Official Tourist Destination Websites: Hierarchical Analysis and Assessment with ELECTRE-III-H

Luis Del Vasto-Terrientes*

Departament d'Enginyeria Informàtica i Matemàtiques, Universitat Rovira i Virgili

José Fernández-Cavia

Departament de Comunicació, Universitat Pompeu Fabra

Assumpció Huertas

Departament de Comunicació, Universitat Rovira i Virgili

Antonio Moreno

Departament d'Enginyeria Informàtica i Matemàtiques, Universitat Rovira i Virgili

Aida Valls

Departament d'Enginyeria Informàtica i Matemàtiques, Universitat Rovira i Virgili

Abstract:

Official websites are important communication tools for tourist destinations. However, it is difficult to make a systematic and complete evaluation of their quality due to their diversity of functionalities, which make them complex to analyze. This paper proposes the complementation of the WQI assessment system for Destination Marketing Organizations with the Multi-criteria Decision Aiding (MCDA) method ELECTRE. WQI assessment system contains several indicators (123) that can be organized in a hierarchical structure, which makes suitable the application of ELECTRE-III-H. ELECTRE-III-H method is able to reveal relevant preference relations among the websites with regard to different aspects (e.g. usability, architecture or persuasiveness), being a powerful tool to detect the strong and weak points of each website. The study is illustrated with the results of a pilot test that evaluates 10 touristic destination websites.

Keywords: Website Assessment; Website Communication; Destination Brand Communication; Hierarchical Indicators; Decision Support Systems.

Acknowledgment: Luis Del Vasto-Terrientes is supported by a FI predoctoral grant from Generalitat de Catalunya. This work was partially supported by Spain's Ministry of Economy and Competitiveness through projects CSO2012-34824 “Uso e influencia de los social media y la comunicación 2.0 en la toma de decisiones turísticas y en la imagen de marca de los destinos” and CSO 2011-22691 “Online Communication for Destination Brands. Development of an Integrated Assessment Tool: Websites, Mobile Applications and Social Media (CODETUR)”. This work was also partially supported by the Spanish research project SHADE (TIN-2012-34369: Semantic and Hierarchical Attributes in Decision Making).

1. Introduction

Destination Marketing Organizations (DMOs) are non-profit institutions (usually public or public/private organizations) responsible for attracting tourists and helping to commercialize hospitality and travel services based in a territory conceived as a single unit, whether a city, a region or a whole nation (Gretzel, Fesenmaier, Formica, & O’Leary, 2006). Moreover, these institutions (DMOs) are also responsible for the promotion of destination brands (Blain, Levy, & Ritchie, 2005).

To promote destination brands, in a global scenario, on-line tools such as websites are crucial (Choi, Lehto, & O’Leary, 2007; Tang & Jang, 2012). Actually, some researchers have highlighted official websites as the most important communication tool for destinations (Fernández-Cavia & Huertas-Roig, 2009; Lee & Gretzel, 2012).

Destination websites are very important because they can provide a huge amount of information, convey an image of the place, permit useful ways of interacting with users and also operate as a point of sale. Due to this diversity of functionalities, destination websites are complex interactive objects, which make their performance and overall quality difficult to evaluate (Law, Qi, & Buhalis, 2010).

In this research, building upon one of the latest destination website assessment systems, the *Web Quality Index* (WQI) (Fernández-Cavia, Rovira, Díaz-Luque, & Cavaller, 2014), we propose a complementary method called ELECTRE-III-H that, combined with WQI, is able not only to state which website is better in terms of quality, but also to establish coherent and consistent preference relations among the different websites.

The WQI have been tested and published previously (Fernández-Cavia et al., 2014). This is why in this article we focus mainly on the contribution that the ELECTRE-III-H makes to the analysis of brand communication in destination websites.

The ELECTRE-III-H method combines mathematical models, social science theories and artificial intelligence techniques. The ELECTRE-III-H method has been especially designed for complex systems in which the decision criteria (i.e. indicators, variables or features that describe the performance of the alternatives) are organized into a hierarchy tree. It performs a comprehensive analysis of a set of alternatives (i.e. the objects of interest in the study) by considering simultaneously a set of diverse criteria. Considering the large quantity of indicators presented in the WQI methodology that can be organized into a hierarchy structure, the application of ELECTRE-III-H may help to evaluate the performance of touristic websites at different levels of generality, helping managers to evaluate more specifically the parameters they must improve to achieve a better website. Other interesting features of ELECTRE-III-H, such as its non-compensatory operations, may be interesting for the experts when making the assessment of destination websites.

The aim of this paper is to show that the ELECTRE-III-H method can be used in combination with the Web Quality Index as a powerful tool to analyse official destination websites. We illustrate this with the results of a pilot test that evaluates 10 different websites of touristic destinations in Spain and Europe. The integrated application of the ELECTRE-III-H and WQI improves the knowledge provided to the DMOs about the websites' strengths and weaknesses. On the one hand, the extensive number of indicators analysed in WQI, which can be organized hierarchically, enable making one of the most complete assessments of the performance of websites. On the

other hand, ELECTRE-III-H is an analysis method based on optimization algorithms for help with decision making that can be directed towards a certain goal, in this case, the assessment of the communication of tourism brands. Therefore, the integration of both techniques is a novel and interesting tool for DMOs.

This paper begins with an analysis of previous works that focus on the assessment of tourist destination websites. After that, we introduce the Web Quality Index and ELECTRE-III-H is presented. Then, the methodology for obtaining the pilot test and the data modelling with the ELECTRE-III-H parameters are explained. The results obtained using the new proposal are compared to the results obtained using only WQI. We also discuss the weak and strong points of the websites analysed in the pilot test, in order to illustrate the kind of knowledge the DMO can obtain using this tool.

2. Literature Review

2.1 Evaluation of tourist destination websites

The importance of a thorough evaluation of websites for tourism destinations has been largely recognized in the last decade due to their impact and their contribution to our society. Some remarkable articles that collect and review journal publications about website assessment systems have been published recently (Law et al., 2010; Law & Lee, 2011). In both articles the study is framed in the interval from 1997 to 2009. Law et al. (2010) analysed 19 papers about the evaluation of destination websites. In this article, four evaluation approaches were identified: counting (i.e. a checklist), user judgement of the factors, numerical computation (using mainly statistical techniques), and automated evaluation (i.e. content mining and data mining tools). The technique

most used in all studies was counting, followed by user judgements and numerical computation or scoring.

In the review of Ip et al. (2011), they collected 30 tourism website assessment systems, which were classified into 3 main types: evaluation by phases, evaluation by features and evaluation by features and effectiveness. In evaluation by phases, five levels of website development were identified (1. Promotion, 2. Provision, 3. Processing, 4. Proactive, 5. Partnership) and each website was assigned to one of these phases. Evaluation by features consisted of defining a list of indicators that must be found (or measured) in the website, mainly focused on content and design issues. Finally, effectiveness was a more advanced dimension that considers user satisfaction, consumer intentions or expert opinions. Most of the assessment systems (around 70%) corresponded to the second model (evaluation by features). In this study it was observed that there was a lack of a standard, well-defined set of features in this area. Moreover, we agree with the authors that the evaluation of websites could be improved by incorporating theories and models from other disciplines. In fact, it can be seen that only modified versions of the Balanced Scorecard method or basic statistical techniques are used to build overall scores. However, none of the previous assessment methodologies uses the type of multi-criteria decision support system proposed in this paper, which is based on social choice models and pairwise outranking relations.

The feature-based website evaluation methods that appeared after 2010 still consider a small set of features and they do not seem to have incorporated more complex analysis. Li and Wang (2010; 2011) have used a model measuring 47 items. This assessment model defines five basic dimensions, namely information, communication, transaction, relationship, and technical merit. In relation to the communication of the tourism brand,

they consider diverse technical and marketing factors, such as Web 2.0 components, website design, etc. We consider that although their website evaluation model is solid and useful, necessarily it leaves aside some basic website functionalities and features (i.e. quality of photographs and videos, contact with DMO, presence of a tagline or customer segmentation, home page features or accessibility from different devices), which are quite relevant for an effective communication of the brand.

In recent proposals, like Li and Wang (2011) and Bastida and Huan (2014), we still find two important weak points: only a small number of indicators is considered and the mathematical model of analysis is based on simple additive or product averages, which does not permit a detailed comparison between websites taking into account the preferences or needs of the DMO.

There have been some other attempts to define a more extensive and complete assessment model focused on a specific part of the website, such as the home page. This is a reasonable domain restriction because the home page is the welcome point for the potential customers of a tourist destination. A recently study (Luna-Nevarez and Hyman, 2012) puts forward a methodology based on six categories: primary focus, visual and presentation style, navigation and interactivity, textual information, advertising and, finally, social media and travel aids. These variables are highly valuable but possibly the conclusions can be misleading for the users that navigate to the whole website, because we are omitting the effect of the rest of the web pages and their content and functionalities.

The limitations of these recent website assessment techniques show that a more comprehensive, systematic and powerful methodology of analysis is desirable in order to assess the whole website in terms of performance, using a complete set of indicators

that allow taking advantage of more refined scales. A useful evaluation method should help DMOs to extract conclusions with respect to different parameters and also to obtain comparative results with their direct competitors. The combination of the WQI assessment system with the ELECTRE-III-H decision support method goes in this direction.

2.2 Web Quality Index

The *Web Quality Index* for destination websites is an assessment system that consists of a set of twelve parameters that are examined in each website with the aim of analysing its quality. Each parameter is evaluated by means of a set of indicators that can vary from the presence/absence of an element/feature to a qualitative scale assessed by an expert. The WQI assessment system was built after studying the current website evaluation systems (Fernández-Cavia, Díaz-Luque, Huertas, Rovira, Pedraza-Jiménez, Sicilia, Gómez, & Míguez, 2013), and it aligns with the key factors identified in the survey conducted in Park and Gretzel (2010), extending them with factors not considered in other studies, like persuasiveness, the use of new technologies (i.e. social Web facilities) or the ability to appeal to consumers in the home page.

The list of parameters and the number of indicators for each of them is given in Table 1.

Next we give a brief description of each one.

Table 1
WQI parameters, their number of indicators and brief descriptions.

Parameters	Number of indicators	Description
Home page	13	Measures the suitability and appeal of the website's home page
Content amount and quality	15	The website's content is assessed in terms of variety and suitability to the tourists' needs
Information architecture	10	Examines the manner in which the website is organized and structured in order to enable users' access to information
Usability and accessibility	17	Looks into user-friendliness on the website and availability for use by people with sensory difficulties

Positioning	8	Verifies whether the website is designed to assist positioning algorithms within web search engines
Commercialization	7	Looks into the options for distributing tourist products and services through the website
Languages	6	Assesses the existence of several languages aside from the official languages of the destination in question
Brand image	12	Examines how the destination's brand image is conveyed and managed via the website's content
Persuasiveness	8	Looks into the website's persuasive capacity, that is, its capability to convince visitors that the destination is worth seeing
Interactivity	9	Examines the two-way communicative relationship between the user and the website content, between the user and the destination managers and between the user and other users
Social web	13	Studies the presence of 2.0 tools on the official destination website
Mobile communication	5	Considers whether the official destination website is adapted for mobile communication using smartphones or tablets
Total	123	

The indicators were evaluated using different measurement scales, depending on their meaning. The linguistic scales that were used are shown in Table 2. These linguistic labels were translated into numbers in the range of 0 to 1 depending on the number of terms, as shown in the first row of Table 2.

Table 2

Scales for each indicator. The first row indicates the numerical score given to each linguistic term. The rest of rows show the different sets of linguistic terms used, depending on the meaning of each indicator.

4 values	3 values	2 values
0.0 - 0.33 - 0.66 - 1.0	0.0 - 0.5 - 1.0	0.0 - 1.0
(B,R,G,VG) Bad – Regular – Good – Very Good	(B,R,G) Bad – Regular – Good	(N,Y) No – Yes
(N,F,S,M) None – Few – Sufficient – Many	(N,F,M) None – Few – Many	
(N,P,Y,E) No – Partially – Yes – Extra	(N,P,Y) No – Partially – Yes	
(L,M,H,VH) Low – Medium – High – Very High	(L,M,H) Low – Medium – High	

In addition, the relevance of each of the indicators was weighted in the range [0, 4]. These weights indicate the trade-off between the indicators inside one of the parameters categories. For example if indicator *a* has a weight of 1 and indicator *b* has a weight of

2, it means that you need two units of a to compensate a loss of 1 unit in b . This interpretation of the weights is inherent to the use of a weighted average, which is a compensative operator.

Then, an overall numerical score was calculated for each parameter by calculating an average of the values given by the experts to each of their corresponding indicators. Next, the overall Web Quality Index was calculated as an average of the numerical scores obtained in each of the different parameters. A complete description of the evaluation methodology can be consulted at Fernández-Cavia *et al.* (2014).

It is important to note that, in this previous work, the final analysis method is based on the use of a very simple statistical operator: weighted average. In Dujmovic and Legind Larsen (2007) several weaknesses of this type of mathematical operation are explained. Three relevant drawbacks are presented in this study: the possibility of compensation, the lack of defining mandatory requirements, and the precision of the aggregation. The first refers to the compensation between high and low values when averages are calculated. In this case, low values cannot be detected and explicitly penalised. For example, the average of (0.5,0.5) is the same as the average of (0.0,1.0), but in the first case the website is performing acceptably in the two indicators, while in the second case the website has a very bad performance in the first indicator but is perfect with respect to the second one. Second, using a weighted average we cannot define mandatory requirements or indispensable indicators that must necessarily be fulfilled in order to consider that the website is performing well in some parameters. For example, in order to evaluate Brand Image, the website must at least have a suitable logotype, while the rest of indicators are optional. Finally, the last drawback concerns the precision of the weighted average operation used in WQI, it is very sensitive to the

numerical score given to each indicator. However, in this study the numbers have been introduced as mere translations of linguistic terms that initially did not correspond to an exact number but to an uncertain degree of quality. For example, in Table 2 we can see that “Few” and “Medium” are given the same score 0.33 in the first column, although they may have slightly different meanings for the evaluator.

In order to improve the assessment of destination websites and mitigate these drawbacks, we propose to introduce the ELECTRE-III-H method into the assessment system.

2.3 The ELECTRE-III-H method for multiple criteria decision analysis

Statistical techniques have traditionally been used for data analysis and decision making. When dealing with complex domains, these techniques may not be appropriate due to the limitations mentioned before. This could be solved by introducing additional domain knowledge from the experts. In this paper, to complement the results of the Web Quality Index, we use the ELECTRE-III-H approach based on the concept of constructing *outranking relations*. An outranking relation is a binary relation between a pair of alternatives aSb which means “ a is at least as good as b ”. In this way, if it is true that aSb then we can say that alternative a is a better solution than b .

ELECTRE methods have been widely considered as an effective and efficient decision aiding tool with successful applications in different domains (Arondel & Girando, 2000; Colson, 2000; Abedi, Torabi, Norouzi, & Hamzeh, 2012). An example of an application of this kind of methods to analyse tourism destinations of Hawaiian islands is presented in (Botti & Peypoch, 2013). This work shows how useful ELECTRE results can be in contrast to a simple Weighted-Sum method for tourism destination analysis. However,

they use another version of ELECTRE (called ELECTRE-I), which does not take into account imprecision or uncertainty, which are present in many real-world problems.

The main features of the ELECTRE methods that make set them apart from other statistical and data analysis methods include the calculation of two indices, named *concordance index* and *discordance index*, which are defined for each pair of alternatives a and b . The concordance index $c_j(a,b)$ provides a measure of the strength of j -th criterion in favour of the assertion aSb . Each criterion is weighted to take into account the different importance of the criteria in the collective decision. For the criteria that do not support the assertion aSb , they can state their opposition with different strength. This is measured by the discordance index $d_j(a,b)$, known also as the “right to veto” (Figueira, Mousseau, & Roy, 2005; Figueira, Greco, Roy, & Slowinski, 2010). A *veto threshold* (v_j) permits to establish the maximum loss allowed between a compared to b on the indicator j , before it uses the right to veto the assertion aSb . When a criterion strongly disagrees with the assertion aSb , independently of its relative weight with regard to the rest of criteria, no improvement of the performance of a over b nor deterioration of b over a in other criteria can compensate this veto effect. With the joint consideration of these two indices, we can avoid the compensative effect of other operators, such as weighted average. This procedure is based on social voting models. Another interesting feature of ELECTRE methods is the management of imprecision and uncertainty. The use of discrimination thresholds allows taking into account the imperfect nature of the determination of evaluations of the indicators. The comparison of each pair of alternatives is made for each criterion separately. The difference between their performances on a given criterion may justify the preference in favour of one of the two alternatives, it may show indifference on both alternatives, or it may indicate a

hesitation between these two possibilities (Figueira *et al.*, 2005). To model these different situations ELECTRE-III-H introduces two thresholds on each criterion j : the *indifference threshold* (q_j) and the *preference threshold* (p_j). If the difference between the values of a and b in the criterion j is smaller than q_j then the alternatives are considered indifferent (f.i. a price of 112€ in comparison with a price of 115€ makes the two options indifferent if $q_{price}=20$). Similarly if the difference is greater than p_j then clearly one option is better than the other. When the difference is greater than q_j and smaller than p_j then there is a weak preference situation of one alternative with respect to the other. Finally, in ELECTRE methods the result is not an overall numerical score, but a preference structure in terms of a partial preorder, with three possible relations:

- a is strictly preferred to b (aPb) when aSb and not bSa
- a is indifferent to b (aIb) when aSb and bSa
- a is incomparable to b (aRb) when not aSb and not bSa

The incomparability relation, defined as aRb , corresponds to the absence of a clear reason that justifies any preference of a with respect to b and vice versa. This fact indicates that a performs better in some criteria and b performs better in others, and it is impossible to state a preference or indifference between the alternatives a and b .

ELECTRE-III-H is a recent version of ELECTRE that is able to work with criteria that are structured in a hierarchy. This hierarchy decomposes the overall goal into smaller sub-goals, or sub-problems, that focus on more specific aspects of the problem. A recent real-world application that shows the suitability of this method is explained in (Chao, Del Vasto-Terrientes, Valls, Kumar, & Schuhmacher, 2014), where a hierarchy of economic and environmental criteria is analysed for the assessment of several water allocation strategies to mitigate water scarcity induced by climate change.

The hierarchy decomposes the problem from the overall goal down to elementary or base indicators, which directly measure some concrete attribute of the alternatives. At elementary criteria level, classical ELECTRE-III is applied (Figueira *et al.*, 2010). At intermediate levels, the concordance and discordance indices are based on the three possible relations in the preference structure and the function $\Gamma_j(\cdot)$, where $\Gamma_j(a)$ is the number of alternatives preferred to a , and $\Gamma_j(b)$ is the number of alternatives preferred to b in the preference structure j . Depending on the pairwise relation between a and b , the calculations are as follows:

- Preference (P) and Indifference (I) relations: in both cases the relation supports the assertion aSb , so that $c_j(aPb)$ and $c_j(aIb) = 1$, while $d_j(aPb)$ and $d_j(aIb) = 0$.
- Inverse preference (aP^-b) relation: This relation does not support aSb , but we admit some tolerance depending on the discrimination thresholds. Then, the calculation of the partial concordance and discordance is as follows:

$$c_j(aP^-b) = \begin{cases} 1 & \text{if } \Gamma_j(a) - \Gamma_j(b) \leq q_j \\ 0 & \text{if } \Gamma_j(a) - \Gamma_j(b) > v_j \\ \frac{p_j(a) - (\Gamma_j(a) - \Gamma_j(b))}{p_j - q_j} & \text{otherwise.} \end{cases}$$

$$d_j(aP^-b) = \begin{cases} 1 & \text{if } \Gamma_j(a) - \Gamma_j(b) > v_j \\ 0 & \text{if } \Gamma_j(a) - \Gamma_j(b) \leq p_j \\ \frac{\Gamma_j(a) - \Gamma_j(b) - p_j(a)}{v_j - p_j} & \text{otherwise.} \end{cases}$$

- Incomparability (R) relation: Incomparability is a lack of direct relation between a and b , thus it is impossible to state whether a is preferred, inversely preferred or indifferent to b . Considering that aRb could turn with an equal probability to aPb , aIb and aP^-b , then in two of the three cases we support aSb , thus we can assume a base value of $2/3$ for partial concordance and $1/3$ for partial discordance. In addition, a tuning factor α has been added to the formulation to increase or decrease the

partial concordance or discordance based on the magnitude of the difference between the alternatives analysed.

$$\begin{aligned} \text{if } \Gamma(a) - \Gamma(b) \leq p_j, \text{ then } & \begin{cases} c_j(a R b) = 2/3 + \frac{(\Gamma_j(b) - \Gamma_j(a) - q_j) \times \alpha}{(p_j - q_j) + (n - 2)} \\ d_j(a R b) = 0 \end{cases} \\ \text{if } \Gamma(a) - \Gamma(b) > p_j, \text{ then } & \begin{cases} d_j(a R b) = 1/3 + \frac{(\Gamma_j(a) - \Gamma_j(b) - v_j) \times \alpha}{(v_j - p_j) + (n - 2)} \\ c_j(a R b) = 0 \end{cases} \end{aligned}$$

More details of the ELECTRE-III-H method can be found in (Del Vasto-Terrientes, Valls, Slowinski, & Zielniewicz, in press).

In contrast to other non-outranking methods such as the Analytical Hierarchy Process (AHP), the non-compensatory effect of the ELECTRE-III-H method instead of a trade-off aggregation can be an interesting feature. For example, if a website has a very poor performance in “Positioning” (because it is not found by the web search engines), it cannot be compensated with other parameters because the tourists will not find this website and then the rest of the parameters become irrelevant (e.g. the tourists do not arrive at the home page, even if it is excellent). ELECTRE-III-H also calculates a preference structure among the alternatives at all levels of the hierarchy in the form of partial preorders, including incomparability relations between two alternatives, which cannot be provided by other methods that calculate cardinal scores.

These features not only make the combination of the ELECTRE-III-H method with the WQI assessment system as a powerful tool suitable for the analysis of destination websites, but also because the ELECTRE-III-H method facilitates the construction of a more accurate model of evaluation that fulfils the needs of the DMOs.

3. Methodology

In this section we present the methodology proposed to integrate the indicators of the WQI into the ELECTRE-III-H method. We also explain the data considered in the pilot test and how the data have been processed in order to use ELECTRE-III-H. Special attention is paid to the selection of the parameters of the model in order to focus the analysis towards the target goal of this work: evaluating the communication of tourism brands.

3.1 Pilot test

A pilot test was applied to a sample of diverse destinations, including cities, regions and even nations. It is a convenience sample, designed to verify the use of the method in destinations of different dimensions. The websites that were analysed are shown in Table 3. The destinations studied were chosen trying to achieve great variability in a small sample in order to test the viability of the methodology. It then combines Spanish and international destinations, as well as different kinds of places, such as cities, regions and nations.

Table 3
Pilot sample of official tourist destination websites.

Destination	URL
Andalusia	http://www.andalucia.org/
Catalonia	http://www20.gencat.cat/portal/site/catalunya-act
Barcelona	http://www.barcelonaturisme.com/
Madrid	http://www.esmadrid.com/
Santiago de Compostela	http://www.santiagoturismo.com/
Rías Baixas	http://www.riasbaixas.depo.es/web2009/
Stockholm	http://www.visitstockholm.com/
Wales	http://www.visitwales.co.uk/
Rome	http://www.turismoroma.it/
Switzerland	http://www.myswitzerland.com/

The fieldwork was carried out in July 2012 by two trained analysts. Each of them analysed the whole sample in order to share criteria and identify errors. The inter-rater

agreement for Cohen's Kappa index obtained a value of 0.81. The process was performed under the supervision of the research project director, who made the recommendations and adjustments required. As an illustration, the data collected for the Interactivity parameter in the pilot test are shown in Table 4. The nine indicators J1 .. J9, shown in Table 5, correspond to different features that show the degree of interactivity of the user with the website.

Table 4
Interactivity parameter.

Topic: Interactivity										
Indicators		J1	J2	J3	J4	J5	J6	J7	J8	J9
Scales		N,P,Y	N,P,Y	N,P,Y	N,P,Y	N,F,M	N,P,Y	N,P,Y	N,Y	N,P,Y
1	Andalusia	0	0.66	1	0	0.5	1	0.5	0	0
2	Catalonia	0	0.66	0.5	0	0	0.5	0.5	0	0
3	Barcelona	0	0.33	0.5	1	0.5	1	1	0	0
4	Madrid	0	0	1	0	1	1	1	0	0
5	Santiago de Compostela	1	0.33	0.5	1	0.5	1	0.5	1	1
6	Rías Baixas	0	0	0.5	0	0	0.5	0.5	0	0
7	Stockholm	0	0	0.5	0	0.5	0.5	1	1	0
8	Wales	0	0	1	0	0.5	0.5	0	0	0
9	Rome	0	0	1	0	0	0.5	0.5	0	0
10	Switzerland	1	0.33	1	1	0.5	0.5	0.5	0	0

The meanings of the scales presented in Table 4 are as follows: N=No, P=Partially, Y=Yes, F=Few and M=Many (see Table 2).

Table 5
Interactivity indicators.

Indicator	Name
J1	Multimedia visualization of the content
J2	Promotional multimedia tools
J3	Free downloads allowed
J4	Mobile downloads allowed
J5	Interactive resources
J6	Community of users on the destination
J7	Community / users feedback of the destination
J8	Frequently Asked Questions section
J9	Chat

The collected data were initially evaluated with the WQI method, as explained before (Fernández-Cavia *et al.* 2014).

3.2 Integration of ELECTRE-III-H with WQI

As presented in Table 1, the WQI distinguishes 12 main parameters to evaluate tourist destination websites. Each parameter is composed of multiple basic indicators, which were measured in binary scales (presence/absence), ternary or quaternary scales (see Table 2). For the analysis with ELECTRE-III-H it is convenient to have a larger set of values to be able to refine a distinction of the different levels of achievement of the objectives evaluated in each parameter. Otherwise, it is not possible to properly establish the preference relations among the websites. For this reason, and with the help of experts in the field of brand communication, the indicators were grouped into small subsets inside each parameter, thus identifying sub-parameters of interest. The indicators grouped in a set are strongly related, according to the expert's knowledge. For example, image quality and video content can be grouped into a more general sub-parameter named multimedia.

The organization of the indicators is presented in Fig. 1. in tree form, from the most generic parameters to the most specific indicators.

Fig. 1. Hierarchical structure of parameters.

The weight of each parameter and indicator is displayed in Fig. 1. These weights have been calculated with the Simos' procedure (Figueira & Roy, 2001), as the weights have a different meaning and role in WQI (trade-off) than in ELECTRE-III-H (voting power). Simos' procedure permits to establish the relative importance for each indicator by associating a "playing card" with each criterion, which determines indirectly the corresponding numerical value for the weights. For example, in "Positioning", the internal factors have a relative relevance of 1/3 whereas external factors have a relative relevance of 2/3.

The experts also provided other additional information to guide the analysis by establishing the mandatory indicators. In this study the mandatory indicators, highlighted in grey in Fig. 1, were provided by experts with the purpose of focusing the study towards the ability to communicate the destination brand. For example, "Usability

& Accessibility” is considered as mandatory when evaluating the goodness of the overall goal according to the experts, while “External Factors” is considered to be a mandatory indicator for a good “Positioning” of the website.

According to this new organization of the parameters and indicators, the original input data values were grouped. Table 6 shows the values of the composed indicators used in the Interactivity parameter, obtained from Table 4.

Table 6
Interactivity indicators grouped.

Topic: Interactivity					
Indicators	J1, J2	J3, J4	J5	J6, J7	J8, J9
Group (Weight)	Consumer – Message interaction (44.4)			Consumer - Consumer (22.3)	Consumer - Marketer (33.3)
Grouped subparameters	Multimedia	Downloads	Interactive resources		
Weights	33.3	44.4	22.3		
1 Andalusia	0.33	0.5	0.5	0.75	0
2 Catalonia	0.33	0.25	0	0.5	0
3 Barcelona	0.165	0.75	0.5	1	0
4 Madrid	0	0.5	1	1	0
5 Santiago de Compostela	0.665	0.75	0.5	0.75	1
6 Rías Baixas	0	0.25	0	0.5	0
7 Stockholm	0	0.25	0.5	0.75	0.5
8 Wales	0	0.5	0.5	0.25	0
9 Rome	0	0.5	0	0.5	0
10 Switzerland	0.665	1	0.5	0.5	0

Expert knowledge is also necessary when establishing the thresholds of the ELECTRE-III-H method, which are defined for each parameter and indicator in the hierarchy. As for the elementary indicators, all values have been normalized (from 0 to 1), for the mandatory indicators the thresholds have been set in terms of percentages: $q_j=0\%$, $p_j=10\%$ and $v_j=25\%$ of the maximum performance allowed (i.e. 1), such that $q_j=0$, $p_j=0.1$ and $v_j=0.25$. These values reflect how strict the experts are with respect to mandatory elements, as there is only 0.1 of preference tolerance for evaluation differences and when the difference is larger than 0.25, the system automatically

activates the veto against the worst website from the binary comparison. On the other hand, when the elementary indicator is not mandatory, the thresholds are set to $q_j=10\%$, $p_j=35\%$ and $v_j=75\%$, i.e. $q_j=0.1$, $p_j=0.35$ and $v_j=0.75$. In this case, the experts are more tolerant of differences in the performance of the websites compared. For non-elementary criteria (parameters and sub-parameters of the hierarchy), the threshold values have been specified distinguishing the mandatory and non-mandatory criteria. For these cases, the threshold values are relative to the rank order of the websites in the corresponding preference structure. Two possibilities have been defined. For mandatory parameters, we set stricter thresholds ($p_j=0$, $q_j=1$, $v_j=2$) than for non-indispensable ($p_j=1$, $q_j=2$, $v_j=3$) ones, because small performance differences of the websites are much more relevant for the decision.

4. Results and discussion

The ELECTRE-III-H method was applied to each of the parameters in the hierarchical model presented in Figure 4. However, due to their large number of parameters, only the analysis of the most relevant ones for the communication of destination brands is discussed in this section.

The four parameters analysed are the following:

1. Home page: The home page is of great importance in the communication of destination identity and destination brand, as the home page is the first image of the place that the tourist gets. The quality of a home page can lead users to continue surfing the Web or not. We evaluated various items related to the quality of the home page: if it asks the language before entering, if it is part of the website of the competent authority, if there is a video or presentation of the destination, if there is a sitemap, if it offers the ability to register or not or if it is linked to Web 2.0

applications. The two aspects that we considered essential for the quality of the home page in the communication of the destination brand were the clear identification of the destination in the home page and direct entry to the home page through its main URL.

2. Usability and accessibility: Both are key aspects for the communication of destination brands in websites. Their strong relationship has led to their union into a single more general parameter. *Usability* refers to the ease of use of the website, whereas *accessibility* is concerned with the resources that make the website accessible for disabled users. Usability is a key aspect for destination communication because it facilitates Web navigation, and thus, it increases user navigation time throughout the website and improves its image (Chen & Wells, 1999; Chen, Gillenson, & Sherrell, 2002; Heijden, 2003). In the usability analysis with ELECTRE-III-H we established as an essential requisite that the information on the websites had to be up-to-date. Moreover, we also considered other aspects such as having a clear URL, a coherent general design, identification of the DMO responsible for the website, high-quality images, comprehensible icons and contextual help.
3. Brand image: The treatment of the brand by websites is a key aspect of our analysis. Slogans can be regarded as one of the most efficient brand elements when destinations brand themselves with cohesive and powerful slogans (Lee & Gretzel, 2012). We grouped the indicators into two categories: one refers to the treatment of the logotype and the slogan, and the other studies the communication of the functional and emotional attributes of the brand through images and texts.

Regarding the slogan and logotype, we measured their presence on the website and the existence of a short explanation.

4. Interactivity: For the degree of interactivity, three different and complementary perspectives of this aspect are considered: user interactivity with Web contents, interactivity with the webmaster and user-to-user interactivity (Cho & Cheon, 2005). Interactivity is a key aspect of websites which enables active participation and entails a longer navigation time by users throughout the websites as well as greater entertainment and a better image of the destination and of its brand (Sicilia, Ruiz, & Munuera, 2005; Ko, Cho, & Roberts, 2005). The most important aspects we considered to measure interactivity (although they were treated as not indispensable) included the free download of leaflets and maps, the availability of interactive resources related to the destination (such as maps, games, music, etc.) and the possibility to post experiences, photographs and videos by the users themselves.

For each parameter, a comparison is made between the ordering obtained with ELECTRE-III-H & WQI and the ranking of WQI alone (i.e. with weighted sum), in order to observe the contributions of ELECTRE-III-H to the analysis of destination websites, especially observing the cases of indifferences or incomparabilities. Next, the case of Rome and Wales is used to illustrate how the output of the ELECTRE-III-H method is specially designed for helping in the comparison between websites of competing destinations.

Finally, the partial preorders of the rest of parameters are given. From these results we identify the assets that each website possessed or lacked, so that DMOs can know which parameters should be improved to increase the quality of their website.

4.1 Home Page

Fig. 2. Home Page: ELECTRE-III-H and WQI rankings.

If we compare the ranking obtained using ELECTRE with the ranking obtained through statistical analysis, we observe that the first positions do not change between the two rankings. The Andalusia website possesses all the evaluated aspects, including a video about the destination, which very few other websites have. According to the results obtained in ELECTRE-III-H, Catalonia, Stockholm and Rome are incomparable websites, which indicates that these destination websites possess and lack different items. For example, Catalonia has a video on its home page, which is not the case of Stockholm or Rome. Rome allows users to register, which cannot be done in the other two websites. Stockholm has FAQs and user help, items that Rome and Catalonia do not have. Conversely, with the numerical index WQI the values for Stockholm, Catalonia and Rome are very similar, and they determine a certain order among them because they were obtained without considering imprecisions of data processing, which can lead to erroneous conclusions.

Finally, in the ELECTRE-III-H ranking we cannot detect a clear preference between Rias Baixas or Switzerland, as both websites occupy the last position and they are not mutually comparable.

Now, we will concentrate on the case of the websites of Wales and Rome. The arrow between them indicates that Rome is preferred to Wales. In fact, they share some features: the URL in both websites links directly to the home page of the website, where the territory is clearly identified. Both possess the logotypes of the competent authorities, Web 2.0 applications, news, sitemap and contact details. They also share some shortcomings: they fail to ask for the language of preference and they do not have an online shop or a list of most frequently asked questions. However, Rome's website has some of the analysed indicators that Wales does not have, like the possibility of registering and more Web 2.0 applications. Because of this, it ranks slightly higher.

4.2 Usability & Accessibility

Fig. 3. Usability and Accessibility: ELECTRE-III-H and WQI rankings.

If we analyse the preference relationships detected with ELECTRE we see that we can define a clear enough ranking with only one incomparability. Conversely, the WQI values are very similar in many of the websites. For example, Andalusia, Santiago, Wales and Catalonia obtain almost the same final value, which is due to the compensative character of the weighted mean. However, ELECTRE detects some clear preferences among them, and incomparability between Catalonia and Switzerland. In this case, Switzerland performs well in the usability aspects while Catalonia does better in accessibility.

One of the most relevant differences is the position of Catalonia's website, which changes from ninth position in the statistical ranking to fifth in the ELECTRE-III-H ranking. The reason is that the ELECTRE-III-H methodology does not only measure the analysed items with a simple summation, but it also takes into account the requisites which are considered essential, the weights and the groupings. As the Catalonia website is very good concerning accessibility and has a great number of the analysed items as well as the essential requisites, in spite of not being as usable as others, it has moved up several positions in the ranking which measures both aspects.

If we compare the Wales and the Rome websites in terms of usability and accessibility in the ELECTRE-III-H ranking, we now observe that there is a great difference between them and their positioning. While Rome is in third place, Wales lies in eighth. If we compare the parameters in detail we can observe that Rome has better scores than Wales in most of them. Rome's website is better than that of Wales for several features: it rapidly identifies the DMO responsible for the brand, it has high image quality, it offers contextual help, it indicates shopping steps and it uses alternative text labels.

4.3 Brand Image

The parameter Brand Image is obtained from the evaluation of the slogan, logotype and brand treatment indicators. On the one hand, from the information collected we have seen that all the websites have the logotype of the destination, which is considered an indispensable aspect, but most of them lack an explanation of this logo and a slogan. The destinations with the best treatment slogan and logotype are Switzerland, followed by Andalusia and Wales. The worst are Madrid and Rome, which have neither a slogan nor a description of the logotype, nor the representation of any functional element of the brand. On the other hand, regarding brand treatment, Switzerland and Andalusia have excellent videos and photographic images which communicate both the emotional and functional brand, including distinctive images of the place as well as stories and myths which explain the brand. However, Andalusia does not have a short description of the brand, whereas Switzerland and Barcelona do. Also, the videos and photographic images for Barcelona are average and not excellent line on Andalusia's website, which results in a rank tie for Barcelona and Andalusia. In this aspect Rias Baixas is the worst. When we merge all these aspects we obtain the result displayed in Figure 4.

Fig. 4. Brand image: ELECTRE-III-H and WQI rankings.

If we compare the rankings for brand image, we observe that the three first websites coincide in both rankings.

The most remarkable differences are the ones of Catalonia, Wales, Stockholm websites, placed in fifth, sixth, and seventh position respectively using the WQI score. Stockholm moves up in the ELECTRE-III-H ranking because it fulfils an aspect considered important for the proper communication of the destination brand: the possession of a short description of the brand on site. Catalonia achieves a lower position not only because it does not have this description of the brand, but also because it does not fulfil other important aspects such as the presence of the slogan in the home page or a description of the logotype.

Therefore, again, we observe that with ELECTRE-III-H both essential and important aspects are considered and the measuring system regarding the communication of the destination brand becomes much more qualitative, unlike the analytical methodology that only proposed the simple use of a linear and numerical ranking.

Focusing now again on the cases of Wales and Rome, the Welsh website (which comes in third place) improves with respect to WQI and overtakes, notably, the position of Rome (in sixth place). In both websites the logotype was present in the home page and this item was considered of utmost importance. Similarly, neither of the two websites has a short description of the brand, which was also considered important. However, the website of Wales has the slogan on the home page but Rome does not, and the logotype remains a functional element of its brand and the images are distinctive of the destination; these aspects are not covered on Rome's website.

4.4 Interactivity

In general, we observe that websites take more care of user-message interactivity than of interaction with the webmaster or with other users. This coincides with previous studies (Fernández-Cavia & Huertas-Roig, 2009; Huertas, Rovira, & Fernández-Cavia, 2011).

If we compare both rankings (see Fig. 5-) we observe that positions barely change. This is due to the fact that, for this aspect of the analysis, indispensable requisites were not established.

Fig. 5. Interactivity: ELECTRE-III-H and WQI rankings.

Finally, if we compare the websites of Wales and Rome in the ELECTRE-III-H ranking, we observe that Rome is better positioned than Wales. The websites of Wales and Rome have basically the same items regarding interactivity, but they differ in two. The first is the most important aspect regarding user-message interactivity, which is to possess various interactive resources. Wales's website has this feature while Rome's does not. However, Rome has the most important item regarding user-to-user interactivity, which is the possibility for users to post their experiences on the website. Then, Rome's website is better in user-to-user interactivity than Wales's in user-message interactivity.

4.5 Results for the rest of parameters

The ELECTRE-III-H rankings for the rest of parameters of the hierarchy are shown in Fig. 6 and Fig. 7. The WQI rankings are also shown in Table 7 and Table 8. The “Persuasiveness” and “Mobile Communication” parameters are elementary criteria, so that they are not calculated using the tool but directly evaluated by the experts.

Fig. 6. ELECTRE-III-H results for Content Amount and Quality, Information Architecture and Positioning respectively.

Fig. 7. ELECTRE-III-H results for Commercialization, Languages and Social Web respectively.

Table 7
WQI rankings for Content Amount and Quality, Information Architecture and Commercialization.

Content Amount and Quality		Information Architecture		Commercialization	
Website	WQI	Website	WQI	Website	WQI
Switz	0.93	Stock, Wal, Rome	0.84	Sant	0.9
Mad	0.90	Anda, Mad	0.79	Bcn	0.88
Sant	0.82	Cat, Sant, Switz	0.74	Stock	0.76
Anda, Bcn, Stock	0.78	Bcn	0.68	Switz	0.72
Wal	0.76	Rias	0.63	Anda	0.7
Rome	0.69			Mad	0.5
Cat	0.55			Wal	0.46
Rias	0.39			Rome	0.32
				Cat	0.3
				Rias	0.2

Table 8
WQI rankings for Positioning, Languages and Social Web.

Positioning		Languages		Social Web	
Website	WQI	Website	WQI	Website	WQI
Switz	0.86	Switz	0.95	Sant	0.83
Bcn, Sant, Stock	0.71	Stock	0.76	Switz	0.64
Mad, Wal	0.69	Mad. Sant	0.62	Anda	0.59
Anda	0.67	Wal	0.57	Mad	0.49
Rome	0.61	Bcn	0.54	Rias	0.41
Rias	0.45	Cat, Rome	0.49	Bcn	0.38
Cat	0.39	Anda	0.41	Wal	0.36
		Rias	0.35	Stock	0.35
				Cat	0.27
				Rome	0.20

4.6 Overall result

Finally, global rankings which considered all the analysed aspects were obtained. Three of the parameters were established as indispensable to consider that a website performs good brand communication in general. Therefore, if we compare the two results, we

observe the existence of big differences. Specifically, we considered as minimal requirements good quality brand communication, usability-accessibility and website interactivity.

Fig. 6. Global ELECTRE-III-H and WQI rankings.

In these global rankings Switzerland, that occupied first place in the statistical ranking, moves down to share fourth position in ELECTRE-III-H. Stockholm, which was in fourth position, moves up to first place in the ELECTRE-III-H ranking. This is due to the fact that the ELECTRE method does not measure all the aspects and items equally with a summation, but prioritizes certain items and aspects for analysis. To properly communicate destination brand, special importance is given to brand communication, but also to usability-accessibility and to Web interactivity. For this reason, the final rankings are so different. Stockholm is the first destination because its website stands out in the essential aspects of analysis.

Moreover, global WQI scores are seen to be centred on the medium value 0.5, with little deviation from this value. This illustrates the compensatory character of this index, given that at this general level a mean of the means of each parameter is calculated,

leading to a growing dilution of singular scores (high or low) as they are compensated by others. As a consequence, it is demonstrated that ELECTRE has the advantage of enabling a more qualitative analysis, including parameters which allow the expert to guide the process in a way that the indispensable requisites cannot be compensated by the presence of less relevant factors.

In purely numerical indexes such as WQI the communicative potentiality of a website is only measured through the possession of the highest number of items. The careful analysis of the results reveals that this perspective is not the most adequate and can lead to erroneous conclusions.

Finally, if we compare Rome's website with that of Wales on a global level, we observe that Rome occupies a higher position than Wales. Thus, in the global evaluation of website communication Rome is preferred. This comparative analysis of each parameter enables Wales's website managers to know what should be changed, added or improved to overtake Rome's website with regard to different parameters. Wales's website is better than Rome's in terms of home page quality, and is also better in usability and accessibility, while in terms of brand image indicators Rome's is better than Wales's. Finally, the detected incomparability with regard to interactivity illustrates a case in which for Wales to overtake Rome it must identify in which specific indicators it is at a disadvantage.

In this respect, as observed, ELECTRE-III-H is useful to compare specific aspects among websites; it shows what requirements a website should fulfil to overtake others in terms of ranking and thus, is useful in practice for destination website managers.

In addition to the possibility of performing comparative analysis, we can also obtain some individual general suggestions for DMOs, because we can identify the strengths and shortcomings of each website based on their position in the different preorders.

In Table 9, some recommendations based on the results obtained with ELECTRE-III-H can be given for each DMO. The names of the parameters have been shortened in the following way: Home Page (HP), Usability and Accessibility (U&A), Brand Image (BI), Interactivity (Inter), Content Amount and Quality (CAQ), Information Architecture (IA), Positioning (Pos), Commercialization (Comm), Languages (Lang), and Social Web (SW).

Table 9
Some recommendations for DMOs based on websites' strengths and shortcomings

Website	Urgently needs improvement	Should be reviewed	Strong features
Stockholm	SW	HP, CAQ	U&A, IA, Lang
Barcelona	-	IA, Lang, SW	U&A, BI, Pos
Madrid	BI	Pos, SW	HP, CAQ
Andalusia	Lang	U&A,	HP, BI
Sant. de Comp.	U&A	BI	Inter, Comm, SW
Switzerland	HP, IA	U&A	BI, CAQ, Pos, Lang
Rome	Pos, Comm, SW	BI, Inter	UA, IA
Wales	HP, U&A, Inter, Lang, Pos	CAQ, Comm	IA, SW
Catalonia	BI, CAQ, Pos, COMM	HP, Inter, IA	-
Rías Baixas	All parameters	SW	-

Each website has its particular weak points and it is difficult to extract general indications for DMOs. From this pilot test, it could be said that there are three parameters that should generally be improved: Home Page, because it is the entry point to the website and should have enough elements to engage the tourist; Usability & Accessibility, including facilities to identify the elements and navigation for disabled

people and from different devices; and Brand Image because an appealing slogan and logotype are of great importance for capturing the attention of the user.

5. Conclusions and future work

This article presents a combined methodology for destination website analysis, initially based on the WQI, but enhanced and improved with a more sophisticated model of data analysis, ELECTRE-III-H. Given the results of the pilot study, this combined analysis methodology represents a great advance for this type of study.

ELECTRE-III-H provides a more qualitative measuring system than simple numerical averaging, showing incompatibilities between websites because of their differential characteristics. In this way, the ELECTRE-III-H method introduces subjective elements to refine the comparison of websites and to focus it towards the fundamental aspects of destination brand communication. ELECTRE-III-H does not substitute or invalidate WQI, but it enriches and complements it, as it provides more information which enables the comparison of competitive destination websites to find the aspects in which they should be improved to overtake other destinations.

The combined methodology then allows performing a personalized evaluation of each website, depending on the dimensions, objectives and priorities stated by the DMOs. It also permits pair-to-pair assessment once the DMO manager has identified the main competitors for his/her destination, discarding all non-comparable websites. This type of methods of help in decision aiding are being increasingly used in other fields, such as in the comparison of industrial products, in transport or environmental issues; however, they still have not been used to analyse Web resources, probably due to the lack of a clear definition of the indicators that should be assessed and how to measure them. For

this reason, this article represents a step forward in this line, as the result of the close collaboration of researchers from communication departments and researchers in computing and mathematics.

The results obtained for the ten websites analysed have some limitations because the websites were evaluated in 2012, and therefore they must now be outdated. Destination websites are very dynamic and in constant evolution to adopt new technologies, so these results probably do not reflect their current performances. However, the purpose of the paper was not to propose means to improve these ten websites in particular, but to present a new and more complete methodology of website assessment for DMOs.

A limitation of this methodology of assessment is the difficulty for the experts to evaluate 123 indicators for each website, which can be a tedious and time-consuming task. This was one of the reasons for evaluating only a small sample of ten websites in the pilot test. As future research lines we intend to apply this combined methodology (WQI-ELECTRE-III-H) to a new and wider sample of websites, consisting of the tourism portals of the 50 provincial capital cities of Spain, the 17 Spanish autonomous communities and 20 international destinations of reference. We also intend to study if some indicators can be obtained automatically with computer support to ease the expert's task (f.i. the evaluation of the positioning of the websites in web search engines can be automated). Meanwhile, we intend to discuss the analysis results with the DMO managers, to assess their usefulness and to further improve the system to evaluate destination websites. We would also like to consider in future research the suitability of the use of ELECTRE-III-H along with other tourism assessment systems with a hierarchical structure of a large number of indicators.

Acknowledgements

References

- Abedi, M., Torabi, S., Norouzi, G., & Hamzeh, M. (2012). ELECTRE III A knowledge driven method for integration of geophysical data with geological and geochemical data in mineral prospectivity mapping, *Journal of Applied Geophysics*, 87, 9-18.
- Arondel, C., & Girando, P. (2000). Sorting Cropping Systems on the Basis of Impact of Groundwater Quality. *European Journal of Operational Research*, 12, 467-482.
- Bastida, U., & Huan, TC. (2014). Performance evaluation of tourism websites' information quality of four global destination brands: Beijing, Honk Kong, Shangai and Taipei, *Journal of Business Research*. 67, 167-170.
- Blain, C., Levy, S.E., & Ritchie, J.R. (2005). Destination branding: Insights and practices from Destination Management Organizations, *Journal of Travel Research*. 43, 328-338.
- Botti, L., & Peypoch, N. (2013). Multi-criteria ELECTRE method and destination competitiveness. *Tourism Management Perspectives*, 6, 108-113.
- Chao, T.C., Del Vasto-Terrientes, L., Valls, A., Kumar, V., Schuhmacher, M. (2014). A hierarchical decision support system to evaluate the effects of climate change in water supply in a Mediterranean river basin. *Artificial Intelligence Research and Development* (pp. 77-86). IOSPress.

- Chen, L.D., & Wells, W.D. (1999). Attitude toward the site. *Journal of Advertising Research*, 39(5), 27-38.
- Chen, L.D., Gillenson, M.L., & Sherrell, D.L. (2002). Exciting online consumers: an extended technology acceptance perspective. *Information and Management*, 39, 705-719.
- Cho, C.H., & Cheon, H.J. (2005). Cross-cultural comparisons of interactivity on corporate Web sites. *Journal of Advertising*, 43(2), 99-115.
- Choi, S., Lehto, X.Y., & O'Leary, J.T. (2007). What does the consumer want from a DMO website? A study of US and Canadian tourists' perspectives. *International Journal of Tourism Research*, 9, 59-72.
- Colson, G. (2000). The OR's prize winner and the software ARGOS: How a multijudge and a multicriteria ranking GDSS helps a jury to attribute a scientific award. *Computers & Operations Research*, 27, 741-755.
- Del Vasto-Terrientes, L., Valls, A., Slowinski, R., Zielniewicz, P. (In Press). ELECTRE-III-H: an outranking-based decision aiding method for hierarchically structured criteria, *Expert Systems with Applications*, In Press.
- Dujmovic, J., & Legind Larsen, H. (2007). Generalized conjunction/disjunction. *International Journal of Approximate Reasoning*, 46, 423-446.
- Fernández-Cavia, J., Díaz-Luque, P., Huertas, A., Rovira, C., Pedraza-Jiménez, R., Sicilia, M., Gómez, L. & Míguez, M. I. (2013). Destination brands and website evaluation: a research methodology. *Revista Latina de Comunicación Social*, 68, 622-638.

- Fernández-Cavia, J. & Huertas-Roig A. (2009). City Brands and their Communication through Web Sites: Identification of Problems and Proposals for Improvement. In M. Gascó-Hernández, & T. Torres-Coronas (Eds.). *Information Communication Technologies and City Marketing. Digital Opportunities for Cities around the World*. Hershey: Information Science Reference.
- Fernández-Cavia, J., Rovira, C., Díaz-Luque, P., Cavaller, V. (2014). Web Quality Index (WQI) for official tourist destination websites. Proposal for an assessment system. *Tourism Management Perspectives*, 9,5-13.
- Figueira, J., & Roy, B. (2001). Determining the weights of criteria in the ELECTRE type methods with a revised Simos' procedure. *European Journal of Operational Research*, 139, 317-326.
- Figueira, J., Mousseau, V., Roy, B. (2005). Electre Methods. In J. Figueira, S. Greco & M. Ehrogott, *Multicriteria decision analysis: State of the Art Surveys*. New York: Springer.
- Figueira, J., Greco, S., Roy, B., & Slowinski, R. (2010). ELECTRE Methods: Main Features and Recent Developments. In C. Zopounidis, & P.M. Pardalos (Eds.), *Handbook of Multi-criteria Analysis*. Berlin Heidelberg: Springer.
- Gretzel, U., Fesenmaier, D., Formica, S., & O'Leary, J.T. (2006). Searching for the future: Challenges faced by Destination Marketing Organizations. *Journal of Travel Research*, 45, 116-126.

- Huertas, A., Rovira, C., & Fernández-Cavia, J. (2011). Interactivity as a key factor in city website visibility and place brand communication. *Journal of Town and City Management, 13*, 132-142.
- Ip, C., Law, R., & Lee, H.A. (2011). A review of website evaluation studies in the tourism and hospitality fields from 1996 to 2009. *International Journal of Tourism Research, 13*, 234-265.
- Ko, H., Cho, C.H., & Roberts, M.S. (2005). Internet uses and gratifications. A structural equation model of interactive advertising, *Journal of Advertising, 34*(2), 57-70.
- Law, R., Qi, S., & Buhalis, D. (2010). Progress in tourism management: A review of website evaluation in tourism research, *Tourism Management, 31*(3), 297-313.
- Lee, W., & Gretzel, U. (2012). Designing persuasive destination websites: A mental imagery processing perspective. *Tourism Management, 33*, 1270-1280.
- Li, X., & Wang, Y. (2010). Evaluating the effectiveness of Destination Marketing Organisations' websites: Evidence from China. *International Journal of Tourism Research, 12*, 536-549.
- Li, X., & Wang, Y. (2011). Measuring the effectiveness of US official state tourism websites. *Journal of Vacation Marketing, 17*(4), 287-302.
- Luna-Nevarez, C., & Hyman, M. (2012). Common practices in destination website design. *Journal of Destination Marketing & Management, 1*, 94-106.
- Park, Y., & Gretzel, U. (2007). Success factors for destination marketing web sites: a qualitative meta-analysis. *Journal of Travel Research, 46*, 46-63.

Sicilia, M., Ruiz, S., & Munuera, J.L. (2005). Effects of interactivity in a Web site. *Journal of Advertising*, 34(3), 31-45.

Tang, L.R., & Jang, S.S. (2012). Investigating the routes of communication on Destination websites. *Journal of Travel Research*, 51(1), 94-108.