2 Lake-destination image attributes
A neural network content analysis

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Introduction

Forty years of research have clearly demonstrated that destination image (DI) is nowadays an important field of tourism studies, more specifically destination marketing inquiry. However, an apparent absence of homogeneity related to DI theory and empirical work have led to a lack of theoretical framework, continuously pointed out by several researchers in the field (Baloglu & McCleary, 1999; Echtner & Ritchie, 1993; Fakeye & Crompton, 1991). This is mainly due to the fact that DI can be classified as an 'umbrella construct' which requires an evolutionary approach when investigating this field of research (Rodrigues, Correia & Kozak, 2011, 2012).

Embraced by a cyclical process, different theories, perspectives, methods and techniques have been emerging in recent decades and new trends in the DI field are arising (Stepchenkova & Mills, 2010). For example, new methodologies for DI measurement based on Jenkins' (1999) model which incorporates two phases of research (both qualitative and quantitative), started to emerge. As stated by Walle (1997, p. 535), 'the field of tourism needs to embrace a general recognition of the legitimacy of a variety of research tools'. In the last decade, multi-method studies have been increasing in this field of research (e.g. Martin & Bosque, 2008; Rolo-Vela, 2009), where computer-aided text analysis, specifically the use of CATPAC software has been highlighted (Ryan & Cave, 2005; Govers & Go, 2005; Govers, Go & Kumar, 2007; Ryan, 1998).

In addition, as a result of an intensive competitive environment non-traditional entities have started to be the focus of recent DI studies, such as regions (Kastenholz, Davis & Gordon, 1999; Silvestre & Correia, 2005), resorts (Alcaniz, Garcia & Blas, 2009) or types of tourism (Silva, Kastenholz & Abrantes, 2013). Particularly related to lake tourism, very little is known about destination marketing and image applied to the lake tourism context (Tuohino, 2006). This is a relatively unexplored research theme of tourism studies, specifically in the DI field.

In this context, this chapter aims to advance knowledge of lake tourism as a recent research area in tourism studies and to extract image attributes more related to lake-destination areas (LDAs). For this purpose, the study's goal is to explore and analyse the findings obtained through content analysis and validate their interpretation. In order to assure the reliability of these outputs, a different method of analysis was adopted through the use of a computer-aided text analysis named CATPAC (v. III, Woelfel, forthcomimg), which 'is able to identify the most important words in a text and determine the patterns of similarity based on the way they are used in the text' (Woelfel, 1998, p.11). CATPAC is as a selforganizing artificial neural network software package that has been optimized for reading text.

Literature review

The literature review of DI research over the last forty years clearly demonstrated that: (1) destinations under study were mainly large-scale entities; (2) only three DI scales were considered to be reliable and valid (Rolo-Vela, 2009); (3) there is no consensus about which attributes should be selected and included in a DI scale; and finally, (4) DI scales should progressively include attributes that really match the object under study (Rodrigues *et al.*, 2012).

Additionally, recent studies (Stepchenkova & Mills, 2010) argue that the scope of DI measurement has become wider including non-traditional entities, such as national parks, resorts, rural areas and sport events. In this line of thought there is also Beerli and Martin's (2004, p. 659) rationale, for whom

the selection of the attributes used in designing a scale will depend largely on the attractions of each destination, on its positioning, and on the objectives of the assessment of perceived image, which will also determine whether specific or more general attributes are chosen.

Also, Correia, Santos and Barros (2010) posit that the probability of choice by tourists is strongly affected by different attributes related to destination characteristics, among other variables.

Given this, and considering the fact that due to the multifaceted nature of tourism new typologies have come into existence over the last decade, DI scales should consider the attribute differences not only based on geographical scope, but also on the type of entity/object, such as types of tourism and destinations. In this context and particularly related to water as a tourism resource, a new type of tourism has emerged - lake tourism - as a relatively unexplored research theme of tourism studies with an emerging body of literature (Cooper, 2006; Tuohino, 2006). Lakes are open bonds of water (natural or man-made) which can either be considered as a tourism resource, which adds value to the whole destination experience or arise as the core of the destination's attractiveness. In fact, tourism development not only on the lake itself but in the surrounding area might constitute a valuable resource for some countries if properly developed.

Based on this, due to the emergence of LDAs all over the world, it is assumed that DI might represent a relevant basis for the development and management of this new type of destination. According to Pike and Ryan (2004), DI is considered a key construct in destination positioning, and destinations should be oriented to target positioning in their own competitiveness set (Bahar & Kozak, 2007; Kozak, 2002; Kozak & Rimmington, 1999). For this reason, the objective of this chapter is to explore what attributes might be involved in the image formation of LDAs, as a possible basis for developing a future image measurement scale applied to this particular type of destination.

Grounded on the premise that various methods should be used to explore DI attributes, both qualitative and quantitative (e.g. Martin & Bosque, 2008; Rolo- Vela, 2009), this study assumes that unstructured and semi-structured techniques should be employed to obtain more knowledge concerning image attributes (Prebensen, 2007; Ryan & Cave, 2005). Similarly to Cave, Ryan and Panakera (2003), this study also advocates that there are advantages in employing qualitative techniques, particularly in the early stages of DI research, since it apprehends more aspects of image.

Methodology

The qualitative phase began with an analysis of the image measurement variables found in the literature for other types of tourist destinations. A meta-analysis paper concerning DI as a field of research since the emergence of the construct in the 1970s was examined. Having as a base line the list of the most common DI attributes proposed by Gallarza, Saura and Garcia (2002), an extension of the period was considered (2000 to 2012) and twenty-four research studies were analysed (Rodrigues, Correia, Kozak & Tuohino, 2015). With this in mind, and since the scales analysed did not correspond well to the object of the study (LDAs in this case), the goal of the study is to explore the cognitive image of LDAs, analysing both its functional and psychological attributes, and also to investigate the nature of the lake tourism concept.

This chapter focuses on validating the results obtained through the content-analysis method in a previous research stage (Rodrigues *et al.*, 2015). As suggested by Ryan (1998), other steps of analysis might be implemented for the refinement of the final results and one way of attempting to assess the qualitative data is by trying to establish relationships between phrases and words. Therefore, by matching the results from content analysis with the establishment of associations between words (attributes) through perceptual maps, it becomes possible to assess whether the data are mutually supportive. With this in mind, this chapter focuses on the use of a neural content analysis with CATPAC software.

As a reminder, the general objective of this chapter is to explore the cognitive image of LDAs, analysing both its functional and psychological attributes, and also investigate the nature of the lake tourism concept. This general objective is reflected in the following research question:

• What attributes might be involved in the image formation of LDAs, as a possible basis for developing a future image measurement scale applied to this particular type of destination?

The extracting process was carried out based on a content analysis of text and pictures in the database of an online directory for lake enthusiasts (cf. Lakelubbers.com). A total of 40 lake descriptions (units of analysis) constitute the sample of this study (for a more detailed explanation see Rodrigues *et al.*, 2015). As a first step a 'deductive procedure' was conducted since the goal here was to conceptually validate a theoretical framework of DI dimensions (e.g. 'natural resources', 'tourism infrastructures') by using Beerli and Martin's (2004) scale, but particularly applied to the lake-destination context.

As analysis proceeded, additional codes were developed more related to lake- destinations, and the initial coding scheme was revised. Subcategories were then defined through 'inductive procedure' as a method of coding (e.g. A.1. 'Physical features of the lake'; A.2. 'Richness of nature'; A.3. 'Weather' under category A. 'Natural resources'). Through a deductive-inductive approach it was possible to generate a set of over 100 potential attributes related to LDAs, grouped into 23 subcategories, classified in nine predetermined categories or domains (see Table 2.1). These items might be included in an image measurement scale for this type of destinations in the future.

After this and in order to respond the second research question, a holistic method of coding was applied and five dimensions of lake tourism concept were extracted (resource, supply, logistical, organizational and representational). Based on these results of the conventional content analysis mentioned above, and aiming to enrich the interpretation of those results, a different method of analysis was used. CATPAC is a self-organizing artificial neural network software package, which 'is able to identify the most important words in a text and determine the patterns of similarity based on the way they are used in the text' (Woelfel, 1998, p. 11).

Simply, CATPAC is based on a neural modelling technique that generates a frequency table and proximity for the most common words. As Govers and Go (2005) explain, proximities between words consists of artificial neurons or nodes which are connected by communications channels of varying strength within a sliding text window chosen by the researcher (standard size is seven words, i.e., CATPAC moves a window of seven words over the text and calculates proximities based on the number of times words are found together within these frames). For a good overview, refer to Woelfel (1998), Doerfel and Barnett (1999).

Conjointly, other researchers have supported the use of CATPAC as a helpful tool for content analysis in tourism studies (Cave & Ryan, 2005; Choi, Lehto & Morrison, 2007; Govers & Go 2005; Govers, Go & Kumar, 2007; Ryan, 1998). Summarizing, the resulting neural network output was used to identify the words that were most frequently mentioned to portray image attributes related to LDAs.

Similar to Choi *et al.*'s procedure (2007), some technical operations were needed to achieve interpretable results. The program: (1) eliminates 'stop words' (Doerfel & Barnett, 1999), which include a list of articles, prepositions, conjunctions and intransitive verbs that do not contribute to the meaning of the text (e.g. *if, and, to, is*); (2) combines two and more words into one so that they are not counted separately (e.g. *NationalPark, RealEstate*); and (3) replaces plurals with singulars (e.g. *lake, mountain, island, city, village* all in singular) and past tense with present tense.

Table 2.1 Defining dimensions and attributes of lake-destination areas from content analysis

Categories	Subcategories	Attributes/properties (examples)
A. Natural resources	A.1. Physical features of the lake	A.1. Origin, type, surface, depth, elevation, length, topography (...)
	A.2. Richness of nature	A.2. Protected areas, flora and fauna (birds, fish); sky, beaches, islands (...)
	A.3. Weather	A.3. Temperature, snow, frozen or unfrozen lake (...)
B. General infrastructure	B.1. Development and quality of roads	B.1. Access roads to the lake, circular drives
	B.2. Transport facilities	B.2. Existence of nearby airport, between villages around the lake, between lakes, between islands on the lake
	B.3. Nautical facilities and other infrastructures	B.3. Marinas, ports, public ramps, boat slips, public piers, berths, swimming areas, boardwalks (...)
C. Tourist infrastructure	C.1. Accommodation and catering facilities	C.1. Caravan parks, cottages, real estate, camping, hotels, chalets, vacation rentals (...)
	C.2. Available packages	C.2. Sightseeing tours, excursions, cruises (half-day, whole-day, evening, lunch), fishing trips (...)
	C.3. Signed trails and paths	C.3. Bicycle trails, climbing trails, hiking trails, nature/scenic trails, walking trails (...)
	C.4. Tourist services and information	C.4. Maps, tourist offices, visitor/information centres, nature centres, picnic areas, rental services), charter services (...)
D. Tourist leisure and recreation	D.1. Water activities, sports and recreation	D.1. Boating, boardwalk, canoeing, fishing, houseboating, lake sightseeing, kayaking, kite surfing, sailing, swimming
	D.2. Land-based activities, sports and recreation	D.2. Biking, birdwatching, climbing, hiking, paragliding, picnicking, sightseeing, rock climbing trekking, walking
	D.3. Winter activities, sports and recreation	D.3. Alpine and Nordic skiing, dog sledding, ice fishing, ice skating, ice climbing, snowboard, snowshoeing, toboggan
	D.4. Entertainment and events	D.4. Sport competitions (regattas, tournaments, parades), themed events (wine festivals, evening parties), local attractions (swimming pools, casinos), nightlife
E. Culture, history and art	E.1. History of the lake and surrounding region	E.1. Historic ruins, archaeological ruins and artefacts, local architecture, legends/ stories, caves, UNESCO
	E.2. Museums and historic buildings	E.2. Museums, castles, fortresses, fortifications, churches, monasteries, abbeys, chapels, cathedrals, monasteries (...)
	E.3. Cultural attractions and events	E.3. Music festivals and demonstrations, concerts, recitals, exhibitions, theatre, dance performances
	E.4. Gastronomy	E.4. Local dishes, wine (...)
F. Political and economic factors	F.1. Geographical location and territorial division	F.1. Location, countries and region boundaries, geo-political significance of the lake
	F.2. Lake purposes (past and present)	F.2. Salt extraction, fishery, energy production, supply of drinking water, agriculture, transportation
G. Natural environment	G.1. Attractiveness of the communities	G.1. Historic villages, mountain villages, cities, hamlets, lakeside towns, small towns (...)
	G.2. Beauty of the landscape/ scenery	G.2. Rural, natural, alpine, mountain, vineyards, orchards, vegetable farms, deep valleys, foothills, alpine
H. Social environment	H.1. Host community	H.1. Presence of local people, way of life, hospitality and friendliness
I. Atmosphere	No sub-category	Active, amazing scenery, breathtaking views, challenging, dramatic scenery, friendly and family-oriented lake, inspired, simplicity, tranquillity, beauty, memorable, outdoor destination, picturesque, quiet, rejuvenation, relaxing, unspoiled, romantic

Source: Own elaboration.

Multiple runs of the CATPAC were then conducted to further exclude other words that do not contribute to a meaningful interpretation of the results. According to Doerfel & Barnett (1999, p. 592), CATPAC

then counts the occurrences of the remaining words yielding the most frequently occurring words equal to the value set by the user. CATPAC creates a words-by-words matrix which cell containing the likelihood that the occurrence of one word will indicate the occurrence of another.

This matrix is then entered into a variety of multivariate analytic procedures through the use of two familiar techniques: cluster analysis and multidimensional scaling ('perceptual mapping'). A 'dendogram' as a graphic representation of the clusters in the text is produced indicating the degree of clustering (for a more in-depth explanation see Doerfel & Barnett, 1999; Woelfel, 1993). In order to enrich the analytic procedure, a visual plot of the symbols by multidimensional scaling is produced by CATPAC.

Based on the results of the content analysis as previously presented, the text data analysed by CATPAC was classified under themes or domains. The process of defining these themes was derived from the intersection of the first and second research question results. Therefore, five themes were extracted and the text data disposed, namely: *theme 0* based on a total combined lake description (40 texts of all units of analysis); *theme 1* corresponding to lake natural resources (about the lake itself); *theme 2* with a destination description (natural and social environment, atmosphere); *theme 3* comprising text data about destination heritage; (e) *theme 4* with the activities and facilities (general and tourist infrastructures and activities on and around the lake).

Findings

As previously explained, the initial set of image attributes extracted from the literature review reveals that they are too generic (e.g. landscape, sport facilities, culture attractions, accommodation). The list was considered inadequate and did not incorporate all salient attributes for LDAs. Through a content analysis deductive approach, nine image categories were determined based on Beerli and Martin's (2004) classification and 21 subcategories identified through a more inductive approach. Each subcategory includes several image attributes more related to LDAs. The outcomes of the conventional content analysis were the nine categories and 23 subcategories. A set of over 100 potential variables were extracted from textual analysis.

Using CATPAC content-analysis software, the totality of qualitative responses for each theme or subcategory was processed (Choi *et al.*, 2007; Gretzel & Fesenmaier, 2003; Ryan, 1998). Table 2.2 displays and compares the top 30 most frequent words for each theme and shows the combined total frequencies for all themes extracted from CATPAC outputs. This procedure was undertaken since the purpose behind the study was to obtain key descriptors that could be incorporated into a subsequent questionnaire.

Table 2.2 Most frequent words related to LDA in rank order

Rank	Theme 0	Theme 1	Theme 2	Theme 3	Theme 4
1	Lake	Lake	Lake	Lake	Lake
2	Water	Water	Visitor	Castle	Boating
3	Area	Feet	Area	Northern	Fishing
4	Visitors	Acres	Beautiful	History	Water
5	Along	Largest	Shoreline	Historical	Visitor
6	Fishing	River	Northern	Century	Area
7	Shoreline	Depth	City	Shore	Along
8	Around	Miles	Water	Area	Shoreline
9	Miles	Area	Town	Early	Holiday
10	City	Known	Village	Dates	Offer
11	Island	Over	Museum	Time	Rentals
12	Enjoy	Northern	Forest	Abbey	Around
13	Holiday	Island	Nature	Island	Enjoy
14	popular	Sea	Around	Ruins	Available
15	Large	Fishing	Mountain	Years	Popular
16	Over	Fish	Over	Western	Town
17	Offer	Located	Miles	Visitors	Skiing
18	Mountain	Shoreline	Largest	Place	Several
19	Village	Surface	Enjoy	First	Vacation
20	Year	Part	NationalPark	NationalPark	Trails
21	North	Reservoir	Lough	Built	Island
22	Known	Smaller	Find	Lies	Mountain
23	Home	Includes	Home	Thousands	Cruise
24	Town	Trout	Along	City	Including
25	Provide	Natural	Located	Stone	Village
26	River	Years	Feet	Ohrid	Local
27	Feet	Canal	Irland	Goods	Find
28	Vacation	Species	Popular	Sweden	Hiking
29	Several	Salmon	Destination	Ancient	Provide
30	Located	Provide	Castle	UNESCO	Home

Source: Own elaboration. Generated by CATPAC.

Theme 0: total combined lake description; theme 1: lake natural resources; theme 2: destination description; theme 3: destination heritage; theme 4: activities and facilities.

Not surprisingly, 'lake' was the most frequently used word in all themes, followed by 'water' in *theme 0* and *theme 1.* This reinforces the idea that 'lake' and 'water' are the two main attributes related to LDAs, indicating that lake itself is the core resource of lake tourism as a type of tourism. 'Visitor', 'castle' and 'boating' were the second most ranked words in *theme 2, theme 3* and *theme 4,* correspondently. This is an evident outcome since *theme 2* includes the visit to the surrounding region where the lake is located, therefore the tourist truly becomes a 'visitor'; *theme 3* specifies heritage as an important element of the destination, where 'castle' was ranked higher than the other themes; and *theme 4* shows that 'boating' is undoubtedly the utmost important activity in LDAs.

Another interesting analysis might set out a more focused observation on each theme. In *theme 1,* which characterizes the lake itself, emphasizing its natural resources, the ranks of words such as 'feet', 'largest', 'depth', 'surface', 'island' might indicate that natural features (e.g. depth, surface or topography) seem to be important attributes when promoting lakes for tourism. Seemingly, natural resources such as icthyofauna through the words 'fishing', 'fish', 'trout', 'species' or 'salmon' also reveal the relevance of this type of attributes related to LDAs. Another interesting observation is 'shoreline', which is used across all themes (except *theme 3),* and was the eighteenth most frequent word in *theme 1.* This reinforces the notion that LDAs are being described or projected based on a strong association between lakes and their shorelines.

In *theme 2* examples of the most frequently mentioned terms are 'city', 'town' or 'village', which are intertwined. These

words constitute an important group, emphasizing the description of the region where the lake is located. It can be inferred that the cities or villages around the lake are relevant attributes when promoting lake tourism. In addition, natural and cultural attributes located in the surrounding region also add value to the lake itself (e.g. 'forest', 'nature', 'mountain', 'National Park'). Similarly the words 'museums' and 'castle' also indicate the relevance of cultural attributes. Not surprisingly, in this theme the word 'water' emerges only as the eighth most frequent word, since the core here is not the lake, but the surrounding region.

In *theme 3*, in which the text data is related to destination heritage, the tendency appears to be the promotion of the destination history and its historical elements. That is evident through the words 'history' and 'historical' ranked in fourth and fifth position, correspondingly. Words such as 'century', 'ruins' and 'ancient' corroborate this assumption. Another interesting observation refers to the word 'UNESCO' revealing that the classification as World Heritage Sites by UNESCO, namely cultural sites, is a relevant attribute for LDAs. The tendency appears to be that UNESCO cultural sites might add a significant value to the lake, suggesting its importance when promoting LDAs.

Theme 4 refers to the activities and facilities located on and around the lake. The top 30 most frequent words highlight the occurrence of activities on water (e.g. 'boating', fishing', 'cruise') and at the surrounding region (e.g. 'skiing', 'hiking' and 'mountain') as a key attribute for lake tourism and, consequently LDAs. Following this line of thought, words such as 'available', 'offer' and 'provide' clearly demonstrate that for LDAs it not only is the existence of lakes important as a resource, but also a supply of nautical and touristic infrastructures and activities. Interestingly, and corroborating this inference is the word 'trails' ranked in twentieth position, which provides evidence once more of the need to support the existence of natural and cultural resources with signed trails and paths.

A final remark on *theme 0* shows the combined total frequencies for all themes (40 texts of all units of analysis). This means that 'lake' and 'water' not surprisingly are the most frequent words when characterizing LDAs. These attributes refer to the nuclear resource of lake tourism, the lakes themselves. The words 'city', 'village' and 'town' also appear in this top 30, demonstrating once more that these places are of utmost importance when promoting lakes. This means that not only is the lake itself relevant, but also the territory where the lake is located. In a similar way this is also expressed through the word 'enjoy' ranked in twelfth position. The idea is to have a pleasurable time near the lake and to appreciate a sum of attributes that define the destination where the lake is located.
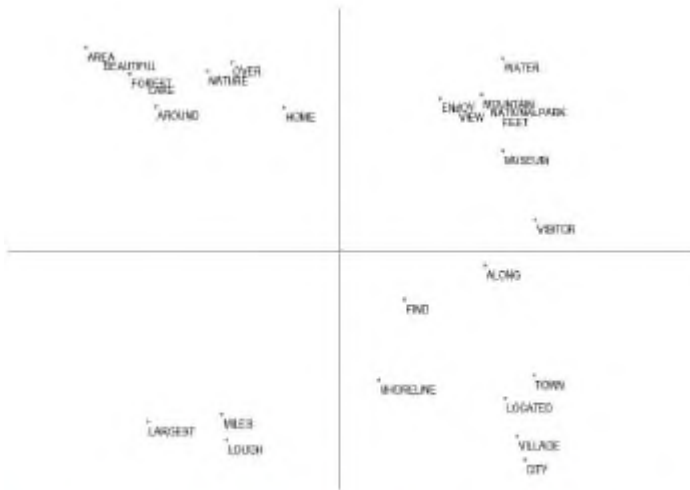

Figure 2.1 Two-dimensional perceptual map of theme 2 (destination). (Source: Generated by CATPAC.)

The next step was to return to the text and develop a perceptual map with CATPAC. Figure 2.1 presents a two-dimensional perceptual map of *theme 2* as an example. The analysis contains the results from *theme 2*, which shows attributes more related to the surrounding region where the lake is located. The analysis was restricted to 30 keywords. As in textual analysis, the top left-hand cell of the diagram exhibits a clustering of words ('nature', 'around', 'forest') associated with nature and the landscape which surrounds the lakes. The top right cell also corroborates this revealing a cluster with the words like 'mountain' and 'national park' and 'view'. The bottom right cell shows 'town', 'village' and 'city' related closely to each other. This word association brings into the discussion the value that the communities located around the lakes have in terms of tourism development.

Conclusion

The findings of this study, based on CATPAC analysis, suggest that certain themes or domains exist in lake tourism conceptualization (e.g. 'lake natural resources', 'destination description', 'activities and facilities'), corroborating the need to

understand better lake tourism as a particular type of tourism. The text data analysed by CATPAC classified under five themes confirms the conclusions of Rodrigues *et al.* (2015) that the lake tourism concept should be analysed according two main spatial levels of development: (i) the lake itself and lakeshore, and (ii) the destination/surrounding region. This is also in line with the five dimensions of the lake tourism concept obtained through a content-analysis process. It is thus believed that conceptualizing lake tourism facilitates a move forward in developing an image measurement scale more adapted to LDAs.

This chapter examined image attributes which are more related to this type of tourism for a more accurate picture of lake tourism. The first stage of a qualitative study confirms that several dimensions and attributes exist specifically related to LDAs, through an analysis of information contents provided by a lake-lovers' online directory (Lakelubbers.com). As a result of the initial data collecting-phase and content analysis, a set of more than 100 variables that potentially influence the image formation of LDAs was obtained.

These results were then validated by the use of CATPAC, as a self-organizing artificial neural network software package, in order to assure the reliability of the outputs. Certain words or attributes which represent the image projected by LDAs, following specific patterns of associations was obtained. The rank words by themes extracted by CATPAC related to LDAs corroborate the set of variables obtained by content analysis. The projected image of LDAs related to 'lake natural resources' is represented by words such as 'feet', 'largest ', 'depth', 'miles' or 'area', which means that lake features as 'surface area', 'depth' or 'length' might be important attributes when promoting LDAs. Additionally, words such as 'city', 'town' or 'village' also came up, showing how relevant they are for LDA image, adding value to the lake itself. In the theme 'destination heritage', words such as 'castle', 'century', 'abbey' or 'ruins' demonstrated the importance of highlighting these attributes when promoting LDAs. The theme 'activities and facilities' also revealed that 'boating', 'fishing' or 'cruising' are some examples of nautical activities intertwined with LDAs.

Based on these results, future research will focus on this issue and also aim to validate the results here obtained through stakeholder interviews, based on the case of the Alqueva Lake as a recent LDA. Located in the south of Portugal, in the Alentejo region, this is the biggest man-made lake in western Europe. Future lines of research should be directed towards reliable and valid scales for this type of tourism.

The development of this scale could provide relevant and useful information for tourism decision makers in order to design a marketing management strategy for this type of destinations. This is in line with several researchers who argue that image is an important component for a more competitive destination (Ritchie & Crouch, 2003) and directly influences the choice of a destination, valued attributes and purchase process (Morgan & Pritchard, 1998). All the decisions to create or improve an LDA's image, its positioning in the market and enhance competitive advantage of such locations are based on the implementation of elements related to the set of image attributes extracted from the content analysis and validated by CATPAC.

Acknowledgements

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