of Creuers Delta Ebre influence area

Furthermore, figure 6 illustrates on a map the role of accommodation hubs in generating flows to an attraction. Although the closest accommodation hubs supply the majority of visitors to this attraction; the map show how the influence area follows the typically elongated spread of accommodation from coastal destinations (Smith, 1992). Conversely, many towns located close to the attraction generate little or zero flows due to the lack of accommodation offer.

Figure 6 - Map of Trabucador influence area

Despite tourists' tendency to stay overnight close to attractions, significant differences have been detected between attractions with nearby accommodation and

those without. In general, most flows come from the closest accommodation hub available in preference over more distant ones.

Certain attractions are both highly attractive and offer a significant number of beds within walking distance of the main attractions. Therefore, most tourists visiting them do, logically, stay overnight in the same town (Figure 7).

Figure 7 – Distance Decay graph of St. Carles Ràpita and Buxton influence areas

When attractions do have a significant provision of beds within walking distance, as well as other accommodation hubs nearby, their decay curves still demonstrate this closeness tendency but with accommodation in the less immediate area also playing an important role (Figure 8 & table 2).

Figure 8 – Distance Decay graph of Castleton influence area

In other cases where accommodation is not available at a walking distance from an attraction, the closeness tendency is also apparent, since most flows come from the immediate area coinciding with the closest accommodation offer. The mean time-length of flows to such attractions is higher in these cases, given that accommodation hubs are more distant. Their influence areas usually show a delayed frequency pattern, including more flows from the intermediate area compared to attractions with accommodation offered in closer proximity (Figure 9 & Table 2).

Figure 9 compares two 'high-level' attractions, one with a large number of bed spaces within walking distance (Vall-de-roures) and the other without (Chatsworth House). Contrasting with Vall-de-roures, whose decay curve peaks within walking distance, Chatsworth House receives its peak flows from the immediate area coinciding with the closest accommodation hub (Bakewell). Several accommodation hubs at both immediate and intermediate distance are still significant regarding the amount of flows to Chatsworth House, showing this delayed pattern of frequency.

Figure 9 – Distance Decay graph of Vall-de-roures and Chatsworth House influence areas

Infrastructure

As previously suggested, the characteristics of a destination, such as topography and rurality, influence the quality of infrastructure. The amount and quality of roads is naturally related to time distance from accommodation to attractions and can produce significant differences in influence areas.

The Pesquera map (Figure 10) is a good example illustrating how the road network and topography affect flows between attractions and accommodation centres. In Ports', the main mountain ridge passes from south to north, partially coinciding with the administrative boundary between Aragon and Catalonia. The mountain range is so steep that practically no roads connect the western and eastern sides of the mountain. Tourists staying on the coastal side or at the eastern side of the ridge have to circumnavigate the mountain range to get to Pesquera and other nearby attractions. This has the effect of restricting flows coming from accommodation which is physically close, but on the other side of the mountain range. Conversely, some border municipalities from more distant Catalonia, but situated on the same side of the mountain range, host many tourists visiting the Pesquera attraction by virtue of the good road connection between them.

Figure 10 - Map of Pesquera influence area in Ports

This influence of infrastructure is equally apparent in the Toll del Vidre decay curve (Figure 11). Tourists can only access this attraction via a narrow and twisting mountain road which takes 26 minutes driving from Arnes, the closest accommodation hub. Furthermore, tourists staying in other accommodation further afield also have to get to Arnes first and then follow this same mountain road.

Figure 11 – Distance Decay graph of Toll del Vidre influence area

Administrative boundaries

The maps of all three destinations clearly show how the influence areas of attractions are not confined to the administrative limits of the local authority or DMO boundary. Tourist mostly base themselves at accommodation hubs close to the attractions visited, regardless of their location in terms of administrative boundaries, or even being within the same DMO area.

Figure 12 - Map of Bakewell influence area in Peak District

As an example of this we have selected Bakewell, which is an attraction centrally located in the Peak District National Park and distant from any administrative boundary. The map (Figure 12) illustrates, firstly that the Bakewell influence area extends beyond several administrative boundaries, and secondly, the significance of flows from accommodation in Sheffield, which is managed by another DMO and is part of another administrative region. Accommodation in South Derbyshire, conversely, despite falling within the DMO's administrative scope, generates negligible flows to Bakewell.

Multiple attraction

Multi-attraction graphs provide the means to represent the influence areas of several attractions from within the same destination area simultaneously. They entail more complexity of analysis due to the wider range influencing factors associated with each of the attractions and accommodation hubs, as well as the spatial relationship between them. It is, therefore, difficult to find a single influencing factor which explains the differences in tourist flows, being influenced by a combination of factors. Multi-attraction graphs are, however, useful in that they allow us to identify the overlapping

influence areas of the selected attractions, based upon the accommodations points from which tourists' flows originate to each attraction and the volume of such flows.

The examples used here illustrate both the influence areas of attractions without contiguous accommodation (Figures 14), attractions with a nearby accommodation offer (Figure 15) and a combination of attractions with accommodation and without (Figure 13). These results show differing degrees of overlap of influence areas, depending on the shared accommodation point and the frequency of flows coming from them.

Figure 13 - Accommodations generating flows of intensity higher than 1 to the three main attractions of Ports: Beseit and Vall-de-roures with an accommodation hub at a walking distance and Parrissal without.

Figure 13 represents an example of three attractions with a high degree ofoverlapping in their influence areas, with the most frequent flows of tourists coming from the same accommodation points. With reference to figure 1, this graph indicates that these attractions and their related hubs of accommodation are naturally combined in some form of nuclear mix, as proposed by Leiper (1990). This, in turn, suggests that the overall level of attractiveness (and therefore level of visitation) is likely to be increased through this cumulative effect.

Figure 14 - Accommodation hubs generating any flows to the three main attractions of Ebro Delta without accommodation within walking distance

Figure 15 - Accommodation hubs generating flows of intensity higher than 2 to the three main attractions of Peak District with an accommodation hub within walking distance.

In the case of partially overlapping influence areas (Figures 14 & 15), the attractions analysed tend to be more distant from the tourists' points of accommodation. This may represent different potentialities in terms of increasing the individual influence areas depending on each case. Isolated attractions without accommodation

offered within the narrow nearby area, such as Mam Tor, Trabucador, Toll del Vidre or Creuers Delta Ebre are dependent on more distant accommodation hubs for the necessary support facilities for tourists (Figure 14 & Table 2). Equally, whilst attractions next to accommodation hubs, like St. Carles Ràpita, Buxton or Bakewell, tend to rely less on more widespread surrounding accommodation (Figure 15)they may still beinterested in expanding their influence area, either through collaboration with other attractions with conjoining influence areas, or by re-focusing their marketing efforts based upon this improved understanding.

Discussion & conclusions

This paper examines tourists' travel patterns, both within and between identified destination areas, in order to establish the scope and strength of linkages between points of accommodation and attractions in three different nature-based destinations as a means of challenging the current orthodoxy of administrative boundary-defined destinations and DMOs.

The results demonstrate that tourist do not restrict their movements on the basis of administrative or destination brand boundaries, as in Truchet et al.'s (2016) study, which found that the influence area of attractions often goes beyond the supralocal or even regional level, none of the identified influence areas of the single attractionscoincide with the destination areas, or with their administrative boundaries. In fact, the graphical representation of tourist movements demonstrates that the influence areas of the attractions in this study correspond rather more with convenient travel patterns, supporting the call to abandon the static all-inclusive geographical area approach tourism destinations (Blasco et al., 2014; Beritelli et al., 2015; Dredge, 1999; Paulino & Prats, 2013) as the results here imply a much more dynamic model of tourism destinations based on how tourists actually consume the space.

In line with Lew & Mckercher's (2006) Mackercher & Lau's (2008) and Mckercher & Lew's (2004) findings about the influence areas of attractions in all three cases,the destinations are largely determined by the spatial relationship between the accommodation supply and attractions. However, whilst a strong body of literature affirms that attractions are the core elements around which tourism develops (Gunn, 1993; Kušen, 2010; Leiper, 1990; Lew, 1987; Richards, 2002), these results clearly demonstrate that attractions and accommodation are interdependent and that the location and capacity of accommodation hubs also exerts a significant impact on tourist

flows within a destination. This has been identified through the application of a distinctly different methodological approach to that of the aforementioned. Whilst they primarily consider the influence of attractions on the tourist's decision-making process, this research analyses travel patterns when tourists are already at the destination. Thus, the present study contributes to our understanding of the interdependence between attractions and wider tourism industry, as suggested by Dredge (1999) and Leask (2008).

Data from the three destinations of study does ratify previous research with regard to the closeness tendency of flows between accommodation and attraction and the apparent decrease of flows between the two as time-distance increases (Mckercher & Lew, 2004). The results here are, however, only partially comparable with findings in the extant literature, where the focus has been more on the territoriality of accommodation rather than that of attractions, and represents travel patterns within urban or sun and beach destinations (rather than rural) (Shoval et al., 2011; Smallwood et al., 2012). Furthermore, as opposed to spatial distance in the above mentioned works, this paper takes time-distance as a key metric, since tourists are outcome oriented and tend to minimize transit time (Dietvorst & Ashworth, 1995; Lew & Mckerker, 2006),.

Despite key differences, the results in the decay curves are similar to the findings of Smallwood et al. (2012), showing that the movements of tourists are highly constrained by distance. Flows clearly peak at the narrow and immediate area andthen quickly dwindle, ending with a long tail representing small flows from further away. In fact, the 80% of the identified flows to attractions come from nearby accommodation hubs situated within the narrow and immediate area and most flows from accommodation hubs to attractions start fall off dramatically beyond the 30 minutes'

time-distance, whereas Smallwood et al. found this to occur at a geographical distance of 20 km.

Shoval et al. (2011) did find that accommodation location exerts a significant impact on tourist movements in an urban context, with a large share of visits carried out in proximity to accommodation. Although the present case studies do demonstrate a clearly similar tendency of closeness, the spatial dispersion of attractions in rural destinations and the focus on attractions' territoriality produces certain differences from Shoval et al.'s study. Many rural attractions suffer from a lack of accommodation within walking distance; meaning that the mean time-distance of the influence area is strongly affected by the location of the closest accommodation hub. Indeed, attractions with substantial accommodation provision within walking distance register their flow peak at the narrow area, whereas attractions without such local provision show the peak at the immediate area coinciding with the closest accommodation hubs.

The relevance of the 'closeness tendency' for accommodation hubs is also clearly observed in the practice of tourists basing their accommodation in accommodation hubs (including both resorts, towns and major cities), which are also themselves host to a renowned attraction. This confirms the previous results of Chhetri & Arrowsmith (2008) that attractions which provide accommodation opportunities for visitors are more likely to attract a greater number of tourists than those without.

Topography and the quality and coverage of road networks also affect the visitation patterns between the accommodation offer and attractions, and therefore produce differences between distance decay curves and influence areas (Lew & McKercher, 2006). An example from the literature is the presence of the Hong Kong Harbour acting as a barrier in Shoval et al.' s (2011) study.

The results also indicate that the overall attractiveness level of attractions determines the number of flows and the diversity of accommodation points of their influence area. Previous literature has suggested that renowned attractions should generate more flows from distant areas than sites of medium and low attractiveness (Lew & McKercher, 2006; Pearce, 1989; Shoval et al., 2011), but the results from this study do not, however, confirm this. Although attractions do differ in the total amount of flows relative to their attractiveness level, most medium and low attractions still receive flows from accommodation points sited in the intermediate and distant areas in a similar proportion to 'high' attractions.

According to the literature, multi-destination patterns and touring behaviour are far more common than single-destination travel patterns in rural areas (Connell & Page, 2008; Lue et al., 1993). As the results demonstrate, attractions are likely to be interconnected with neighbouring attractions due to tourist flows coming from the same accommodation hub. This implies that the influence area of an individual attraction is not an isolated system, but can be considered interdependent of a larger system representing a symbiotic relationship between attractions and accommodations hubs affected by a range factors (Dredge, 1999; Gunn, 1993; Leask, 2008).
A destination is actually likely to include several attractions, each of which will have their own influence areas, which may overlap to a greater or lesser degree.

The examination of influence areas of multiple attractions provides a means to explore the relevance of Leiper's concept of a Nuclear Mix (1990) and the centrality of accommodation hubs (Shoval et al., 2011). The analysis carried out allows for the overlapping of several attractions' influence areas in order to identify the shared hubs of accommodation and the scope of the multi-attraction' influence area. Combining nuclear mix influence areas and single attractions distance decay curves, we can see that

most visitation by tourists is likely to occur at attractions located within 30 minutes' travel-time of a shared accommodation point. Despite this contribution, the multidimensional factors of each individual attraction and the spatial relationship between attractions themselves and between attractions and accommodation hubs causes complexity and makes the accurate prediction of tourists' movements difficult (Lew & McKercher, 2006).

The main value of taking such a multi-attraction approach is to reveal the undervalued potential of linking individual actors within a system in pursuance of the cumulative effect of combining multiple attractions (Lue et al., 1993) with the aim of achieving a multilateral collaboration (Dredge, 1999; Jesus & Franco, 2016; Yang, 2018). The degree of overlapping of influence areas is able to show not only the interrelatedness of multiple attractions across administrative boundaries, but also where potential may lie to expand the influence areas of individual attractions, both through the identification of their main sources of visitors (accommodation) and of other attractions forming part of the observed tourist patterns.

In the case of major overlapping of multi-attractions influence areas, tourists can often be seen to visit these attractions from the same accommodation points. However, nuclear mix patterns of destination development are not granted, and in this case, the development opportunity relies more on encouraging concentric style movement, characterized by multi-nodal exploration of 'safe' areas (Lew & McKercher, 2006).

Further to this, clustered attractions have the potential to increase market penetration by offering a critical mass that is not offered individually (Leiper, 1990; Lue et al., 1993). This, again, provides a motive and rationale for greater cross-border collaboration between individual attractions, in order to attract tourists visiting

attractions which although nearby in geographical terms, may be fall under the administrative and promotional remit of a separate body (Beritelli et al., (2015).

In the case of the minor overlapping of influence areas, the potential lies more in expanding the reach of individual attractions' influence areas. Collaboration in such instances is particularly interesting where attractions are geographically dispersed across rural areas, and typically lack any contiguous accommodation. A lack of the necessary supporting facilities and infrastructure in these satellite attractions drives tourists to depend upon a symbiotic relationship with the support services offered at the 'base-camp' location (Lue et al., 1993). Thus, following tourists' tendency to closeness of visitation and accommodation hubs, remote attractions without their own accommodation should focus on collaborating with 'base-camp' areas situated in the immediate and intermediate areas. These base-camp locations may also benefit from such collaboration as a means to increase the length stay of tourists (and thereby expenditure) by offering them more options and making the place worthier of visitation.

In conclusion, the identification of the existence of overlapping influence areas demonstrates that, when viewed in terms of tourists travel patterns, destinations have no clear boundaries, but are rather interrelated subsystems. The results demonstrate that an understanding of attractions' influence areas is key to deciphering the role of individual actors in tourism destinations. At the same time, the overlapping of influence areas demonstrates the interconnectedness of individual actors within an interrelated system, and hence the importance of collaborating to seek market opportunities and to facilitate the effective planning and management of tourism.

Whilst the demand side approach of this study does present a critical perspective on the marketing and management of tourist destinations, the omission of other actors' point of view, such as residents, administrators or tourism industry (particularly the

managers of attraction and providers of accommodation) does represent a weakness. In addition, the demand side approach is focused on territoriality patterns once the tourist is at the destination, without exploring motivational factors influencing tourists' decisions or other personal factors.

With regard to the methodological approach employed, technological limitations faced in rural destinations, have prevented the use of more advanced techniques able to capture more data from a wider area or to track individual tourists. Furthermore, the methodology employed did not allow for the calculation of the exact degree of significance of each influencing factor, nor was able to confirm the nature of more minor influencing factors, which potentially enrich the precision of gravity models. Moreover, the nature of the data collected was only able to show aggregated influence areas based on a limited number of variables.

Future research should explore influence areas and distance decay graphs in regard to tourist profile, length of stay or distance travelled from home, as well as considering the differences in behaviour between day visitors and tourists staying overnight away from home . Finally, in regard to multi-attraction' influence areas, some cases point to a latent destination as identified from the point of view of tourist consumption, something which could be more fully explored through the examination of direct flows between attractions. Furthermore, questions such as to whether patterns of consumption were pre-planned and motivated by factors exogenous to the destination, or driven by endogenous factors once at the destination, or indeed, whether tourists themselves even consider their movements as occurring at a 'destination' level, are certainly worthy of further consideration.

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