

STAKEHOLDER ENGAGEMENT TO EVALUATE TOURIST DEVELOPMENT PLANS WITH A SUSTAINABLE APPROACH¹

Hannia Gonzalez-Urango^{1,2}
Mónica García-Melón¹

¹Ingenio (CSIC-UPV), Universitat Politècnica de València, Valencia, Spain

²Universidad Simón Bolívar, Barranquilla, Colombia

ABSTRACT

In this paper, an evaluation of tourist development plans in the city of Cartagena de Indias (Colombia) is analyzed. Different stakeholders are involved in the search for solutions to this problem. The proposal is based on a model that combines multicriteria decision analysis and participatory procedures. This is done using a combination of two techniques, namely the Analytic Network Process (ANP) and the Social Network Analysis (SNA). Thus, a systematic course of analysis of the alternatives under examination and of the different stakeholders who participate is provided. The application of SNA will analyze the influence among stakeholders. The ANP will allow prioritizing the tourist development plans. The results obtained in this work allow concluding that the combination SNA-ANP is a suitable tool for strategic planning of a city.

KEYWORDS: Social network analysis (SNA), Analytic Network Process (ANP), participatory decision making, Cartagena de Indias, tourist strategic, sustainable evaluation.

1. INTRODUCTION

1.1. Cartagena de Indias and its tourist planning process

Tourism is a great industry that is currently going through a period of great relevance. The sector accounts for 10% of world's GDP, 7% of the global trade and creates one in every 10 jobs (World Tourism Organization, 2017). According to UNWTO, these figures are expected to keep rising especially in emerging economic destinations, such as South America (Mariani et al., 2014; UNWTO, 2014; UNWTO, 2017).

¹ "This is the pre-peer reviewed version of the following article: [Gonzalez-Urango H, García-Melón M. Stakeholder engagement to evaluate tourist development plans with a sustainable approach. Sustainable Development. 2018;1–12. <https://doi.org/10.1002/sd.1849>], which has been published in final form at [<https://doi.org/10.1002/sd.1849>]. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions."

This trend of tourism growth comes with some drawbacks which include an increasing pressure on the territories (Berzina et al., 2015). The tourism sector can and is firmly committed to playing its part in the 2030 Sustainable Development Agenda. Promoting governments, the private sector, academia and the civil society are expected to work together in order to implement sustainable tourism activities with an emphasis on sustainable land use (UNWTO, 2017).

Colombia as an emerging destination and Cartagena de Indias as its most representative and important destination cannot be left behind when it comes to achieve this aim. This city has to prepare and to adapt public policies and managerial strategies to face new challenges and opportunities both for the tourist industry and for the destinations. Challenges related to the increasing competition among tourist destinations; the modification of the target markets for established tourist destinations; the increasing importance of collaboration (Mariani et al., 2014; Wang et al., 2016) and integrating sustainable planning (Dvarskas, 2017).

For several years, the city has been doing long-term planning, which has not yet evolved to deal with upcoming challenges such as those of the sustainable development. Environmental perception and attitude of stakeholders generate debates, controversy and contradictions among economic sectors and groups.

In this paper, we will focus in bringing some light to solve this problem. For that we propose to evaluate the different tourist strategic plans that the city has currently in mind considering sustainable criteria together with integrative and participative approach supported by technical and scientific knowledge (Loken 2007; Alves et al., 2013; Le Pira et al., 2016). This is a decision-making problem that should be approached from the multi-criteria analysis perspective, with the participation of different stakeholders.

1.2. The participation of stakeholders in the evaluation process

Due to the complexity and interrelations of the problems caused by global society (economic development, natural resource management, among others) public policy managers must conduct a stakeholder analysis to identify and take account of the individuals, groups and organizations involved in or affected by such policies (Bryson, 2004). Effective use of stakeholders requires that the decision-makers use them in the right place, use the right stakeholders, elicit information from them in a rigorous way, and apply appropriate analysis techniques to the elicited information (Glicken, 2000)..

Several approaches have been proposed to investigate the relationships among stakeholders, like power versus interest grids, stakeholder salience (Mitchell et al., 2009), interrelationship diagrams (Bryson, 2004), or actor-linkage matrices (Biggs & Matsuert, 1999). However, these techniques do not allow determining an individual value of the influence of each actor in a decision-making process.

There is, thus, one technique Social Network Analysis (SNA) (Wasserman & Faust, 2007), based on the graph theory, which allows to determine this individual value. Through SNA we can analyze flows of knowledge in the network. The position of the participant in the network, that is his/her centrality, is the most commonly index used to analyze his/her influence (Ahmedi et al., 2017).

1.3. The multicriteria evaluation approach

The selection and interpretation of the sustainable criteria, in the evaluation of the different tourist strategic plans that Cartagena has currently in mind should be done carefully to maximize the correlation between the index values obtained and the quality to be measured. Multicriteria Decision Aid (MCDA) techniques are appropriate to solve this type of problems. General information about MCDA can be found in Barba-Romero and Pomerol (1997), Belton and Stewart (2002) and Loken (2007).

Several authors introduce the use of MCDA techniques for Sustainable Assessment. Many of them focus on the use of the Analytic Hierarchy Process (AHP; Saaty 1990), which has been accepted as a leading multicriteria decision model (Sólnes, 2003; Ramzan et al., 2008; Šijanec et al., 2009; Akbari et al., 2017) to assign priorities to the criteria or indicators involved. In our case we propose a more evolved technique namely the Analytic Network Process (ANP). The ANP is a method proposed by Saaty to generalize his original AHP in situations of interdependence and feedback among the decision elements. A detailed description of the method can be found in Saaty (2001).

Evidence regarding the use of ANP for the tourism development has been found in (Chen et al., 2009; Garcia-Melon et al. 2010; Aminu et al., 2013; Jeong et al., 2014; Bramwell, 2015; Bonzanigo et al., 2016). Besides ANP has been integrated with other tools such as (GIS) for sustainable tourism planning (Aminu et al., 2013; Aminu et al., 2017); with Delphi as an environmental assessment tool of sustainable tourist strategies (García-Melón et al., 2012); and Hybrid SWOT - ANP – Fuzzy ANP model for prioritization strategies of sustainable development of ecotourism (Arsić et al., 2017).

The use of the ANP for this purpose is novel since currently, the decision-making processes in the city of Cartagena are tackled in a little structured and participative way. It is therefore vital to explore new prioritization tools that contribute to show greater coherence in the selection and public justification of the actions to be taken (Peris et al., 2013).

In this paper we propose a methodology based on the combination of two techniques: SNA to assess the relationships among stakeholders by identifying the most relevant ones and ANP to aggregate their opinions and evaluate the tourist strategic plans of Cartagena in order to improve the tourist offer of the city. The aim being to verify in practice the relevance and usefulness of the methodology in planning process and to draw some conclusions on their potentialities and limitations.

2. METHODOLOGY PROPOSED

The steps followed in the methodology are shown in Figure 1 and a detailed description and the methodology implementation is presented in the case study in next sections.

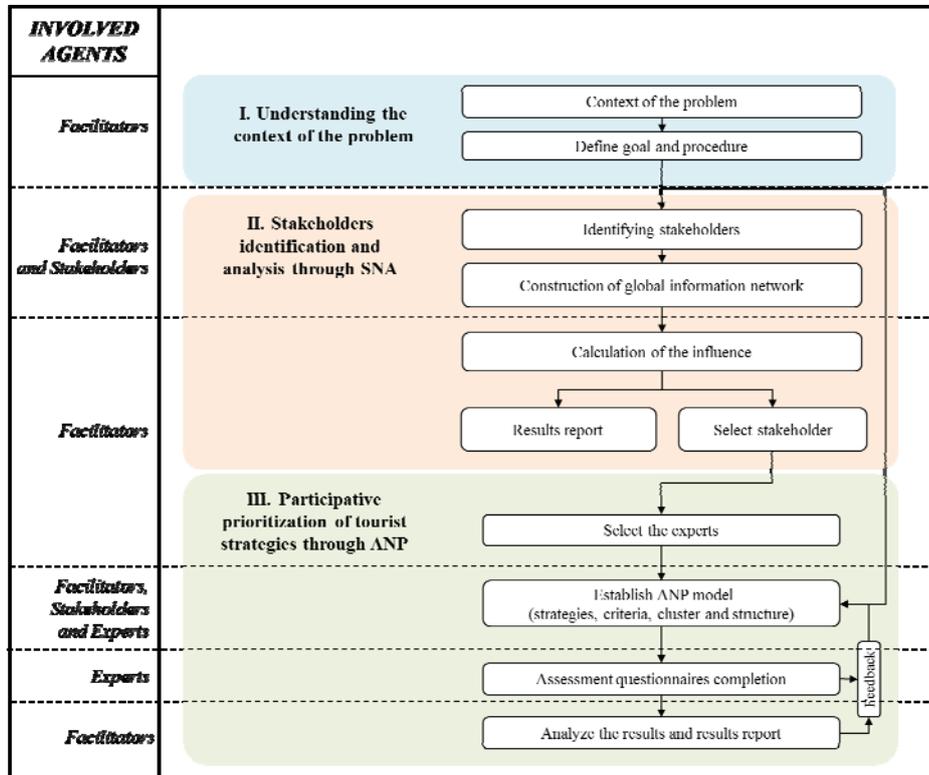


Figure 1. Methodology proposed

The application of this methodology is organized in three main stages:

- Understanding the context of the problem
- Stakeholders identification and analysis through SNA
- Participative prioritization of tourist strategies through ANP

3. CASE STUDY. PRIORITIZING TOURIST DEVELOPMENT PLANS IN THE CITY OF CARTAGENA

3.1. Understanding the context of the problem

After the revision of local and regional plans, international experiences, and a literature review (Comisión Regional de Competitividad de Cartagena y Bolívar, 2010; Alcaldía Distrital de Cartagena de Indias D. T. y C., 2014; Alcaldía Distrital de Cartagena de Indias D. T. y C., 2016) three proposals (alternatives) were selected, with the help of the Local Tourist Office and some experts. Alternatives are comparable between them and are aimed at developing new urban projects in the city. Prioritizing these proposals should allow channeling most of this sector's development and resources, and should help improving the touristic offer of the city.

The selected alternatives are:

- Alternative 1: A1. Tourist complex. Develop an area where tourist facilities are comprehensively established for various purposes of tourism and relaxation, mainly eco-activities. Located in insular territory consistent with geographical and cultural conditions.
- Alternative 2: A2. Tourist boulevard. Develop a coastal protection to improve the connection and spaces between the most relevant tourist neighborhoods and the airport.
- Alternative 3: A3. Waterborne transport system. Develop a network of public transportation system using the water resources available around the city.

Until now, the programs and actions declared in the different plans and programs mentioned above have been prioritized according to the concerns and capacities of the participants. The lack of inclusion and use of more structured techniques for the definition of the Action Plan are the main factors favoring the use of multicriteria multi-stakeholder prioritization techniques.

3.2. Stakeholders identification and analysis through SNA

The first step was the identification of stakeholders. An initial review of secondary sources (Alcaldía Distrital de Cartagena de Indias D. T. y C., 2014; Corpoturismo, 2015, The National Colombian Tourist Register RNT), and a “snowball technique” were used. Following the method proposed by Varvasovszky & Brugha (2000); Reed et al. (2009); and Saint Ville et al (2017).

A list of 45 actors was identified among institutions, organizations and groups. A questionnaire to analyze the amount of information exchanged was sent to all of them (**Error! Reference source not found.**). According to Hanneman et al (2005) the sharing of information can be used to establish links between two nodes in a social network. Our model is based on the analysis of information exchange among stakeholders.

Table 1. Example of the questionnaire for stakeholder A1. Local Government

Regarding tourist sector management, with which of the following actors have you exchanged information? How often?				
<i>Actor</i>	Do you send information to him/her?	How often? (Daily, weekly, monthly ...)	Do you receive information from him/her?	How often? (Daily, weekly, monthly...)
Local Tourist Office				
Local Planning Office				
Local Institute of Heritage and Cultural				
...				

We gathered answers from 43 actors (**Error! Reference source not found.**).The information gathered was scaled in the following way: Zero means none information

exchange, one means an exchange at least every two months, and two means that the information exchange is monthly or more frequently.

Table 2. List of stakeholders and Multiple Centrality Measures

<i>ID</i>	<i>Actors</i>	<i>Freeman Degree</i>		<i>Closeness</i>		<i>Betweenness</i>
		<i>Out</i>	<i>In</i>	<i>Out</i>	<i>In</i>	
<i>A1</i>	Local Government	25	23	68	71	37,49
<i>A2</i>	Local Tourist Office	66	58	46	53	376,53
<i>A3</i>	Local Planning Office	4	4	85	90	0,17
<i>A4</i>	Local Institute of Heritage and Cultural	23	19	66	75	21,36
<i>A5</i>	Departmental (Regional) Tourist Office	34	33	61	65	58,78
<i>A6</i>	Ministry of Commerce, Industry and Tourism	23	22	69	74	13,00
<i>A7</i>	Colombian Agency for the Promotion of Exports, Tourism and Investment	35	31	63	71	21,02
<i>A8</i>	National Tourism Promotion Office	43	38	58	66	72,73
<i>A9</i>	Local Chamber of Commerce	47	42	56	6	118,12
<i>A1</i>	Hotel Association A	21	17	71	77	8,82
<i>A11</i>	Hotel Association B	16	13	76	80	1,70
<i>A12</i>	Travel Agency Association	18	16	73	78	2,69
<i>A13</i>	Restaurant Association	11	9	80	85	0,91
<i>A14</i>	Society for local heritage	17	12	76	83	15,74
<i>A15</i>	Colombian Association of Micro, Small and Medium Enterprises (Bolívar)	5	4	93	95	0,27
<i>A16</i>	National Federation of Merchants (Bolívar)	5	8	83	85	1,18
<i>A17</i>	Professional group of tourist guides	9	6	80	91	0,45
<i>A18</i>	Other associations, groups or guild.	6	6	82	87	0,54
<i>A19</i>	Local Airport	12	8	77	85	1,32
<i>A2</i>	Cruise terminal	25	17	66	77	21,41
<i>A21</i>	Museums	19	11	71	81	5,04
<i>A22</i>	Hotels	36	39	57	59	146,01
<i>A23</i>	Tour Operators	29	29	63	65	51,17
<i>A24</i>	Tour Operator A	29	44	68	62	66,71
<i>A25</i>	Tourist Guides	16	14	76	80	5,96
<i>A26</i>	Promotion Websites	16	11	74	81	42,55
<i>A27</i>	Local transporters	12	10	79	82	0,87
<i>A28</i>	Restaurants and similars	26	24	70	74	32,84
<i>A29</i>	University-Business-State Committee	8	14	78	75	4,06
<i>A3</i>	University A	21	29	70	64	115,58
<i>A31</i>	University B	11	17	82	74	21,17
<i>A32</i>	University C	8	22	79	70	5,83
<i>A33</i>	University D	26	28	66	68	48,14
<i>A34</i>	Research Institutes and Centers	19	25	70	68	44,66
<i>A35</i>	Environmental Institutions	11	22	82	74	5,68
<i>A36</i>	NGOs	6	7	87	88	0,69

<i>ID</i>	<i>Actors</i>	<i>Freeman Degree</i>		<i>Closeness</i>		<i>Betweenness</i>
		<i>Out</i>	<i>In</i>	<i>Out</i>	<i>In</i>	
A37	NGO A	2	4	111	102	0,15
A38	NGO B	10	3	76	91	1,82
A39	Insular Community Representative	7	5	79	88	0,57
A4	Other Communities Representative	12	9	77	81	2,28
A41	Civil Society Groups	2	12	115	77	1,37
A42	Citizen	0	5	168	82	0,00
A43	Other Institutions/actors	7	8	86	79	3,64

The 43 actors analyzed created the network which was introduced in software program UCINET©. The nodes' centrality based on: degree, closeness, and betweenness (Prell et al., 2009; Yang, 2014) was chosen as the most appropriate SNA indicator to assess the relevance of the stakeholders. The centrality indices of the actors were calculated (**Error! Reference source not found.**). The graphical representation of the whole information exchange network is shown in **Error! Reference source not found.** using the results of Betweenness centrality. This measure allows us to establish clearer differences among actors. The bigger the size of the geometric figure, the higher the betweenness centrality.

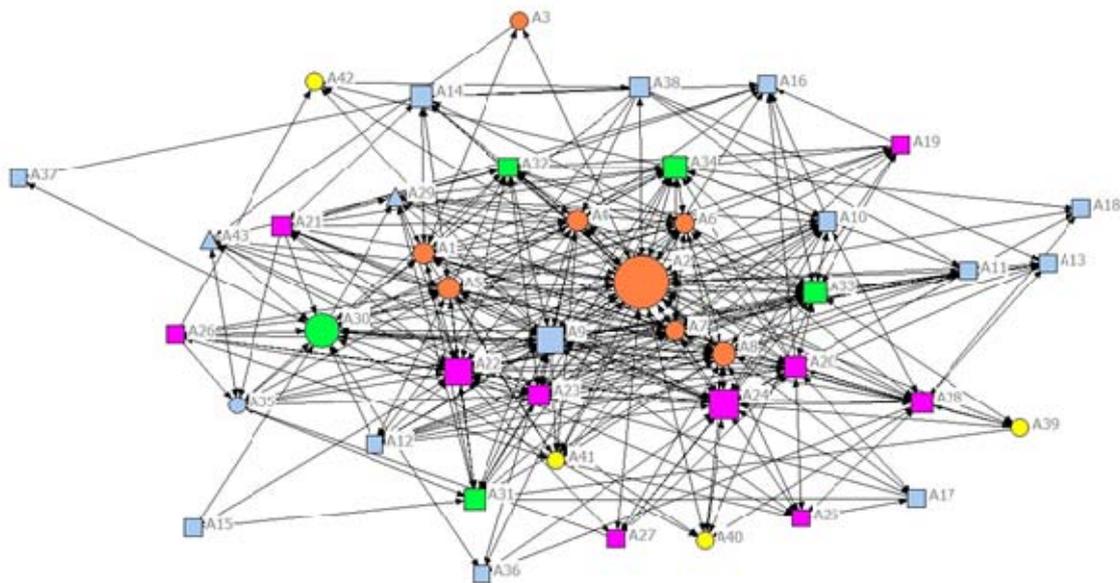


Figure 2. Graphs showing social network of stakeholders – According to Betweenness

The analysis of the network as a whole shows that it is a very dense network, given the number of actors and the number of connections that are observed. All the actors are connected by more than one connection, which denotes good communication within the network. We can also stand out that the local tourist sector has strong ties, which means that it is a consolidated sector and able to respond quickly and effectively.

In order to select the most influential actors, we decided to select those with higher betweenness centrality. They are the ones who would have more control on the network, because more information will pass through them (Bodin & Crona, 2009; Mok et al., 2017; Yamaki, 2017). According to this measure, the most influential actors are:

1. The Local Tourist Office (A2): Institution in charge of the planning and management of the tourist development of the city. It is the most relevant authority in terms of tourist management.
2. Hotels (A22): One of the most important and relevant tourist services providers. The city has at least 530 hotels and two main associations.
3. Local Chamber of Commerce (A9): Is a private non-profit institution whose primary purpose is to promote regional development.
4. University A (A30): It is the only public University in the city.
5. National Tourist Promotion Office (A8): National institution created for the promotion of tourism and its competitiveness.

Once the list of relevant actors has been obtained, we have our preliminary list of experts for the ANP process. However, in order to follow the suggestions proposed by some scholars (Bodin et al., 2006; Prell et al., 2009) aimed at making the group of experts more resilient and adaptative to environmental changes, we have included two more actors who were not considered central, but were willing to collaborate in this process.

6. Social group leader (A41)
7. International expert (A43)

The next stages of the proposed methodology were carried out with the collaboration of the seven actors acting as experts.

3.3. Participative prioritization of tourist strategies through ANP

This part aims to support the experts chosen to evaluate and prioritize sustainable tourist strategies. The three proposals to be analyzed have been described in section 3.1: Tourist complex (A1), Tourist boulevard (A2) and Waterborne transport system (A3).

3.3.1. Selection of evaluation criteria

Following the ANP procedure, the criteria to evaluate the proposed alternatives were identified. It was necessary to make sure that these criteria could be grouped, that they were relevant, not redundant and easy to understand for the different actors. The final list of 25 criteria grouped in five evaluation clusters (**Error! Reference source not found.**) was defined based on a bibliographic review (Eldrandaly & AL-Amari, 2014; Mariani et al., 2014; Jeong et al., 2014; Groselj & Stirn, 2015; Liu & Chou, 2016; Wang et al., 2016; Chen & Bau, 2016) and with the assistance of the experts (Liu & Chou, 2016).

Table 3. Evaluation criteria

Cluster	Criteria	Definition
C.1 Environmental	C 1.1 Use of heritage and natural spaces	The use of monuments, buildings, spaces and natural areas, especially those considered as heritage
	C 1.2 Environmental Risk and threats	Actual or potential threat of adverse effects transmitted through environmental conditions i.e. Erosion, sea levels rise, swell, floods...
C.2 Socio-cultural	C 2.1 Qualified labor	Training and skills required to implement and support alternatives.
	C 2.2 Available infrastructure and Public services	The existing basic systems and services, such as transport, routes and public services.
	C 2.3 Integration of ethnic groups	To allow native communities and ethnic groups to participate.
	C 2.4 Exploitation of cultural identity	The use of elements of cultural identity
	C 2.5 Quality of life	The beneficial effects of alternatives in the city.
	C 2.6 Linking to post-conflict	The possibility of linking alternatives with current post-conflict processes.
	C 2.7 Associativity among actors	Degree of coordination and integration of the involved actors in the city.
C.3 Sectorial	C 3.1 Origin of visitors	Origin of tourist arrivals in the city.
	C 3.2 Visitor expenditure	Tourist spending particularly related to each alternative.
	C 3.3 Length of stay of visitors	Tourists' trip duration (nights, hours...), particularly related to each alternative.
	C 3.4 Positioning in national and international markets	Perceptions of the city in national and international segments of tourism.
	C 3.5 Global Tourism Trend	Preferences and world tourism tendency.
	C 3.6 Integration with other destination	The possibility to connect the city with regional destinations.
	C 3.7 Experiential Content	A closer bond between the visitor and the city created by memorable experiences.
C.4 Economic-Productive	C 4.1 Promoting other economic activities	The influences of the alternative in other economic sectors.
	C 4.2 Generated Revenues	Incomes that the city will get from new activities.
	C 4.3 Required investment	The required capital to implement and support these alternatives.
	C 4.4 Tax Policy	Compatibility of new activities with tax benefits.
C.5 Political-Administrative	C 5.1 Compatibility with the city's vision	Affinity with local, regional and national projects and programs.
	C 5.2 Institutional support	Governability framework for the implementation of each alternative.
	C 5.3 Compatibility with land-use, existing plans and regulations	Compatibility with legal regulations, controls or restrictions.
	C 5.4 Estimated time for development	Required period of time to implement each alternative.
	C 5.5 Responsible and sustainable management	Opportunity to insert responsible and sustainable policies into new services.

3.3.2. Representation of the evaluation problem as a network model

Influences among criteria were determined using a relationship matrix. This procedure was carried out during face-to-face meetings with the experts. The final ANP model proposed is shown in **Error! Reference source not found.** The bidirectional arrows indicate influences between clusters in both directions. That is to say, the elements in a cluster (i) exert some influence over elements in another cluster (j). Feedback means that there is influence between criteria belonging to the same group.

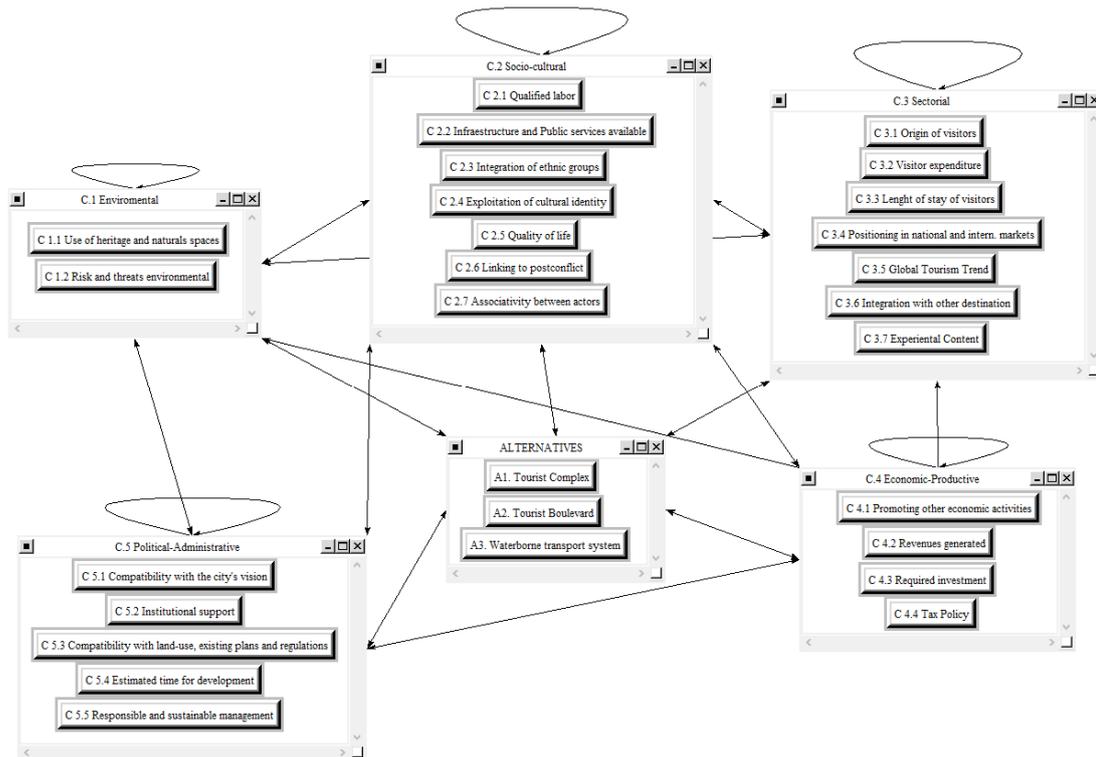


Figure 3. ANP network model of the case study.

3.3.3. Prioritizing strategies

Once the model was agreed upon, the ANP questionnaire with the required judgements based on pairwise comparisons was designed and sent to the experts. From the local priorities derived through pairwise comparisons, the results were obtained with the help of Superdecision© v.2.0.8. software.

The final limit matrix shows the priority obtained for each criterion, a non-dimensional value that can be considered their relative importance. Since a total amount of 7 people were interviewed, a total of 7 individual results were obtained each of which shows the preference index according to the opinion of one particular expert. Individual judgements' aggregation AIJ was performed using the geometric mean in order to obtain a global judgement (Saaty, 2001). Care was taken to ensure that all pairwise comparison matrices had a CR of less than 10%. In instances where judgments were inconsistent, experts were consulted to reconsider their judgment so that they fall within the acceptable limit.

4. RESULTS OBTAINED

4.1. Regarding the weights of the criteria

4.1.1. At the clusters level

The cluster weighting provides some important insights into the overall philosophy and underlying participants' conception of what sustainable tourism of the city of Cartagena is. We can analyze their individual decision-making profiles (**Error! Reference source not found.** and **Error! Reference source not found.**). Experts 1 and 4 show similar profiles. They both give the highest importance to Environmental (C1) and Socio-cultural (C2) aspects and the lowest ones to Economic-Productive (C4) and Political-administrative (C5) aspects. So, we could conclude that they show a *socio-environmental* profile. On the other hand, experts 5 and 7, the ones who do not belong to the city of Cartagena, give the highest importance to C5 and C4. In this case we could conclude that these two experts present a *political-economic* profile.

Expert 2 gives the highest importance to C4; followed by C3. So we could define this expert as an *economic* profile. Expert 6 has a *social* profile and Expert 3 shows a more balanced profiles.

Table 4. Results obtained for the clusters of criteria

Cluster	Expert 1 Tourist Office	Expert 2 Hotels	Expert 3 Chamber of Commerce	Expert 4 University	Expert 5 National Tourist Promotion Office	Expert 6 Social group leader	Expert 7 International expert	Group (AIJ)
C1 Environmental	0,379	0,183	0,200	0,464	0,039	0,276	0,039	0,257
C2 Socio-cultural	0,333	0,052	0,200	0,209	0,076	0,397	0,113	0,228
C3 Sectorial	0,134	0,448	0,200	0,133	0,161	0,205	0,131	0,236
C4 Economic-Productive	0,092	0,234	0,200	0,076	0,362	0,080	0,225	0,162
C5 Political-Administrative	0,062	0,082	0,200	0,119	0,362	0,042	0,492	0,117

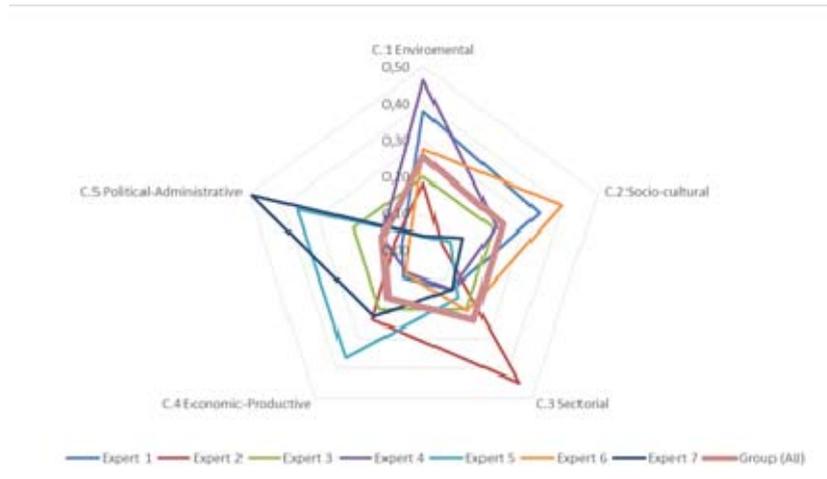


Figure 4. Cluster results according to different experts and global result

4.1.2. At the criteria level

From these results the main conclusion we can highlight is that the most relevant criterion for all the experts is C1.1 *Use of Heritage and natural spaces* (16,4%) followed by C1.2 *Environmental risk and threats* (10%)(see **Error! Reference source not found.** to observe the differences). Following in importance we can observe a group of criteria formed by C5.5 *Responsible and sustainable management*, C3.6. *Integration with other destinations*, C2.7 *Associativity between actors*, C5.3 *Compatibility with land-use, existing plans and regulations*, C4.1 *Promoting other economic activities*, C4.3 *Required investment and C5.2 Institutional support*, which also have an importance of between 5 and 8%. The least important criteria have an importance of 1% or less (**Error! Reference source not found.**).

In general, criteria from the Environmental (A1) cluster are more valued and criteria from the Sectorial (A3) are less valued.

Table 5. Results obtained for the criteria

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Group (All)
C1.1 Use of heritage and natural spaces	0,198	0,185	0,129	0,196	0,136	0,166	0,154	0,164
C1.2 Environmental risk and threats	0,093	0,062	0,124	0,119	0,066	0,097	0,057	0,100
C2.1 Qualified labor	0,021	0,003	0,019	0,011	0,003	0,037	0,005	0,016
C2.2 Available infrastructure and Public services	0,012	0,026	0,023	0,032	0,037	0,025	0,035	0,025
C2.3 Integration of ethnic groups	0,029	0,031	0,026	0,047	0,026	0,071	0,051	0,041
C2.4 Exploitation of cultural identity	0,063	0,041	0,027	0,044	0,034	0,041	0,016	0,041
C2.5 Quality of life	0,043	0,020	0,047	0,027	0,033	0,035	0,017	0,037
C2.6 Linking to postconflict	0,018	0,005	0,016	0,003	0,003	0,012	0,002	0,010
C2.7 Associativity between actors	0,064	0,039	0,054	0,050	0,043	0,056	0,064	0,052
C3.1 Origin of visitors	0,006	0,005	0,007	0,002	0,003	0,005	0,001	0,006
C3.2 Visitor expenditure	0,016	0,030	0,010	0,004	0,007	0,012	0,022	0,013
C3.3 Length of stay of visitors	0,011	0,017	0,013	0,005	0,012	0,016	0,015	0,015

	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Group (AIJ)
C3.4 Positioning in nat. and intern. markets	0,005	0,016	0,008	0,006	0,014	0,007	0,004	0,011
C3.5 Global Tourism Trend	0,010	0,048	0,033	0,029	0,027	0,032	0,010	0,032
C3.6 Integration with other destination	0,053	0,064	0,042	0,045	0,061	0,061	0,051	0,054
C3.7 Experiential Content	0,045	0,073	0,049	0,045	0,032	0,027	0,052	0,044
C4.1 Promoting other economic activities	0,050	0,040	0,045	0,041	0,047	0,053	0,035	0,050
C4.2 Generated Revenues	0,029	0,055	0,036	0,010	0,033	0,011	0,043	0,026
C4.3 Required investment	0,028	0,053	0,042	0,062	0,075	0,041	0,057	0,049
C4.4 Tax Policy	0,006	0,006	0,020	0,004	0,040	0,002	0,019	0,009
C5.1 Compatibility with the city's vision	0,018	0,033	0,040	0,026	0,030	0,022	0,046	0,027
C5.2 Institutional support	0,046	0,041	0,047	0,039	0,094	0,041	0,087	0,047
C5.3 Compatibility with land-use, existing plans and regulations	0,067	0,045	0,058	0,052	0,056	0,042	0,068	0,051
C5.4 Estimated time for development	0,003	0,008	0,014	0,008	0,013	0,004	0,019	0,008
C5.5 Responsible and sustainable manag.	0,066	0,054	0,072	0,092	0,073	0,081	0,069	0,075

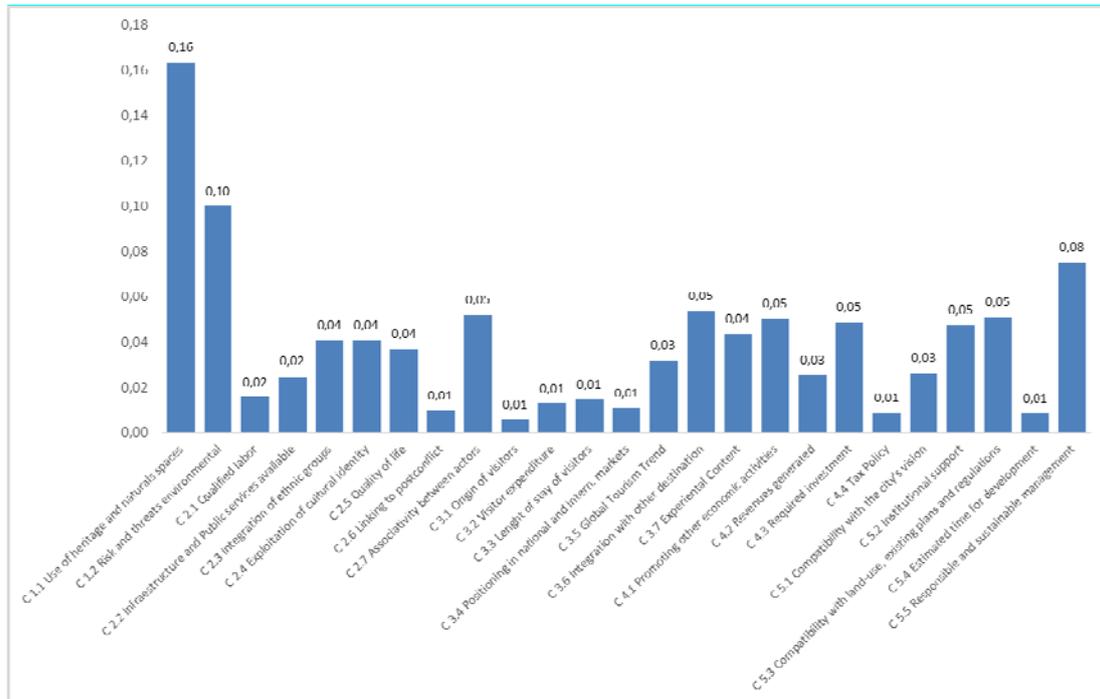


Figure 5. Group results for all the criteria

4.1.3. Regarding the ranking of the alternatives

We can conclude that although the different experts show very different ranking preference of the three alternatives that have been analyzed (**Error! Reference source not found.** and **Error! Reference source not found.**), when we aggregate the results as a group, the results indicate that the preferred alternative to be implemented is A3. *Waterbourne transport system* (45%), followed by A1. *Tourist Complex* (34%).

The Waterborne transport system has been positively valued due to the importance assigned to the criterion related to *Use of Heritage and natural spaces*, thus its aim is to develop a network of public transportation system using the water resources available around the city, and connecting insular and continental zones.

Table 6. Results obtained for the alternatives

	Expert 1 Tourist Office	Expert 2 Hotels	Expert 3 Chamber of Commerce	Expert 4 University A	Expert 5 National Tourist Promotion Office	Expert 6 Social group leader	Expert 7 International expert	Group (AIJ)
A1. Tourist Complex	0,359	0,440	0,347	0,427	0,190	0,375	0,561	0,344
A2. Tourist Boulevard	0,351	0,230	0,211	0,221	0,337	0,087	0,182	0,207
A3. Waterborne transport system	0,290	0,330	0,442	0,351	0,474	0,538	0,257	0,449

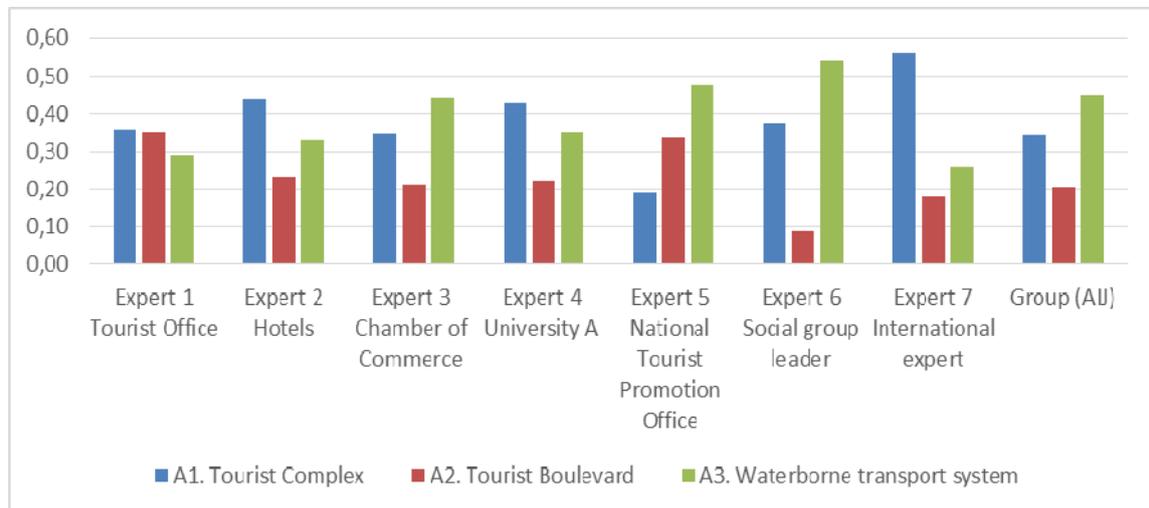


Figure 6. Alternatives

5. CONCLUSIONS

Regarding the experts' selection process with SNA

We used SNA to identify and take account of the actors involved in or affected by the tourist sector in Cartagena de Indias (Colombia). Individual values were obtained through the centrality measures. The betweenness results allowed us to determine an individual value of the influence of each actor in order to involve the most influential stakeholders as decision makers (experts).

The application of SNA also offered some insights about how consolidated the sector is. On one hand, we found out that some associations are less representative that expected e.g. Colombian Association of Micro, Small and Medium Enterprises, which came out as an unexpected result. Also others actors such as The Nautical Association were not

mentioned either. On the other hand, it was also surprising that Tour Operator A (A24) came out as very prominent in front of the rest of tour operators.

Regarding the alternatives prioritization process with ANP

The variety of the results obtained for the individual ranking of the alternatives shows the differences in perception and attitude among the stakeholders. In the final aggregated ranking A3. *Waterbourne transport system* has the highest level of preference. The use of ANP allowed to encourage participation.

Regarding the general satisfaction with the process

The results obtained were presented to the experts. They all agreed that the prioritization process carried out allowed the reduction of debates, controversy and contradictions typical in other types of decision-making sessions. They also stressed that the tourist development plan that was finally selected would improve the touristic offer of the city and would also provide an interesting mobility offer for the inhabitants and tourists, thus, promoting sustainable development in line with global trends.

The combination of SNA-ANP techniques for prioritization of strategic plans allowed transparency and participation. We can conclude that we have brought some light on the issue of solving problems related to participative planning processes.

As future lines of development, we suggest to integrate the SNA-ANP model with other tools such as Geographic Information Systems (GIS), in order to improve the decision making process.

Finally, the authors of this paper suggest the Cartagena Local Administration to further promote this participative approach.

6. REFERENCES

- A. Eldrandaly K, A. AL-Amari M. An Expert GIS-Based ANP-OWA Decision Making Framework for Tourism Development Site Selection. *Int J Intell Syst Appl.* 2014;6(7):1-11
- Ahmedi L, Rrmoku K, Sylejmani K, Shabani D. A bimodal social network analysis to recommend points of interest to tourists. *Soc Netw Anal Min.* 2017;7(1):14.
- Akbari N, Irawan CA, Jones DF, Menachof D. A multi-criteria port suitability assessment for developments in the offshore wind industry. *Renew Energy.* 2017;102:118-133.
- Alcaldía Distrital de Cartagena de Indias D. T. y C. Plan de Desarrollo “Primero La Gente” 2016 – 2019.; 2016. Accessed March 15, 2017.
- Alcaldía Distrital de Cartagena de Indias D. T. y C. Plan Sectorial del Turismo de Cartagena de Indias. 2014:1-92. Accessed March 15, 2017.

- Alves FL, Sousa LP, Almodovar M, Phillips MR. Integrated Coastal Zone Management (ICZM): A review of progress in Portuguese implementation. *Reg Environ Chang.* 2013;13(5):1031-1042.
- Aminu M, Matori AN, Yusof KW, Malakahmad A, Zainol RB. Analytic network process (ANP)-based spatial decision support system (SDSS) for sustainable tourism planning in Cameron Highlands, Malaysia. *Arab J Geosci.* 2017;10(13):286.
- Aminu M, Matori A-N, Yusof KW, Zainol RB. A Framework for sustainable tourism planning in johor Ramsar sites, Malaysia: A geographic information system (GIS) based analytic network process (ANP) approach. *Res J Appl Sci Eng Technol.* 2013;6(3):417-422.
- Arsić S, Nikolić D, Živković Ž. Hybrid SWOT - ANP - FANP model for prioritization strategies of sustainable development of ecotourism in National Park Djerdap, Serbia. *For Policy Econ.* 2017;80:11-26.
- Barba-Romero S, Pomerol J-C. *Decisiones Multicriterio: Fundamentos Teóricos Y Utilización Práctica.* Universidad Alcalá de Henares; 1997. Accessed January 12, 2018.
- Bars M Le, Grusse P Le. Use of a decision support system and a simulation game to help collective decision-making in water management. *Comput Electron Agric.* 2008;62(2):182-189.
- Belton V, Stewart TJ. *Multiple Criteria Decision Analysis.* Boston, MA: Springer US; 2002.
- Berzina I, Grizane T, Jurgelane I. The tourism service consumption model for the sustainability of the special protection areas. *Procedia Comput Sci.* 2015;43(C):62-68.
- Biggs S, Matsuert H. An actor-oriented approach for strengthening research and development capabilities in natural resource systems. *Public Adm Dev.* 1999;19(3):231-262.
- Bodin Ö, Crona BI, Ernstson H. Social networks in natural resource management: what is there to learn from a structural perspective? *Ecol Soc.* 2006;11(2):r2.
- Bodin Ö, Crona BI. The role of social networks in natural resource governance: What relational patterns make a difference? *Glob Environ Chang.* 2009;19(3):366-374.
- Bonzanigo L, Giupponi C, Balbi S. Sustainable tourism planning and climate change adaptation in the Alps: a case study of winter tourism in mountain communities in the Dolomites. *J Sustain Tour.* 2016;24(4):637-652.
- Bramwell B. Theoretical activity in sustainable tourism research. *Ann Tour Res.* 2015;54:204-218.
- Brugha R, Varvasovszky Z. Stakeholder analysis: a review. *Health Policy Plan.* 2000;15(3):239-246.
- Bryson JM. What to do when stakeholders matter. *Public Manag Rev.* 2004;6(1):21-53.
- Ceccato L, Giannini V, Giupponi C. Participatory assessment of adaptation strategies to flood risk in the Upper Brahmaputra and Danube river basins. *Environ Sci Policy.* 2011;14(8):1163-1174.
- Chen C-L, Bau Y-P. Establishing a multi-criteria evaluation structure for tourist beaches in Taiwan: A foundation for sustainable beach tourism. *Ocean Coast Manag.* 2016;121:88-96.

- Chen SH, Chen CM, Lee HT. Tourism development planning using analytic network process. *Int J Leis Tour Mark.* 2009;1(1):70.
- Comisión Regional de Competitividad de Cartagena y Bolívar. Plan Regional de Competitividad Cartagena Y Bolívar 2008 - 2032.; 2010. Accessed March 15, 2017.
- Corpoturismo. Retos Y Realidades. El Sector Turístico En Cartagena de Indias. Cartagena de Indias; 2015. Accessed February 15, 2017.
- Dvaskas A. Dynamically linking economic models to ecological condition for coastal zone management: Application to sustainable tourism planning. *J Environ Manage.* 2017;188:163-172.
- Elgin D, Weible C. A Stakeholder Analysis of Colorado Climate and Energy Issues Using Policy Analytical Capacity and the Advocacy Coalition Framework. *Rev Policy Res.* 2013;30(1):114-133.
- García-Melón M, Gómez-Navarro T, Acuña-Dutra S. A combined ANP-delphi approach to evaluate sustainable tourism. 2012;34:41-50.
- García-Melón M, Gómez-Navarro T, Acuña-Dutra S. An ANP approach to assess the sustainability of tourist strategies for the coastal national parks of Venezuela. *Technol Econ Dev Econ.* 2010;16(4):672-689.
- Glicken J. Getting stakeholder participation “right”: a discussion of participatory processes and possible pitfalls. *Environ Sci Policy.* 2000;3(2000):305-310.
- Goosen H, Janssen R, Vermaat JE. Decision support for participatory wetland decision-making. *Ecol Eng.* 2007;30(2):187-199.
- Groselj P, Stirn LZ. The environmental management problem of Pohorje, Slovenia: A new group approach within ANP - SWOT framework. *J Environ Manage.* 2015;161:106-112.
- Hanneman RA, Riddle M. *Introduction to Social Network Methods.* Riverside: University of California, Riverside; 2005.
- Hjalager AM. A review of innovation research in tourism. *Tour Manag.* 2010;31(1):1-12..
- Janssen MA, Goosen H, Omtzigt N. A simple mediation and negotiation support tool for water management in the Netherlands. *Landsc Urban Plan.* 2006;78(1-2):71-84.
- Jeong JS, García-Moruno L, Hernández-Blanco J, Jaraíz-Cabanillas FJ. An operational method to supporting siting decisions for sustainable rural second home planning in ecotourism sites. *Land use policy.* 2014;41:550-560.
- Le Pira M, Ignaccolo M, Inturri G, Pluchino A, Rapisarda A. Modelling stakeholder participation in transport planning. *Case Stud Transp Policy.* 2016;4(3):230-238.
- Liu C-HS, Chou S-F. Tourism strategy development and facilitation of integrative processes among brand equity, marketing and motivation. *Tour Manag.* 2016;54:298-308.
- Loken E. Use of multicriteria decision analysis methods for energy planning problems. *Renew Sustain Energy Rev.* 2007;11(7):1584-1595.
- Mariani MM, Buhalis D, Longhi C, Vitouladiti O. Managing change in tourism destinations: Key issues and current trends. *J Destin Mark Manag.* 2014;2(4):269-272.

- Mitchell RK, Agle BR, Wood DJ. Toward a Theory of Stakeholder Identification and Saliency: Defining the Principle of Who and What Really. 2009;22(4):853-886.
- Mok KY, Shen GQ, Yang RJ. Addressing stakeholder complexity and major pitfalls in large cultural building projects. *Int J Proj Manag.* 2017;35(3):463-478.
- O'Toole K, Keneley M, Coffey B. The participatory logic of coastal management under the project state: Insights from the Estuary Entrance Management Support System (EEMSS) in Victoria, Australia. *Environ Sci Policy.* 2013;27:206-214.
- Peris J, García-Melón M, Gómez-Navarro T, Calabuig C. Prioritizing Local Agenda 21 Programmes using Analytic Network Process: A Spanish Case Study. *Sustain Dev.* 2013;21(5):338-352.
- Prell C, Hubacek K, Reed M. Stakeholder Analysis and Social Network Analysis in Natural Resource Management. *Soc Nat Resour.* 2009;22(6):501-518.
- Ramzan N, Degenkolbe S, Witt W. Evaluating and improving environmental performance of HC's recovery system: A case study of distillation unit. *Chem Eng J.* 2008;140(1):201-213.
- Reed MS, Graves A, Dandy N, et al. Who's in and why? A typology of stakeholder analysis methods for natural resource management. *J Environ Manage.* 2009;90(5):1933-1949.
- Saaty TL. How to make a decision: The analytic hierarchy process. *Eur J Oper Res.* 1990;48(1):9-26.
- Saaty TL. *The Analytic Network Process: Decision Making with Dependence and Feedback.* RWS Publications; 2001.
- Saint Ville AS, Hickey GM, Phillip LE. How do stakeholder interactions influence national food security policy in the Caribbean? The case of Saint Lucia. *Food Policy.* 2017;68:53-64.
- Šijanec M, Žarnić R, Šelih J. Multicriterial sustainability assessment of residential buildings. *Technol Econ Dev Econ.* 2009;15(4):612-630.
- Sólnes J. Environmental quality indexing of large industrial development alternatives using AHP. *Environ Impact Assess Rev.* 2003;23(3):283-303.
- Wang X, Li, Xiang RobWang, X., Li, X. R., Zhen, F., & Zhang, J. (2016). How smart is your tourist attraction?: Measuring tourist preferences of smart tourism attractions via a FCEM-AHP and IPA approach. *Tour Manag.* 2016;54:309-320.
- Wasserman S, Faust K. *Social Network Analysis.* 15th print. New York: Cambridge University Press; 2007.
- World Tourism Organization UNWTO. *Panorama OMT del turismo internacional.* Annu Rep. 2014:12.
- World Tourism Organization UNWTO. *UNWTO Annual Report 2016.* (UNWTO, ed.). Madrid: UNWTO; 2017.
- Yamaki K. Applying social network analysis to stakeholder analysis in Japan's natural resource governance: Two endangered species conservation activity cases. *J For Res.* 2017;22(2):83-90.
- Yang RJ. An investigation of stakeholder analysis in urban development projects: Empirical or rationalistic perspectives. *Int J Proj Manag.* 2014;32(5):838-849.