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Reframing mountain destinations from the perspective of tourist mobility: Hub-and-spoke travel patterns

Current Issues in Tourism

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Abstract

In mountain areas, tourism destination management and branding generally follow administrative boundaries, representing a loss of competitiveness in the tourism sector for theses already remote destinations, in many cases, with under-developed tourism. Increasingly, researchers are claiming to consider tourist perspectives, not only in drawing up promotion strategies, but in rethinking management structures of tourism destinations, which are traditionally based on administrative boundaries. This can help to promote and manage mountain destinations more efficiently and provide an opportunity to economically develop these areas in decline through tourism.

This research aims to detect new destination areas based on how tourists geographically consume mountain destinations in two European medium mountain ranges. To do so, the territoriality of tourist flows from accommodation hubs to surrounding attractions are analysed, representing hub-and spoke travel patterns. This enabled the detection of latent consumer-based mountain destinations, which were then contrasted with the official destinations limits in order to identify lost opportunities linked to mismatching between how mountain destinations are consumed and how they are managed.

The findings show that consumer-based destinations are nothing like officially managed destinations and identify the most relevant factors determining hub-consumption systems. Finally, this research contributes to the discussion on increasing competitiveness of mountain destinations by adapting tourism branding and destination management to tourists.

Introduction

The intense modernization processes of the past centuries, together with social changes, have yielded have pushed population to urban areas, stimulating a progressive depopulation of mountain areas (Snowdon, Slee, & Farr, 2000). To face this problem, tourism is seen as an economic activity that promotes rural renaissance through the creation of new wealth and employment, thus enhancing the traditional values of mountain life, as well as contributing to the general diversification of the economy (Flores Ruiz & Barroso González, 2012). Tourism development is a key factor in improving the quality of life of people living in mountain areas, particularly through sustainable economic development initiatives and environmental conservation (Nepal & Chipeniuk, 2005). However, these destinations frequently have to face the planning, management and branding challenges associated with their rurality and remoteness, while competing with established urban and coastal destinations with more resources and facilities for a share of the market.

Tourism policies and destination promotion are mostly implemented without considering the perspective of tourist consumption, or the constraints of political divisions. This entails a lost opportunity for mountain areas to be more competitive and boost the local economy hand in hand with sustainable tourism development.

Taking a consumer-centered approach, this study aims to offer a more effective way to manage, plan and brand two European mountain destinations by focusing on how tourists consume a mountain destination geographically. This research is underpinned by several theories that challenge long-established notions of destination boundaries, (Beritelli, Reinhold, Laesser, & Bieger, 2015), visitation patterns and paradigms of travel flows (Lue, Crompton, & Fesenmaier, 1993; Mckercher & Lau, 2008), the concept of a local tourism destination (Lew & McKercher, 2006) and how destinations overlap geographically (Dredge, 1999). Furthermore, previous literature on travel patterns is reviewed so the magnitude of factors affecting tourist mobility and the territorial influence of accommodation hubs in mountain destinations can be fully understood.

Following this line, the first objective of this study is to identify destination areas from a tourist perspective by analyzing the extent to which attractions generate visitor flows from accommodation centers. Following on from previous literature, which identifies hub-and-spoke as the most common travel pattern, this study focuses on aggregated territoriality patterns around accommodation hubs in order to identify their network of attractions that represent the hub-consumption systems. The second objective is to contrast the hub-consumption systems with the official destination areas, to verify the extent to which the consumer-based destinations build around the hosting hub differ with the present administrative-based destinations. This includes considering overlapping systems of attractions around each accommodation hub in comparison to the previous model of destinations consisting on excluding areas. Finally, a third objective is to identify the most relevant factors determining the territoriality of travel patterns. This may be useful for other mountain areas that want to identify destinations from a consumer perspective based on hub-consumption patterns. To this effect, the range of attractions connected to an individual accommodation hub are analysed with a focus on factors explaining particular visitation patterns.

Network Analysis and GIS techniques are used to analyze and represent the territoriality of tourist flows from accommodation hubs and compare them with the official destinations. This is accompanied by tables that aid interpretation of the factors that influencing the territoriality of travel patterns. Results identify alternative destinations to the official ones in Els Ports (Spain) and the Peak District (UK) and identifies the factors influencing the territoriality of tourist travel patterns from each accommodation hub in the mountain areas.

This research contributes to the literature by identifying the lost opportunity arising from managing and branding mountain destinations on the basis of administrative boundaries. Accordingly, it proposes improving the local economy, providing strategies for the renaissance of mountain areas by adapting the management and promotion of tourism destinations to consumers' needs, seizing on these new consumer-based destinations built around hosting hubs.

Literature review

The dilemma of tourist destinations

A destination is commonly seen as a place that guests, hosts and stakeholders within the public and private sectors construct mutually consumed tourism experiences (Saraniemi & Kylänen, 2011). On the whole, Destination Management Organizations (DMOs) are defined by administrative boundaries, and therefore tied to the corresponding national, regional and local public administrations responsible for implementing administrative regulation and tourism policies within their borders (Saraniemi & Kylänen, 2011). An administrative-based destination implements policies and regulations that affect a particular space within its region or area, thus neglecting, marginalizing and excluding others. This pushes destination areas towards becoming homogeneous, closed, tourist-branded spaces (Brenner, 2009; Kang, Kim, & Nicholls, 2014).

However, tourists do not stop at administrative boundaries unless there is a physical impediment (Timothy, 1995). As mobile technologies and social media become more widespread, tourists feel more empowered to organize their own personalized itineraries using non-official sources, and this may drive flows away from the traditional tourism channels (Llodrà-Riera, Martínez-Ruiz, Jiménez-Zarco, & Izquierdo-Yusta, 2015; Yang, 2018). Tourism destinations consumed by tourists in this way may transcend political boundaries, which leads to certain inconsistencies affecting tourists and tourism actors on both sides of the border alike (Ioannides, Nielsen, & Billing, 2006; Paunovi et al., 2017; Yang, 2018). Thus, tourism infrastructure and demand criteria should be considered as the basis to manage tourism destinations, instead of administrative areas.

Specific challenges of mountain destinations

Mountain destinations are considered geographical, economic and social areas which include tourism organizations and businesses, activities supply and basic tourism infrastructure (Kušcer, 2014). Physical characteristics include medium mountains (Fernandes, Daniel & Almeida, 20121; Tizzoni, 2015; Snowdon, et al., 2000) or high mountains (Buckley, Pickering & Warnken, 2000) and generally stand out for their unique ecosystem and important human values (Godde, Price & Zimmermann, 2000). Mountain destinations may accommodate a multi-dimensional diversity of tourism types and segments, including snow-based tourism, adventure tourism (trekking, climbing, rafting, cycling), cultural tourism, ecotourism, rural tourism or pilgrimages. Thus, giving rise to very diverse consumer-oriented studies (Kušcer, 2014; Slusariuc & Bîcˇa, 2015).
Compared to more populated areas such as urban or costal destinations, mountain destinations have to face several challenges associated with their inner characteristics. Their geographical characteristics, rurality and relative remoteness of most mountain destinations puts constraints on physical access and internal mobility, access to new technologies and availability of public services (Godde, et al., 2000; Klimek, 2017; Nepal & Chipeniuk, 2005). As such, mountains are always natural borders between their neighbouring areas and in many cases, they also become borderlands between states and regions. Regional or international borders usually leave these areas in the periphery of their administrative regions, and their cross-border cultural, biological and economic dynamics have often been ignored in public policies (Blasco, Guia, & Prats, 2014; Blasco, Guia & Prats, 2016; Timothy, 2001; Wachowiak, 2006). Mountain areas are therefore in a disadvantageous position when facing both, the challenge of attracting political and economic decision-making and a highly competitive tourism marketplace (Brenner, 2009; Kang et al., 2014; Nepal & Chipeniuk, 2005; Paunovi et al., 2017). Moreover, this implies grievances in the tourism development and management, including the representation of business interests on both sides of the border and the balance between tourism and conservation (Paunovi et al., 2017).

Recently, numerous scholars have begun to show interest in tourism phenomena in mountain destinations (Ng, 2022; Río-Rama, Maldonado-Erazo, Durán-Sánchez & Álvarez-García, 2019), shedding some light on these areas that are traditionally ignored by public administrations. Following Ng (2022), the three main keywords linked to research themes of mountain tourism

are “sustainable development and climate change”, “ecotourism development” and "destination management”, the latter including research in destination branding.

Concerning destination management and branding in mountain destinations, Destination Management Organizations (DMOs) are facing the challenge of product diversification and finding commercialization strategies to adapt products and their distribution to the changing patterns of tourists’ consumption (Klimek, 2017). Taking into consideration that DMOs normally follow administrative boundaries, planning, managing and branding mountain destinations on this basis may not be the most appropriate spatial configuration for their development, as several authors have noted (Blasco, et al., 2014; Paulino & Prats, 2013; Zyryanov, Myshlyavtseva, & Rezvykh, 2009). Other ways to manage mountain destinations have been suggested; for example, Marlowe & Burke (2016) supported the management and governance of a mountain area through non-governmental organizations; Blasco et al. (2016) proposed focusing on supply-chain networks; and Agbebi, Ogunjinmi, Oyeleke & Adetola, (2021) designed geographical clusters based on mapping techniques. Moreover, some studies have explored the potentiality of developing mountain tourism destinations across their administrative boundaries (Blasco, et al., 2014; Taczanowska, 2004); however, the main focus has not been on demand from the perspective of tourists, but, on visitor expectations and opinions (Taczanowska, 2004) or a theoretical approximation to the demand side involving clustering attractions on a time-distance basis (Blasco et al., 2014).

Several authors advocate for the innovation of mountain destinations by meeting tourist demand (Favre-Bonte, Gardet & Thevenard-Puthod, 2019), thus considering how tourists consume the destination (Paulino, Prats, & Whalley, 2020). However, research on travel patterns and tourists’ spatial behaviour in mountain areas is still overlooked. Researchers and practitioners often have to deal with uneven data in mountain destinations as different administrative areas do not use the same data collection system (Heberlein, Fredman & Vuorio, 2002). Furthermore, research on tourists’ travel patterns in mountain areas is limited (Donaire, Galí & Royo-Vela, 2015; Chhetri & Arrowsmith, 2008; Chhetri, 2015; Wolf, Hagenloh & Croft, 2012; Rogowsky, 2020), due to the logistical complexities and difficulties of collecting data in mountainous, rural areas (Orellana, Bregt, Ligtenberg, & Wachowicz, 2012; Zoltan & McKercher, 2015). Although understanding how tourists consume a destination is critical (Paulino et al., 2020), the literature

on mountain area travel patterns tends to focus on monitoring tourist flows, without entering the debate on proposing demand-based destinations, alternative to the current administrative ones.

Tourists' role in shaping destinations

Previous literature on destination management recognizes the way in which tourists help define tourist destinations, pointing out the need to provide deeper insights into how destinations are consumed so they can be better adapted to consumer needs (Beritelli et al., 2015; Cerutti, Piva, Emanuel, & Pioletti, 2018; Dredge, 1999; Paulino & Prats, 2013). This implies moving to a more dynamic tourism destination model based on how tourists actually consume a space, which would condition the shape and size of the destination, and how cooperation between destination stakeholders is structured (Asero, Gozzo, & Tomaselli, 2015; Beritelli et al., 2015; Steiner, 2015; Yang, 2018).

Several studies have described the spatial patterns of tourist movements at destination level (Lew & McKercher, 2006; Lue et al., 1993; Mckercher & Lau, 2008; Oppermann, 1995). However, many of these case studies focus on tourist flows from a tracks viewpoint (Baggio & Scaglione, 2017; Beritelli et al., 2015; Raun, Ahas, & Tiru, 2016) and little attention has been paid to the way in which accommodation interacts with surrounding attractions stemming from tourist consumption, i.e., the territoriality of travel patterns (Lew & McKercher, 2006; Paulino, Prats, & Domenech, 2021; Paulino, Prats, & Schofield, 2019; Paulino et al., 2020; Shoval et al., 2011).

The literature has also centered on factors influencing tourist travel patterns and visiting decisions. Attractions are recognized as central to tourism in that destinations develop around them; thus, they are considered the main push factor of tourism flows within a destination (Gunn, 1993; Kušen, 2010; Leask, 2010; Leiper, 1990; A. Lew, 1987; Richards, 2002). Furthermore, previous studies identified that once tourists are at a destination, they will usually visit other places within the vicinity of their accommodation. Thus, the territoriality of visitor flows from accommodation hubs to attractions may be conditioned in two ways. On one hand, by the specific location of the accommodation (Paulino et al., 2019; Shoval et al., 2011) and the characteristics of the destination. In the case of mountain destinations, their rurality makes tourists dependent on the services provided by bigger towns, particularly regarding accommodation (Gunn, 1993; Lue et al., 1993; Shoval, McKercher, Ng, & Birenboim, 2011). On

the other hand, the territoriality of visitor flows is also determined by the appeal of the attractions (Mckercher & Lew, 2004; Paulino et al., 2020), their accessibility and their spatial distribution (e.g., whether they are clustered or dispersed). Tourists may also travel further afield from their accommodation points to visit other attractions, with distance decay acting as a friction factor in decision making.

Other secondary factors may affect intra-destination travel patterns linked to tourists' inner psychographic and socio-demographic profile and the particular way the trip is organized, making individual decisions somehow unique (Domenech, Paulino, Miravet & Gutierrez, 2023; Donaire, 2012; Lew & McKercher, 2006; Lue et al., 1993; Shoval et al., 2011).

Despite in-depth studies on established urban and coastal destinations (Bujosa, Riera, & Pons, 2015; Caldeira & Kastenholz, 2017; Mckercher & Lau, 2008; Shoval et al., 2011), it is not yet evident how territoriality of travel patterns affects tourism at destination level, especially in mountainous areas (Blasco et al., 2014). Literature on travel patterns in mountain destinations proves that tourists are usually forced to rely on private transport due to the uneven relief, remoteness, reduced mobility infrastructures, lack of adequate public transport services and the geographical dispersion of attractions. This leads to a predominance of car-based trips (Connell & Page, 2008; Zillinger, 2007), which encourage multi-destination patterns of movement, particularly hub-and-spoke, rather than travel patterns linked to single attractions (Blasco et al., 2014; Connell & Page, 2008; Lue et al., 1993; Paulino et al., 2019; Smallwood, Beckley, & Moore, 2012). These patterns may spread out, crossing official destination boundaries; therefore, continuing to develop the functions of the DMO on the basis of political divisions may induce a significant lost opportunity for mountain areas.

Case studies and methods

Two case studies were selected to enable triangulation of data through comparative analysis: 1) a Mediterranean mountain natural park in the Ports area, eastern Spain; and 2) a British upland national park in the Peak District, central England.

Els Ports Massif, located on the border area between the regions of Catalonia, Aragon and Valencia, Spain, is a medium-high massif, with an upland rural area on the western side.

However, its high altitude and steep slopes, its proximity to the Mediterranean Sea, mean this mountain range is unsuitable for snow tourism. Instead, is well known for its rivers, trekking and cycling trails, climbing cliffs, as well as a natural and cultural heritage that is mostly linked to nearby rural towns and local gastronomy. Els Ports is around 2.5 hours from large tourist-generating markets such as Barcelona, Zaragoza and València, and surrounded by a low-populated rural area, so requires staying overnight, rather than day trips. The area is managed by several DMOs and Natural Parks, each operating within the confines of its own administrative boundaries. This case study centers on the western side of the mountain range because tourism is more widespread and the geographical inaccessibility of the area means tourists are only able to cross to the other side through steep walking trails or by driving around the massif.

The Peak District, in the UK, is an example of medium-sized mountains extending into an upland area to the south, and is characterized by medium and low altitudes and a rural population (Fernandes, et al., 2021; Tizzoni, 2015). Unlike the previous case, the Peak District is surrounded by some of the most densely populated cities in the UK, and therefore, it is one of the most visited National Parks in Europe. Multiple attractions link the area to its heritage such as gastronomy, towns, caves and castles, and to its wide range of nature-based activities, such as walking and cycling trails and climbing. In this case, the National Park spans several administrative regions (East Midlands, Yorkshire & the Humber, West Midlands and Northwest regions); however, most of the Peak District is managed by a single DMO, namely Visit Peak District and Derbyshire which is also in charge of the rest of Derbyshire district.

Both case studies share a similar multi-dimensional diversity of tourism types and segments, although they differ in climate, social and economic context, some physical characteristics and management and marketing circumstances. Moreover, Els Ports is a more holiday-based destination (mean of 7.9 days) compared to the Peak District, which tends to attract visitors looking for just a few days or weekend away (mean of 3.6 days). Thus, they represent good examples of multi-dimensional medium-sized mountain areas in different European contexts.

To determine which attractions tourists visited from their accommodation points, data was gathered from 2,240 visitor questionnaire surveys, administered at the main destination accommodation hubs and attractions. Optimum attraction and accommodation survey locations were identified at each destination. In the case of accommodation hubs, official bed registers by municipality were used, and for attractions, content analysis of guide books (Paulino & Prats,

2013). The number of days data collection took place at each location corresponded to the number of available beds and attractions in each location, including weekdays, weekends, and public holidays.

Respondents were asked to give information on where they were staying and the attractions they had visited from their accommodation points. Data from individual questionnaires was aggregated in asymmetric matrices to represent accommodation and attractions (rows and columns, respectively) (Stienmetz & Fesenmaier, 2015), in which the confluent cells represented frequency of flows between one single accommodation point and an attraction.

To identify the accommodation hubs in the area, visits made from locations with less than 50 overnight guests were filtered, thus eliminating locations with little impact on tourist flows. In addition, attractions with residual visits were filtered to simplify the analysis.

Data matrices were uploaded to Gephi and analyzed using network analysis, maps using QGIS and charts. Intra-destination visits from main accommodation points to tourist attractions are represented by a series of networks connecting accommodation hub nodes (black) to attractions nodes (grey). The output figures feature the whole destination network overview, taking into account only accommodation hubs represented in both graphs and maps. Figures also include ego-networks graphs of a particular accommodation hub in time-distance order, and time-distance charts of the visits to attractions from the accommodation hubs. Distances between accommodation hubs and attractions were measured as time-distance rather than road or Euclidean distance, as time is considered an important friction factor when planning a side-trip (Mckercher & Lew, 2003).

Results

The results presented in hub-and-spoke systems show the consumption behaviour of around 70% of tourists staying in these areas. This behaviour means choosing a central accommodation hub linked to a number of attractions, places and areas visited by tourists during their stay overnight at that hub. The resulting data (represented in Figures 1 and 2) show the frequency of visits from the hubs to surrounding attractions, yielding rich information on how mountain destinations are

consumed. However, their lack of geographical attachment and the large amount of data obtained hinders their interpretation.

Figure 1. Aggregated visits from accommodation hubs to attractions in Els Ports

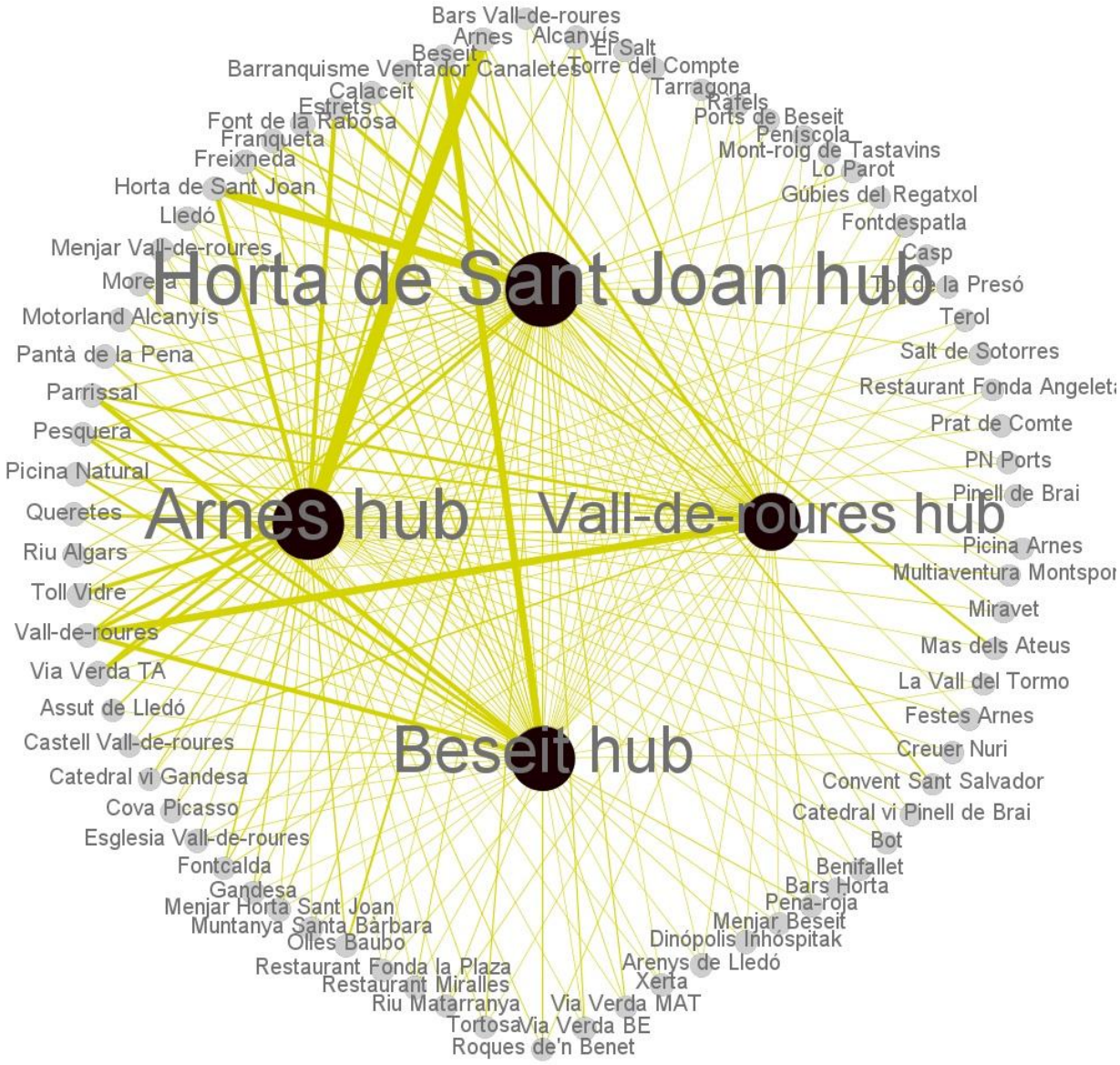
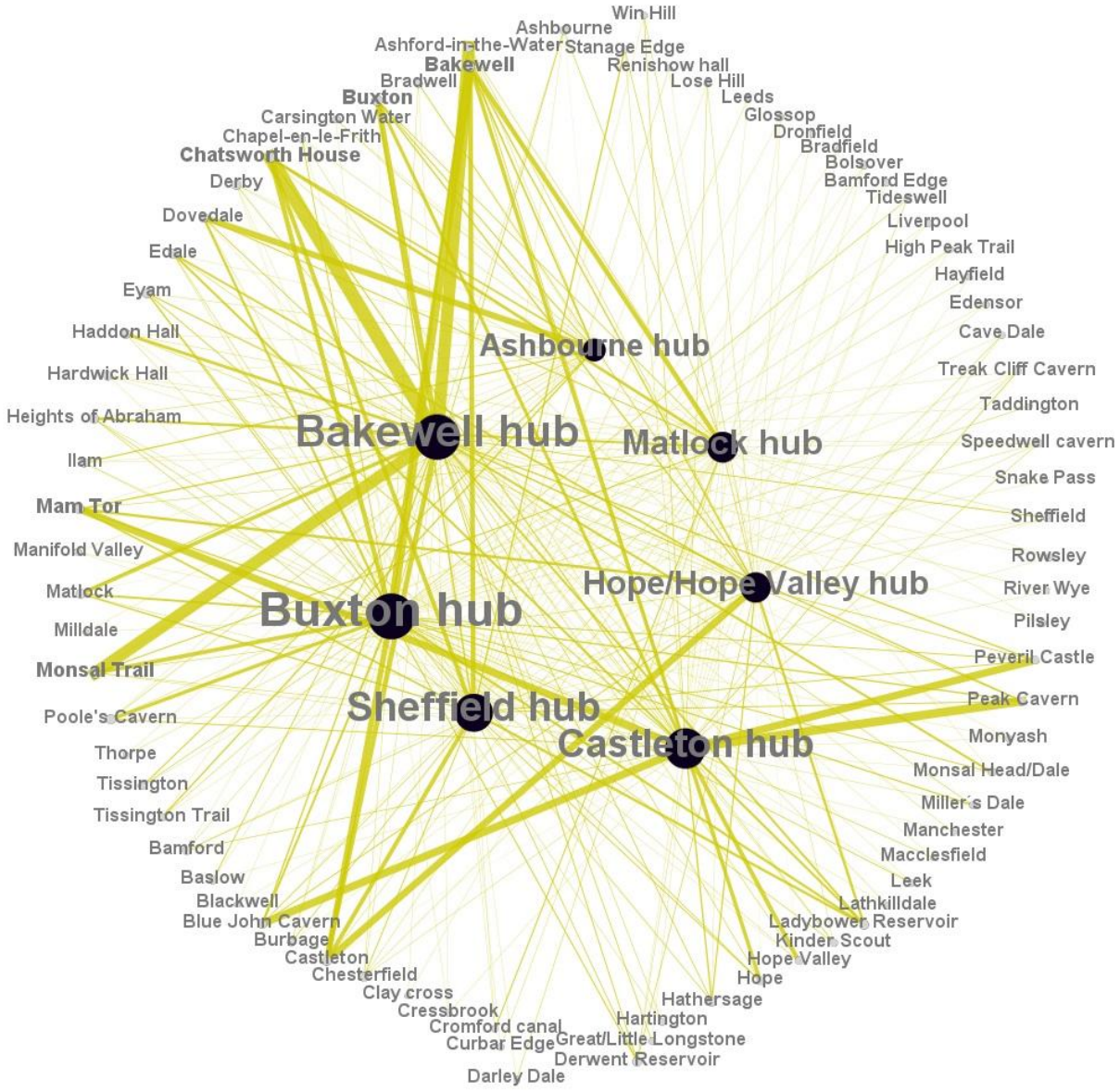


Figure 2. Aggregated visits from accommodation hubs to attractions in the Peak District



To facilitate the geographical interpretation, data on tourist visitation patterns is represented in maps (Figures 3 and 4), showing that visitors stay close to the areas surrounding their accommodation hubs. These visitation patterns reflect the way in which mountain destinations are consumed on a geographical basis. In general, results show that travel patterns are unconstrained by administrative boundaries or branded territories, tending to show convenience-oriented patterns. Although flows from all the accommodation points include cross-border visits, hubs in Arnes (Els Ports) and Sheffield (The Peak District) show an outstanding number of

cross-border visits due to their proximity to regional borders. Thus, they are clear examples of missed opportunities stemming from planning, managing and branding mountain destinations on an administrative basis.

Both the maps and the graphs (Figures 1 to 4) show that some geographical areas, rather than being attached to a single accommodation-hub system, simply overlap; leading to particular attractions being visited by tourists staying in several accommodation hubs. This mostly applies to well-known attractions, which are more likely to attract tourists; however, attractions located between accommodation hubs are also affected. Examples of this are well-known attractions such as Chatsworth House, Mam Tor and Monsal Trail in the Peak District; and Estrets, Parrissal and Via Verda Terra Alta (TA) in the area of Els Ports.

Furthermore, both case studies include accommodation points in well-known tourist attractions; for example, Bakewell and Castleton (The Peak District) and Vall-de-roures, Beseit and Horta de Sant Joan (Els Ports). These attraction-accommodation points capture a substantial share of tourists from several accommodations hubs, as well as creating flows to surrounding attractions, thus generating areas of overlap between the hub-consumption systems.

Moreover, the hub-consumption systems represented in the maps (Figures 3 and 4) reflect the main factors affecting visitation patterns in mountain areas. The dispersal of visits linked to accommodation hubs show that convenient visits are modelled by the mountainous characteristics of the destination and its communication networks. The most popular tourist attractions in Els Ports are found near the main road connecting Horta de Sant Joan, Arnes, Vall-de-roures and Beseit; at a considerable distance from the steep and inaccessible areas of the mountain range. The same pattern applies to the Peak District, where the most visited tourism attractions are condensed into three areas along the main roads. The first is a central area that follows the main road connecting Buxton, Bakewell and Matlock. The second is a northern area connecting Sheffield, Hope and Castleton through a network of roads passing through the Derwent valley and the Hope valley, and which is very much constrained by the High Peak mountains. The third area is located close to Ashbourne accommodation hub, which shows a rather more dispersed pattern along multiple secondary roads between the Dovedale and upland area at White Peak.

Figure 3. Map of aggregated visits from accommodation hubs to attractions in Els Ports

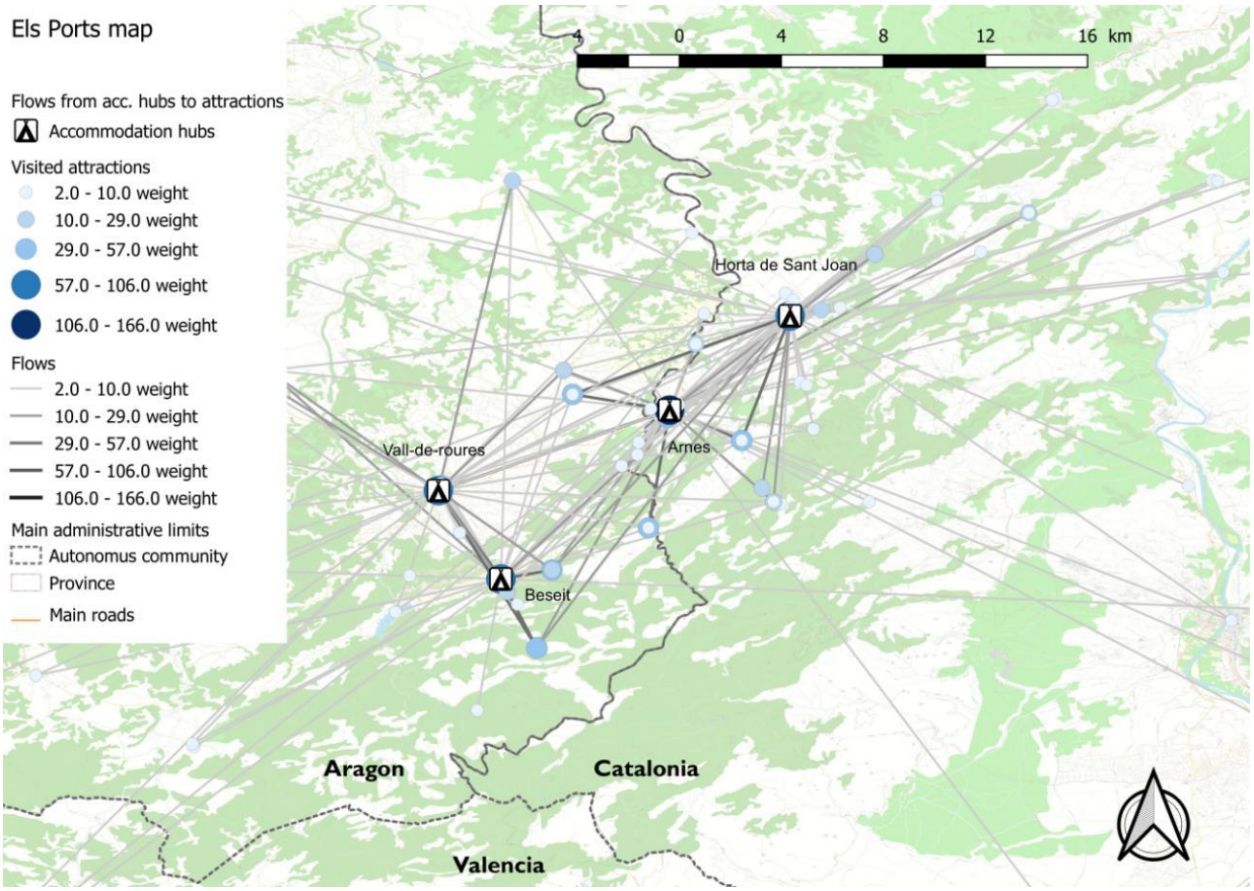
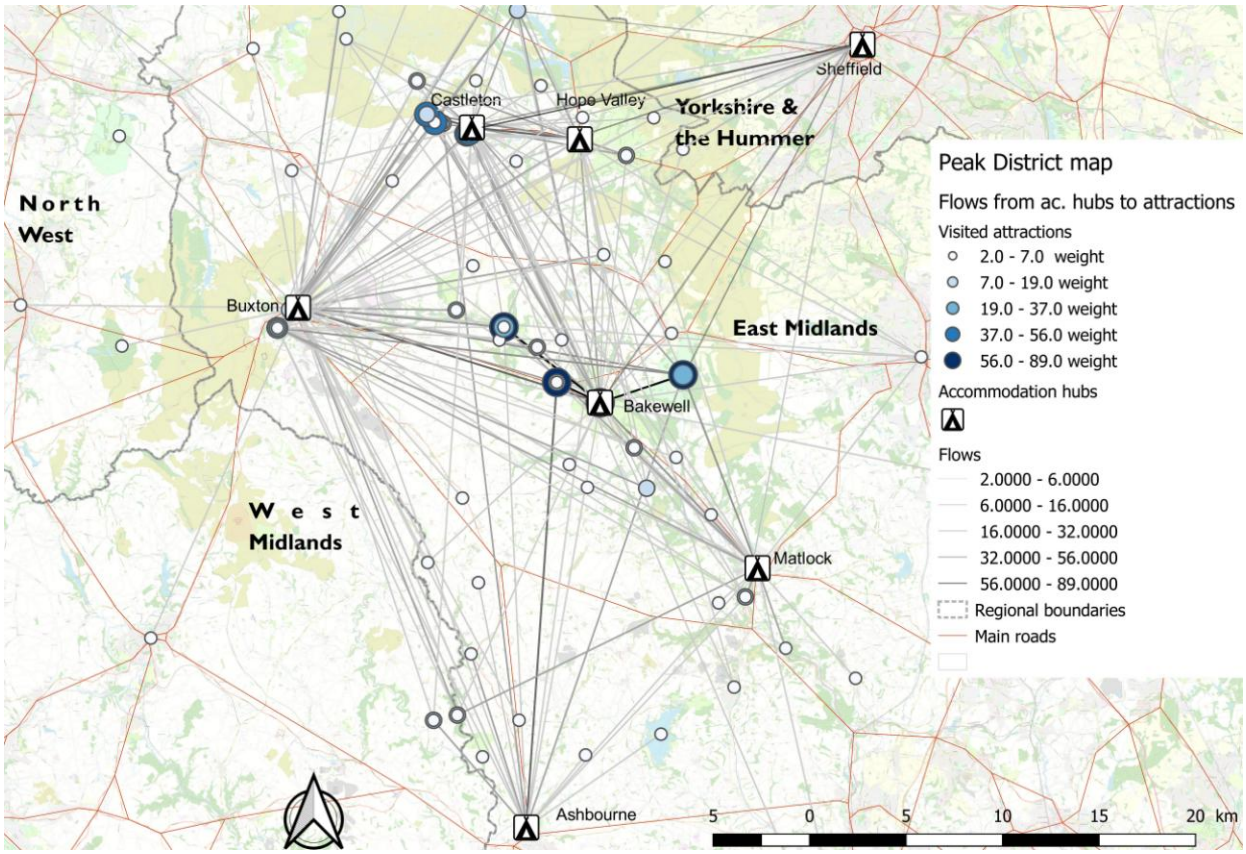


Figure 4. Map of aggregated visits from accommodation hubs to attractions in the Peak District



The combination of a convenience-oriented visitor profile and the characteristics of mountain roads suggests that driving time-distance from accommodation to attractions should be a constricting factor for tourist flows. Thus, each accommodation hub was examined to explore the extent to which the territoriality of travel patterns is affected by time-distance. Graphs 6, 7, 8 and 9 represent 2 accommodation hubs for each destination, and show that the majority of the most frequent visits are within a 30-minute time-distance from the accommodation hub. This reinforces the result that tourist experiences in mountain destinations are convenience oriented. The visits from accommodation hubs to attractions show a tendency to decrease as the distance in minutes increases. However, the data in the graphs show fluctuating frequencies, depending on the attraction visited.

Figure 5. Frequency of visits from Arnes accommodation hub, depending on the time distance to attractions (Els Ports)

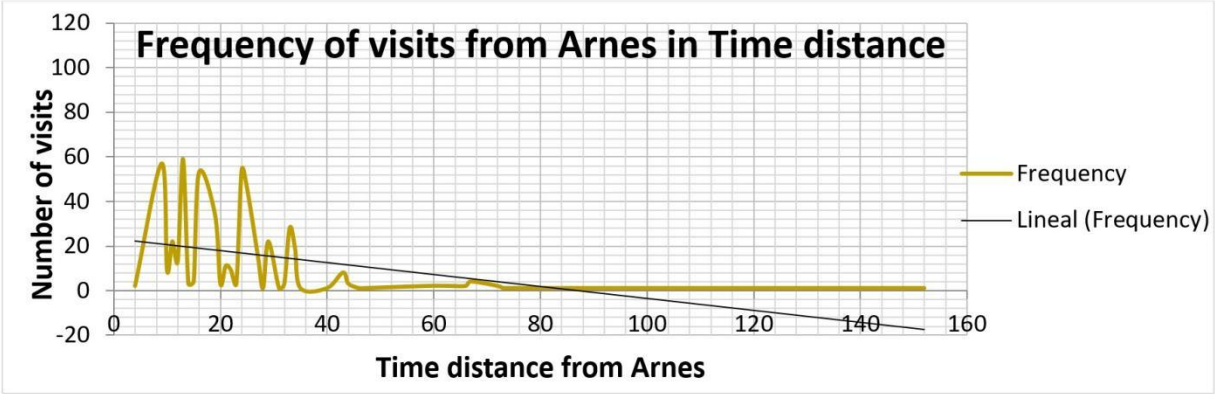


Figure 6. Frequency of visits from Vall-de-roures accommodation hub, depending on the time distance to attractions (Els Ports)

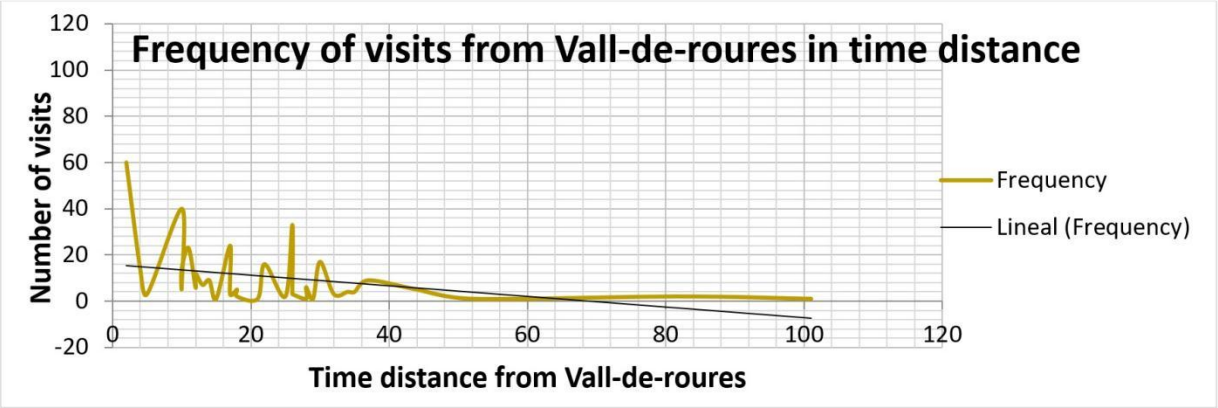


Figure 7. Frequency of visits from Bakewell accommodation hub, depending on the time distance to attractions (The Peak District area)

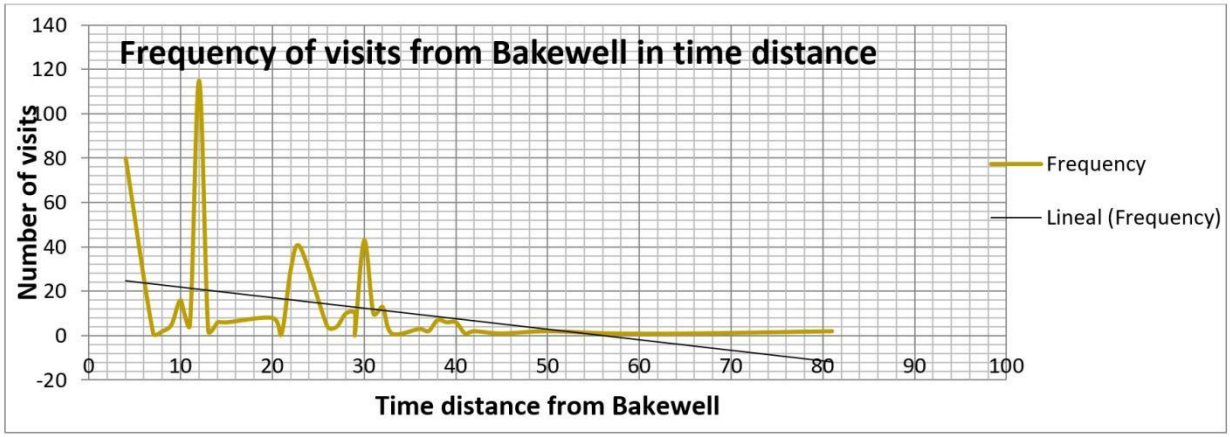
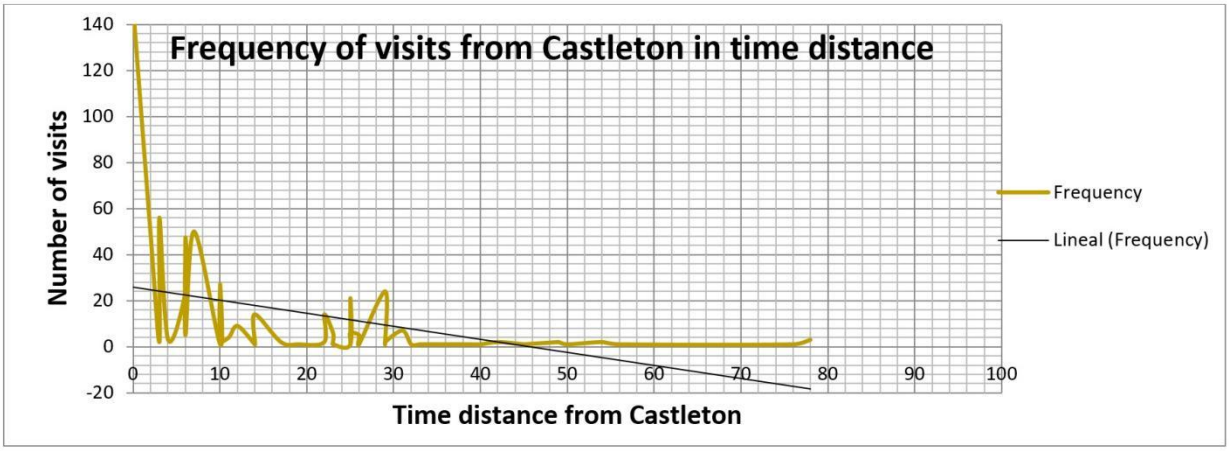


Figure 8. Frequency of visits from Castleton accommodation hub, depending on the time distance to attractions (The Peak District area)



Ego networks of individual accommodation hubs and time-distance graphs from accommodation hubs to attractions represent the effect the level of attractiveness particular attractions have on the frequency of flows (see Figures 9, 10, 11 and 12). Similar to Figures 5, 6, 7 and 8, differences in the intensity of aggregated visits reflect the attractiveness level of the various attractions. However, this indicator can only be used up to a certain point as over time, visits to attractions decrease as the distance increases.

This also applies to attractions the local tourism industry considers to be outstanding. Findings show that frequency of visits to an attraction is largely affected by its attractiveness. Tourists in the two mountain destinations, staying in different accommodation hubs, all showed a clear preference for visiting attractions considered to be outstanding. Furthermore, an attraction's appeal also affects the distance tourists are willing to travel. Graphs 10, 11, 12 and 13 show that visits to attractions located close to accommodation hubs in time distance include both unique places and ones thought to be of little attraction, whereas only attractions with major appeal are visited when travel time increases.

The two destinations analysed show differences in intensity of aggregated visits. Tourists at Els Ports visit a wider range of attractions compared to those visiting the Peak District. Regarding the latter, tourists visit fewer attractions, producing more repetitive travel patterns.

Figure 9. Ego-networks representing aggregated visits from Vall-de-roures accommodation hub to attractions in order of time distance (Els Ports)

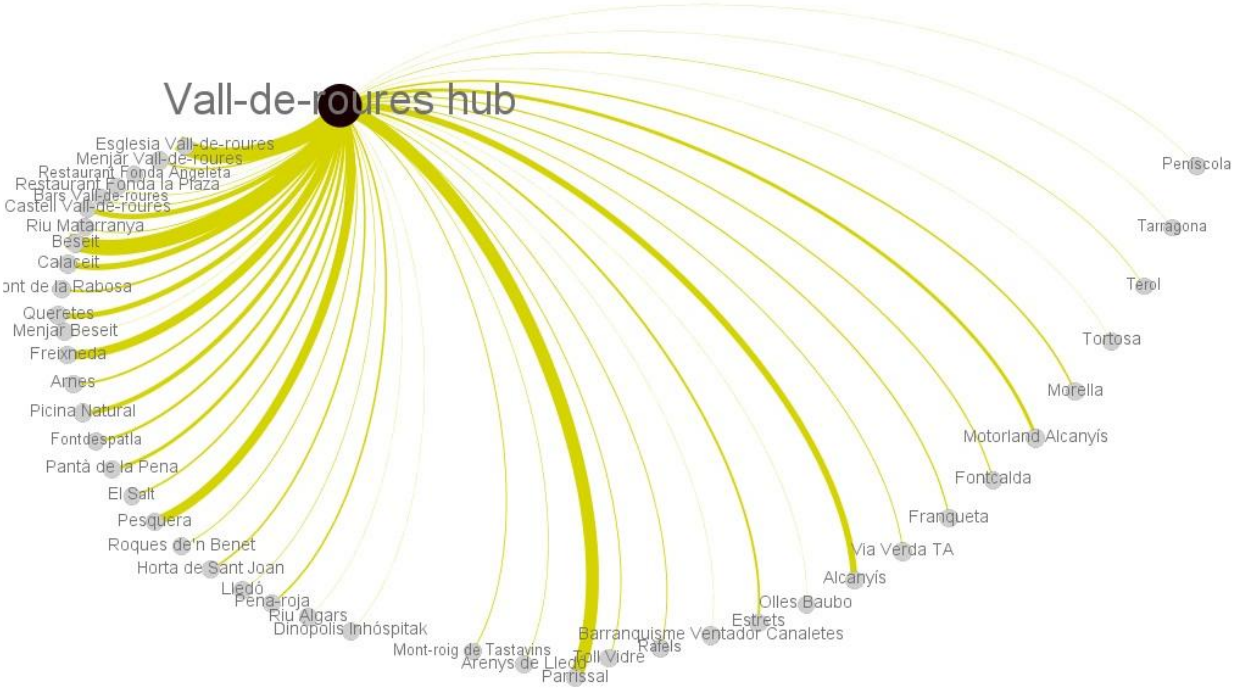


Figure 10. Ego-networks representing aggregated visits from Arnes accommodation hub to attractions in order of time distance (Els Ports)

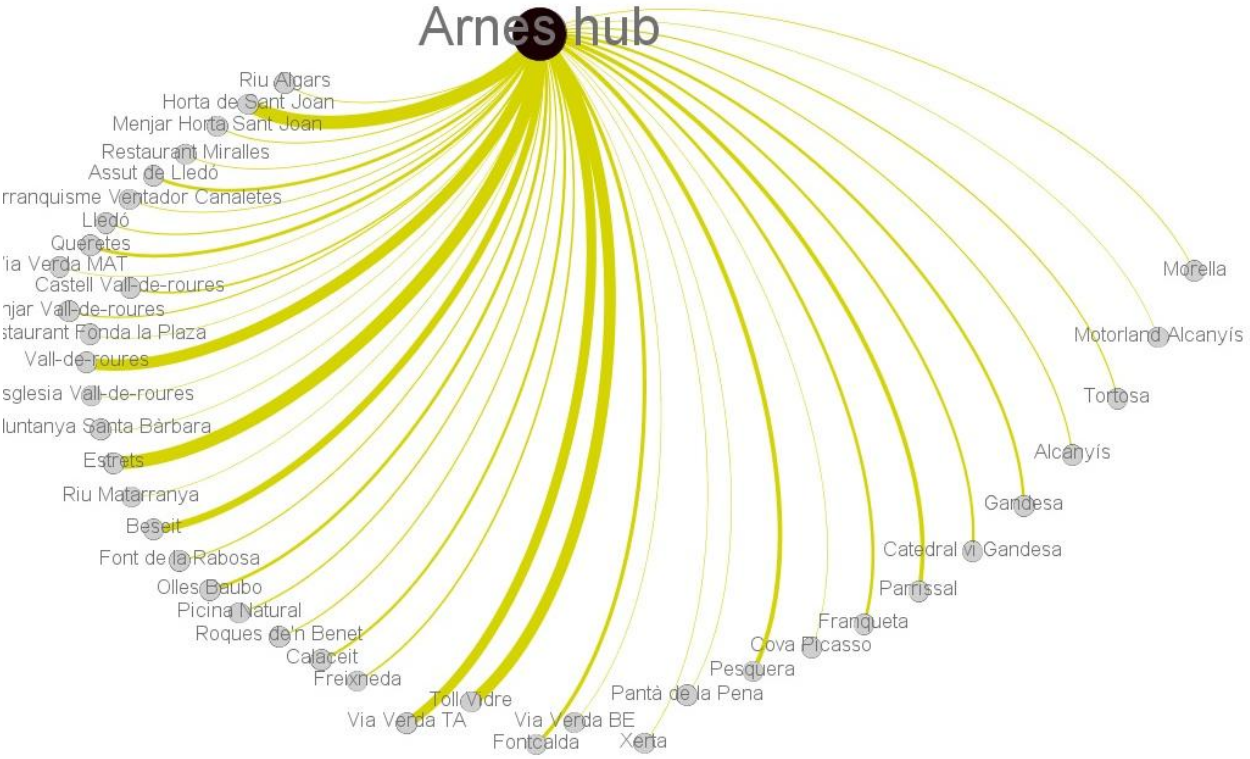


Figure 11. Ego-networks representing aggregated visits from Bakewell accommodation hub to attractions in order of time distance (The Peak District)

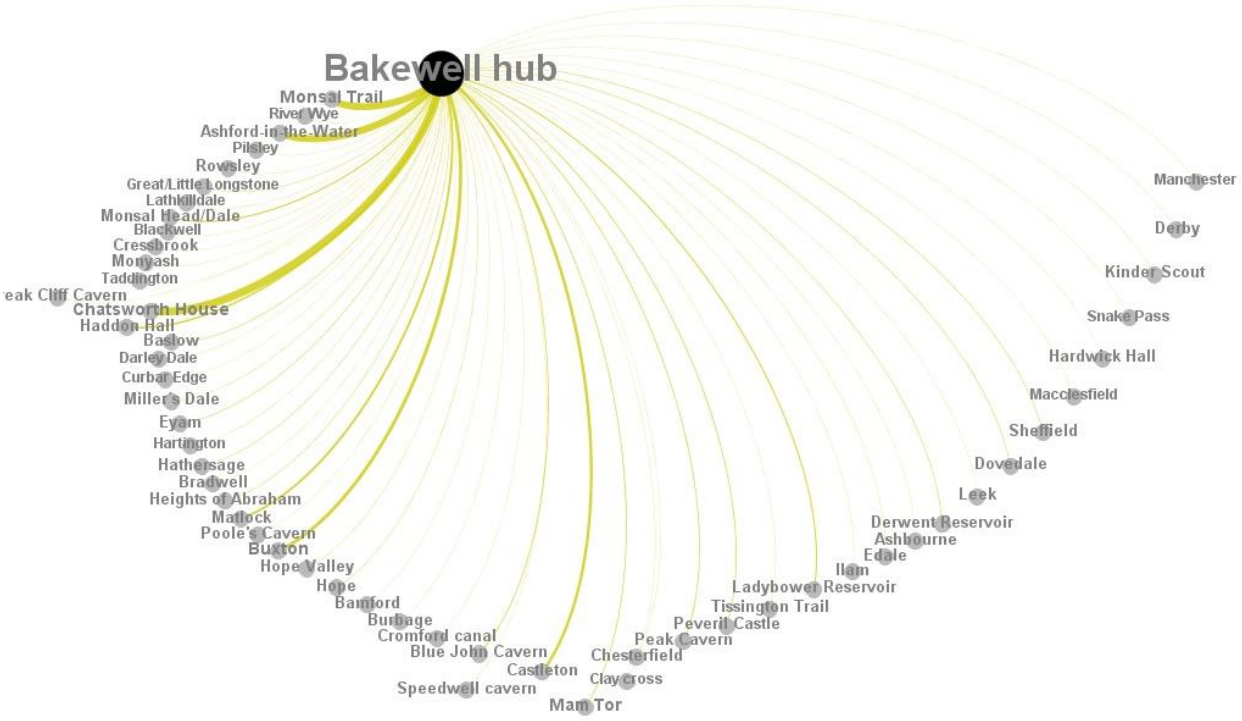
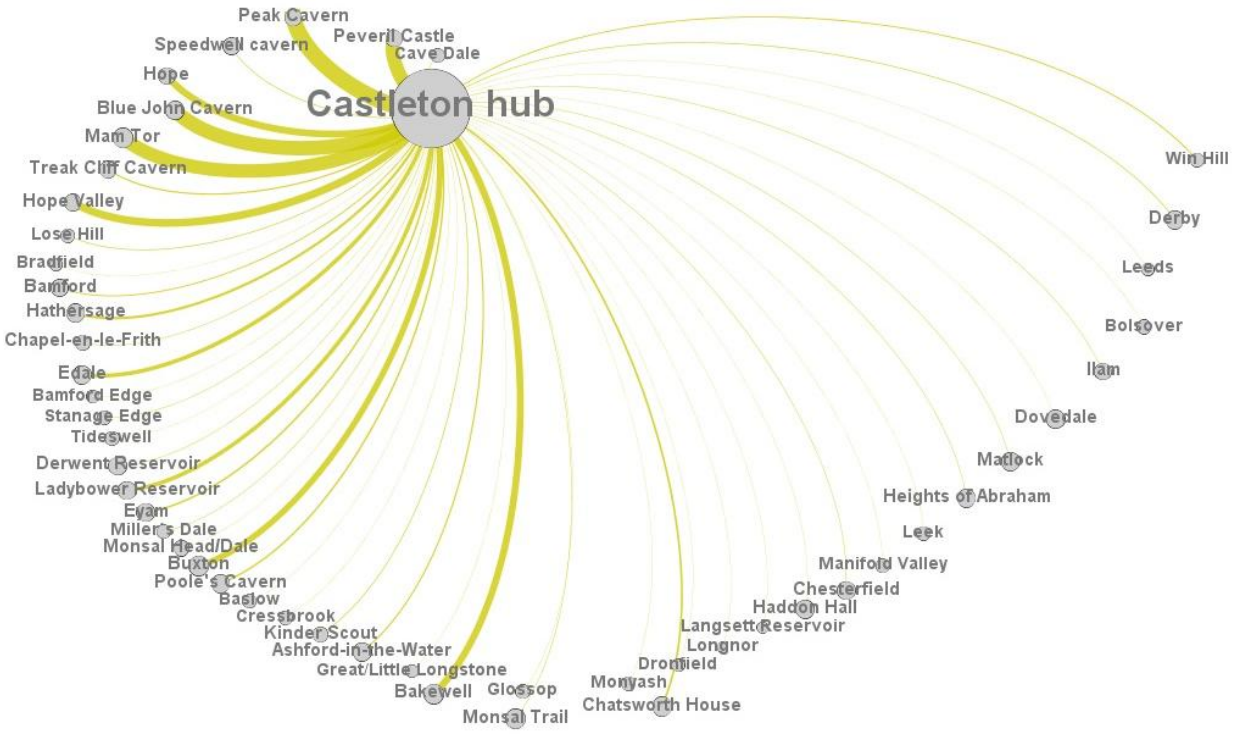


Figure 12. Ego-networks representing aggregated visits from Castleton accommodation hub to attractions in order of time distance (The Peak District)



Discussion

Although the rurality of mountain destinations may imply certain dispersion of accommodation offers, results demonstrate that accommodation concentrated in hubs significantly affects how mountain destinations are consumed geographically (Fabre-Bonte et al., 2019; Blasco et al., 2014; Paulino et al., 2019; Smallwood et al., 2012). In fact, findings show that a large share of tourists tend to select an accommodation hub for overnight stays and then take convenient side trips to surrounding attractions following hub-and-spoke travel patterns. The lack of local support facilities and services offered in these mountain areas makes tourism dependent on a symbiotic relationship with the support services offered in the surrounding towns (Gunn, 1993; Lue et al., 1993). This in turn influences the concentration of accommodation offers in towns, and contributes to the development of hub-consumption systems.

Results show that a large share of visits are close to accommodation hubs, but there are some differences in the intensity of aggregated visits between the two mountain destinations analysed. This may be due to two factors. Firstly, the differing numbers of attractions may create more repetitive patterns when variety is reduced (Lew & McKercher, 2006). Secondly, the differing lengths of stay at a destination, since tourists tend to prioritise visits to renowned and/or closer attractions when they have less time (Barros & Machado, 2010; Lau & McKercher, 2006).

In line with previous findings on travel patterns, visitation patterns around accommodation points in mountain destinations mostly show convenience-oriented visits (Mckercher & Lau, 2008; Shoval et al., 2011; Smallwood et al., 2012). In fact, these results show a similar territoriality pattern as Shoval et al.'s case study (2011) on urban destinations. However, the main difference here lies in the distance that tourists are willing to travel from their accommodation point. Visits to attractions in urban destinations tend to fall within urban area; however, flows in mountain destinations are more dispersed, driven by both the typical dispersion of attractions in these destinations and the widespread use of private cars (Blasco et al., 2014; Connell & Page, 2008; Paulino et al., 2021; Smallwood et al., 2012).

The typical constrains on communications networks (Godde, et al., 2000; Klimek, 2017; Nepal & Chipeniuk, 2005) force to a predominance of car-based trips among mountain tourists (Connell & Page, 2008; Zillinger, 2007); consequently the topography and good quality road networks generally motivate tourists to take side trips to attractions close to main roads

connecting accommodation hubs. Thus, in mountain destinations, the area convenient for visits is not necessarily the geodesic area encircling their accommodation Convenience-oriented visits give destinations of this nature a more elongated shape as they follow main roads and valleys.

In the same context, rather than considering geodesic or geographical distance, as suggested by Stiemetz & Fesenmaier (2015), time distance from accommodation is a better choice for analyzing tourist flows (Lew & McKercher, 2006; McKercher, Wong, & Lau, 2006; Paulino et al., 2020), due to the topographical characteristics and differences in quality of road networks (Godde, et al., 2000; Klimek, 2017; Nepal & Chipeniuk, 2005). Results prove that time distance is a constriction factor in mountain areas, hence, where the chosen accommodation is located highly influences the choice of attractions visited (Shoval et al., 2011), as tourists generally restrict their visits to within a 30-minute drive from their accommodation.

However, results show that distance decay is moderated by the level of attractiveness of attractions. Findings from the study hold up the theory that visitors will willingly travel further to see attractions that are one-of-a-kind, or considered more alluring (Lew & McKercher, 2006, p. 441). Results show that tourists tend to take side trips to outstanding attractions, even if they are further away than a 30-minute drive. Since flagged attractions play an important role in how mountain destinations are consumed, tourist patterns tend to fit into space-sitter characteristics, veering a little off the beaten track (Donaire, 2004)

When results of hub-consumption systems are contrasted with destinations as they are currently established, formal boundaries and the way destinations are consumed do not coincide. In fact, consumption-based destinations are nothing like destinations that are officially managed, since tourists constantly include visits to other administrative boundaries and branded territories, demonstrating that the resulting hub-consumption systems are trans-boundary.

Moreover, in line with the claims of Beritelli et al. (2015) and Dredge (1999), hub-consumption systems are not rigid and excluding destination units as aggregated travel patterns frequently generate visits to the same attraction from more than one hub-consumption system. Thus, these consumer behaviours suggest that the present destination management system in mountain destinations, consisting of defined, static, all-inclusive areas which exclude neighbouring attractions (Beritelli et al., 2015; Dredge, 1999), does not represent the tourists' perspective of the destination. Thus, mountain destinations need to take these overlapping areas into account so that they can develop and promote destinations that are better adapted to real tourist consumption.

Most DMOs and local and regional public administrations are making considerable efforts to face the challenges associated with the remoteness of the area, and are trying to apply policies to push economic dynamics enabling a livelihood for the local population (Nepal & Chipeniuk, 2005; Klimek, 2017; Saraniemi & Kylänen, 2011). However, the results show that these efforts may not be efficient because they are not in line with consumption patterns within the destination. Tourists are clearly playing an important role in defining tourism destinations, whereas mountain destinations are failing to adapt to the reality of how tourists consume the area (Beritelli et al., 2015; Cerutti et al., 2018; Dredge, 1999; Paulino et al., 2021).

This represents a lost opportunity to align business interests on both sides of the border with consumer needs, and to apply a most effective branding and destination management strategies to manage tourism flows and preserve a balance between tourism and conservation (Paunovi et al., 2017). Thus, destination planners of mountain areas should take the lead in developing a dynamic tourism destination model based on the hub-and-spoke mobility of tourists by introducing innovative cross-border policies and promoting cooperation between stakeholders based on tourists' travel patterns (Asero et al., 2015; Beritelli et al., 2015; Steiner, 2015; Yang, 2018). This also offers an opportunity to improve transportation and communication infrastructures, and recognize the environmental and social impacts of tourism. It can also boost networking between tourism stakeholders, which in turn can lead to newly developed tourism products and services with more efficient marketing that better meets the needs of tourists (Kim, Thapa, & Jang, 2019). Altogether, this will enable mountain areas to partially recover from their disadvantageous situation in the face of a highly competitive tourism marketplace (Brenner, 2009; Kang et al., 2014; Nepal & Chipeniuk, 2005; Paunovi et al., 2017).

Conclusions and limitations

This study has achieved the following objectives: 1) identifying consumer-based destinations in mountain areas based on tourists' hub-and-spoke travel patterns; 2) contrasting current administrative-based destinations with the hub-consumption systems identified in order to detect latent opportunities linked to adapting mountain destination management to consumer-based

criteria; and 3) identifying the main factors determining hub-consumption systems in mountain areas, which would enable other mountain destinations to identify hub-consumption systems.

To conclude, results of this study demonstrate the need to redefine the limits and structure of mountain destinations by putting tourists at the center of destination management, thus offering an alternative to the current administrative-based model. Key findings show that, tourists largely consume mountain destinations following hub-and-spoke travel patterns, which are principally influenced by the location of accommodation hubs, road networks and time distance between accommodation hubs and attractions. The hub-consumption systems in mountain areas include visits to surrounding attractions within a 30-minute driving distance regardless of administrative boundaries, as well as visits further away to outstanding attractions. Furthermore, hub-consumption systems geographically overlap with neighboring ones, breaking with the traditional conception of destinations as rigid, excluding units.

Empirically, this research critically examines the traditional management of mountain destinations frequently divided following regions or even states, and contributes to the discourse on functional destinations by identifying how tourists consume mountain destinations. Furthermore, it provides a deeper understanding of the role played by both accommodation hubs and tourist attractions in mountain areas, their spatial relationship, and factors influencing the generation of flows from one to the other. This study contributes to the theoretical literature by introducing a model of hub-consumption systems in mountain areas based on convenient travel patterns around accommodation hubs.

By prioritizing the consumer over the perspective of administrative boundaries, obstacles such as administrative barriers, should be broken down, allowing mountain areas to adapt their planning, management and branding to how tourists consume these destinations. This provides an excellent opportunity for mountain destinations to partially recover from their disadvantageous situation of remoteness and reduced infrastructures through the creation of new richness linked to more efficient tourism planning, management and branding, better networking between tourism stakeholders, as well as improved transportation and communication infrastructures.

Although this study facilitates detecting areas consumed by tourists in multidimensional mountain destinations, it did not discuss how the current system of DMOs and administrative boundaries will need to adapt to these results. Thus, future research should address the

governance of each hub-consumption system. Participative and adaptive meta-governance systems should be drawn up, that include the DMOs, public boards, and private and social stakeholders linked to each each hub-consumption system and considering their overlapping characteristics.

The mobility patterns in the multidimensional mountain destinations analyzed may not be representative of specific mountain profiles, such as snow-based tourism, or trans-mountain hiking. Future analysis should consider specific patterns of diverse tourist profiles visiting mountain destinations. By doing so, the mountain areas will be able to define specific products and services and connect them to marketing strategies, enabling tourists to visit the destination in a different way, according to their profile and preferences.

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