Hybrid SWOT - ANP - FANP model for prioritization strategies of sustainable development of ecotourism in National Park Djerdap, Serbia

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ABSTRACT

The paper presents the results of the research for prioritization strategies of sustainable development of ecotourism in National Park Djerdap (NPDJ), Serbia. Ecotourism as a possible type of tourism in national parks is observed through SWOT situation analysis of NPDJ, Serbia. Based on the results presented in the TOWS matrix - possible SO, WO, ST and WT strategies, which enable sustainable development of ecotourism in the national park, were defined. Using multi-criteria Analytical Network Process (ANP) and Fuzzy Analytical Network Process (FANP) the prioritization defined strategy was determined. It allows sustainable development of ecotourism in NPDJ, Serbia, through the promotion of EU standards for the NPDJ involvement of academic institutions and non-governmental organizations (NGOs). By applying the defined prioritization of certain strategies, there is a possibility of a continuous increase of NPDJ performances which would contribute to the sustainability of the defined ecotourism concept.

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1. Introduction

Examples of international best practice confirms that with the development of ecotourism in national parks in addition to protection and conservation of biodiversity and cultural values, they can certainly improve regional development (Ceballos-Lascuráin, 1996; Hong and Chan, 2010; Sayyed et al., 2013; Puhakka and Saarinen, 2013; Öztürk, 2015; Cobbinah, 2015; Santarem et al., 2015).

However, management of national parks could face with the main challenges that occur during the implementation of the concept of ecotourism in order to promote the potentials of national parks. Therefore, they have to address a functional way of management, which comprises compliance with social needs and development priorities, i.e. this means controlling the area of the national park, protecting biodiversity and making the connection between protection and economic development. Therefore, managers of many national parks in the world are under increasing pressure to attract more visitors and to provide adequate facilities for the different needs of visitors. The expansion of tourism in many national parks is causing serious concern for the safety of the natural environment (La Page, 2010). Numerous researchers dealing with this issue have noticed the tension that arises between the need of tourists for various recreational activities in protected natural areas and the need to preserve the environment (Bernard et al., 2009; Luo et al., 2016).

Concerning this, within this research, National Park Djerdap - the largest national park in Serbia was discussed, facing such a challenge, since from the management of the company better organization of people and resources is being expected so that sustainable harmony, which will contribute to the development of this region, would be achieved. Furthermore, with the Management Plan for the National Park Djerdap for the period from 2017 to 2026 is foreseen support for the development of ecotourism content in the national park (Management Plan for the NP Djerdap, 2016). However, a clear strategic plan which can accomplish so defined a strategic objective, i.e. the development of ecotourism in the National Park Djerdap is still underdeveloped, which was the main motive for the authors of this paper to realize this research. Considering the "in situ" situation, this paper suggests a comprehensive management plan that sets out guidelines for the management in order to accomplish several objectives regarding ecotourism development (Masberg and Morales, 1999; Chan and Bhatta, 2013; Biglarfadafan et al., 2016). This plan will include controlled use of NP so that realized tourist movements in this area would not lead to a distortion of the natural balance (Buckley, 2004) on one hand, while on the other, it would enable economic development of the region (Hovardas and Korfiatis, 2008).

Also, there is a lack of literature concerning this research topic i.e. promoting the strategic concept of ecotourism in protected natural areas in South East Europe, therefore the obtained results can give valuable insight for all decision makers who are dealing with the similar decision making dilemma. This reason encouraged the authors of this study to apply the mentioned methodology to the case of the largest national park in Serbia. For the purposes of the development of NP Djerdap

as an attractive destination for ecotourism, not only for domestic but for foreign tourists as well, a hybrid SWOT-ANP-FANP model for prioritization strategy of sustainable development is being defined in this paper. Thus, this study contributes to the expansion of the mentioned methodology in the field of ecotourism. Also, by the obtained results, it suggests a new approach to strategic decision-making.

This model has been applied in the paper through the following sections: Section 2 gives the relevant literature background regarding introducing and developing the concept of ecotourism in protected areas; Section 3 describes the research area of NPDJ and formulation of the four steps methodological framework for defined research topic; Section 4 discusses the implications of the results of proposed SWOT-FANP model in case of NPDJ; Section 5 presents a discussion of the obtained results and analyses the contribution as well as the life cycle of each proposed strategy and Section 6 presents the main conclusions and recommendations.

2. Literature review

Ecotourism is a new type of tourism that is not a consumable resource, it is for educational and adventurous character, focused on undeveloped and sparsely visited natural, cultural and historical sites (Mayaka and Prasad, 2012; Liu et al., 2013; Lenao and Basupi, 2016). The purpose of such movement in tourism is understanding and appreciation of the natural and social culture of certain destination (Sirakaya et al., 1999). The development objective of ecotourism is to protect natural areas through the provision of income, environmental protection, education and involvement of the local population (Ross and Wall, 1999; Das and Chatterjee, 2015). It is based on the idea that eco-environment is a local resource that creates economic value of attracting tourists (Björk, 2000; Chiu et al., 2014; Cobbinah, 2015). Ecotourism is defined as: "Environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features both past and present) that promotes conservation, has low negative visitor impacts, and provides for beneficially active socioeconomic involvement of local people" (Ceballos-Lascuráin, 1996; Sayyed et al., 2013; Ghorbani et al., 2015).

Implementation of ecotourism has numerous positive impacts. Many authors have stated that ecotourism contributes to the conservation of endangered species (Steven et al., 2013; Santarem et al., 2015) and cultural heritage in the world (Nepal, 2004). Also, ecotourism represents a reliable tool for improving the local economy, particularly in underdeveloped regions. In remote and pristine areas ecotourism is responsible for generating revenue for the protection of the environment (Honey, 2008; Steven et al., 2013; Santarem et al., 2015).

Moreover, given that the traditional tourism and recreational services in some cases do not meet the needs of tourists in terms of quality of services provided (Selby et al., 2011), there is a significant space for improving the offer of protected areas by implementing appropriate strategies that will contribute to the development of the whole area, where the trend of ecotourism is gradually gaining in importance (Arabatzis and Grigorodis, 2010). When it comes to the needs of ecotourists, they also vary from country to country, but basically they come to the same requirements. For this reason, numerous studies have been conducted dealing with the examining the behavior of ecotourists according to their needs (Kerstetter et al., 2004; Trangeland, 2011; Sirivongs and Tsuchiya, 2012). According to the United Nations, there are three types of ecotourists: hard ecotourist, soft ecotourist and the adventure ecotourist (Fennell, 2008). They share a common interest, but enjoy slightly different flavors of green travel as well as levels of exertion. For those looking to explore the rugged outdoors with others wanting to enjoy luxury done green. They are experienced travelers and are shaping the market. Therefore, each of these groups has different requirements for tourist facilities and recreational activities (Lee, 2009). Therefore, during the implementation of strategies which

accompany the introducing of ecotourism, it should be considered which of these tourist's requirements are possible to actualize.

Regarding to that, many authors have defined the most important factors which have influence on planning and implementation of the concept of ecotourism in the world. Moreover, in many studies are listed challenges with which the management may confront when introducing the concept of ecotourism. Hence, when introducing the concept of ecotourism in the new area, the answers to initial problems should be sought in the best benchmarking in the world which is applied in national parks with the already achieved level of successful implementation of ecotourism (Masberg and Morales, 1999; Biglarfadafan et al., 2016).

To meet the needs of ecotourism development in a national park, it is necessary to meet a number of prerequisites which are achieved by applying appropriate strategies for sustainable development (Arabatzis and Grigorodis, 2010). It is necessary to complete the implementation of international standards to ensure the quality of services which are offered in the world (Selby et al., 2011). The fact of great importance is that many protected natural sites from neighboring countries unite, through the realization of joint programs of cooperation thus achieving the possibility of reducing the competitiveness of the region by placing a joint tourist offer (Nicula et al., 2013). Moreover, in order to make ecotourism a recognized activity in these areas, it is necessary, first of all, to improve communication between stakeholders that complement the ecotourism offer (Bernard et al., 2009; Randle and Hoye, 2016) and the management of NP. A common problem which NP deals with is insufficient education in the field of ecotourism (Ke, 2012). Many local residents recognize the potential of ecotourism, but do not have enough knowledge and experience of starting an independent business and its promotion to potential visitors (Arabatzis and Grigorodis, 2010). For this reason there is a need to educate the local population regarding the way of the appropriate product and services, placement in order to meet the needs of visitors. Another significant issue in this area is poor infrastructure that does not meet the needs of visitors as well (Haukeland et al., 2010). Therefore, it is necessary to invest in this segment, so that adequate accommodation and catering facilities could be built (Öztürk, 2015). For such a significant investment it is of crucial importance to engage both state institutions and EU through projects which will provide funds to finance these needs. The role of official state institutions for the development of ecotourism in national parks is extremely important because of the both financial and legal support (Luo et al., 2016).

As an example of good practice is the Community of Capirona in the Amazon Region of Ecuador. In order to attract ecotourists, beside the visit to the protected area or jungle hikes, they organized a cultural presentation of songs, visit to the local theater that was made only for the visitors, exhibition of traditional handicrafts of the region. In their spare time, visitors are also being offered bathing in the river, walking on the beach and educating related to the history of this area as well as going on excursions to the local residents where they have the opportunity to taste traditional delicacies (Wesche and Drumm, 1999). Also, the management of the Galapagos National Park, Ecuador introduced the controlled use of the park which meant organizing tours and individual trips in the presence of competent guides and guards (Benitez, 2001). This measure significantly reduced the negative influence of ecotourism. The study, which was carried out in the Sarikum Nature Protection Area is focused on defining a comprehensive control strategy due to the fact that this protected area does not have any management plan. On the basis of the data collected and defined SWOT analysis, the ranking of the defined strategies based on SWOT factors, using the method of multiple criteria analysis, has been carried out. This made it much easier for a decision maker to define future management actions. Cayambe Coca Ecological Reserve, Ecuador for the sake of successful implementation of the concept of ecotourism decided that the management in cooperation with the local community forms an ecotourism committee in order to help stakeholders, which eventually resulted in the formation

of the strategic plan for ecotourism. With joint efforts, numerous activities which contributed to the achievement of the objectives of ecotourism were undertaken (Drumm and Moore, 2005).

3. Methodological framework

3.1. Description of the research area - National Park Djerdap

National Park Djerdap is located in Southeastern Europe, in the northeast part of Serbia at the border area with Romania (Fig. 1). It stretches on the right bank of the Danube from Golubac city in the west of Diana Karatas in the east. Its length is about 100 km and includes a narrow mountainous zone whose altitude ranges from 50 m to 803 m. NPDJ borders are legally precisely defined in 1983. By Decision of the Government of Serbia, it occupies a total area of 63 608.4 ha ("Official Gazette of RS", 2013). It is named after the Iron Gates which is one of the most beautiful gorges in Europe. Today the Danube river bed is formally located in National Park Djerdap.

NPDJ operates as a public company that manages the use of forests and land within national park boundaries as well as its fishing area, which includes the right bank of the Danube to the Romanian border and tributaries within the park (Panić and Lovren, 2014). National Park Djerdap is the largest national park in Serbia and it was founded in 1974 ("Official Gazette of SRS", 1974). The management plan was adopted. It will be a valid document till 2020. The plan is setting a way of implementation of the protection, use and management of the protected area. The guidelines and priorities with respecting the needs of local communities were defined by this plan as well (Plan upravljanja, 2012).

Besides national protection within the National Park, this area has several international protections, such as: for birds - Important Bird Areas according to the Birdlife program for over 170 identified species; Plant life International - Plant Europe for plants; Prime Butterfly Areas (PBA) according to Butterfly Conservation Europe program for over 100 different species of day flying butterflies. NPDJ is part of the Emerald Network of Areas of Special Conservation Interest - ASCI and it is part of NATURA the conservation of natural habitats and of wild fauna and flora based on which Special Areas of Conservation are protected - SACs by the EU directive (EU Directive 79/409/ECC, 1979) as Special Protection

Areas - SPAs. It is in the procedure of protection as a Biosphere Reservation by UNESCO program as an area of World Heritage (World Heritage Convention) (Panić and Lovren, 2014).

The hydropower potential of the Danube as the second largest river in Europe, within two lakes of the hydroelectric system Djerdap I and Djerdap II has 65 different species of fish which are mostly strictly protected species so it represents the most important resource of this kind in Europe.

Historical and cultural identity of the area consists of an archaeological prehistoric site Lepenski vir (7000 to 6000 BCE) with Lašac and Padina sites dating from the Mesolithic era which makes it unique in Europe. The remains of fortified objects built in Roman and early Byzantine period and the period of the Roman emperor Trajan (Trajan's Tablet dating from the first century CE) as well as the medieval war architecture from the 14th century (Golubac Fortress) indicate the outstanding cultural - historical value of the area (Krasojević and Farkić, 2014).

The total accommodation capacities in the NPDJ include 833 rooms with 1942 beds in 19 tourist facilities. In the tourist structure, who is visiting NPDJ, 90% are domestic tourists and only 10% are foreigners with an average 2.42 nights which equals the average tourist's stay. Domestic tourists spend 2.48 nights while the foreign ones spend 1.69 nights, which equals their stay. Also, tourists come annually by ships sailing on the Danube and about 75 ships with an average of 125 tourists per ship come yearly (Lovreta, 2007).

On the left bank of the Danube is a Romanian side where, in the same length, is an area which is under the national protection, defined as a nature park, with poorly developed tourist activity.

Specified resources indicate the potential for ecotourism development, with all its attributes within NPDJ as the developing potential of the region. Bearing in mind that the other bank of the Danube in Romania has similar ecological resources, cross-border co-operation with the use of the EU IPA program represents a significant potential (Panić and Lovren, 2014).

Based on the provisions of the Nature Protection Act ("Official Gazette of RS") for the National Park Djerdap, the Management Plan was defined for the period 2011 to 2020. However, concerning the fact that the implementations of the results of this plan have not been implemented adequately yet, the stagnation of the development of this region as well as the low financial progress are still present. In
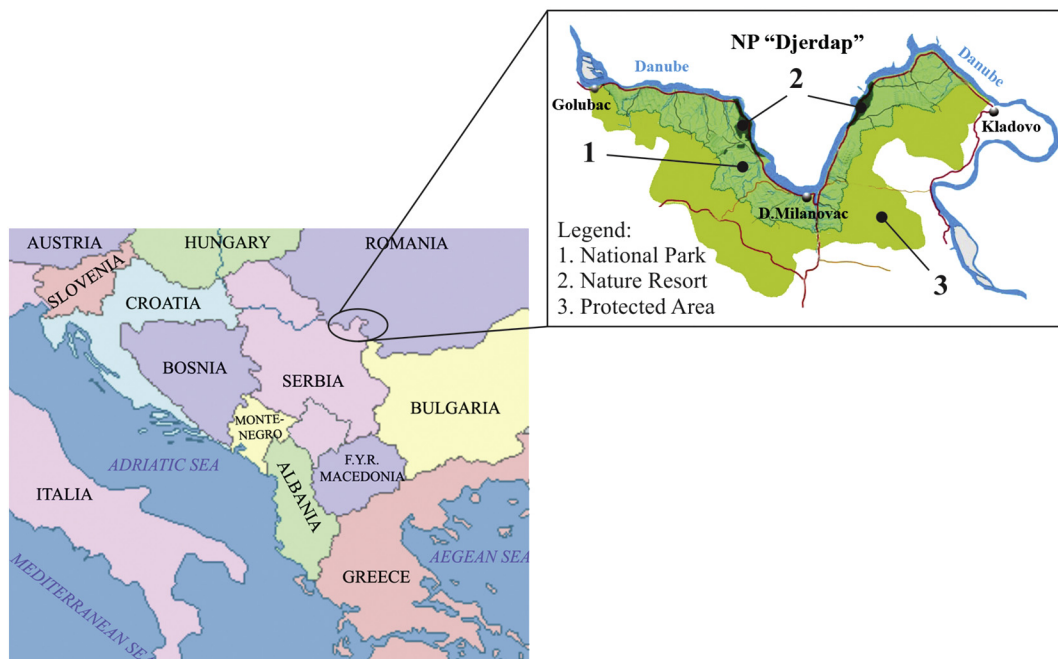

Fig. 1. Geographical location of NPDJ.

2016 a new Management Plan is adopted for the period 2017–2026, which defines the objectives and actions for the development of the National Park Djerdap. In this Plan guidelines that include the development of ecotourism, are involved. Therefore, the actual challenges in front of the NPDJ management are how to define new strategic actions to achieve long term objectives defined in ten years Management Plan. This was the main driver for organizing the initial meetings with the management of NPDJ and main stakeholders from this region. Stakeholders who participated at the meetings are representatives of Management of NPDJ, relevant ministries and local governments of municipalities Golubac, Majdanpek and Kladovo. Based on the generated objective opinions of the participants during these meetings, the current internal strengths and weaknesses, and external opportunities and threats in National Park Djerdap were presented in a form of SWOT matrix, which was used in further analysis in this paper.

3.1.1. Strength

The unique biodiversity of the National Park with over 70 different forest species, including 35 relict type species which are under the first degree of protection, is one of the main resources of this NP. This area is home to about 1.100 species and subspecies of higher plants, of which 40 are under special protection. There are more than 200 different fungi species, of which 63% are edible. As for wildlife, the most researched kind in this area is a day flying butterfly. 286 species from 156 genera of 21 subfamilies of butterflies were identified, which makes NPDJ one of the internationally significant areas for butterflies.

Fish fauna of the lower part of the Danube include 65 species of fish, most of which live in Djerdap lake. Besides other natural resources in NPDJ, 12 species of reptiles were identified, some of those are under the highest degree of protection. As for the bird world in this area, 187 species have been identified, including 37 species belonging to priority species which are also under the highest degree of protection (EU Birds Directive 2009/147). The mammal fauna in this area include 30 species and 14 species of bats (Krasojević and Farkić, 2014).

The Iron Gates gorge has been a challenge for travelers, traders, warriors, peacemakers and adventurers as a gate between the two cultural and economic parts of the world, between the upper and lower Danube region for thousands of years. This area has 62 immovable cultural properties that are protected or are in the procedure of protection. Golubac Fortress (14th century), Fetislam Fortress (16th century), Lepenski vir (7000 to 6000 BCE), Tabula Traiana and Diana Roman Castrum (the first century).

NPDJ is located on the Pan-European Corridor VII where the Danube as the second largest river in Europe with a length of 100 km runs through the NP. Along the right bank of the Danube, a highway was built. The distance between the park and Belgrade Airport is less than 100 km, which makes this location easily accessible to tourists.

On the left bank of the Danube is Romania with a coastal area that has a degree of protection of a nature park. Bulgaria is near the park, which makes NPDJ's position very favorable.

3.1.2. Weaknesses

Lack of knowledge in the field of ecotourism, an acceptable form of tourism in national parks, in the management of the NPDJ, in local
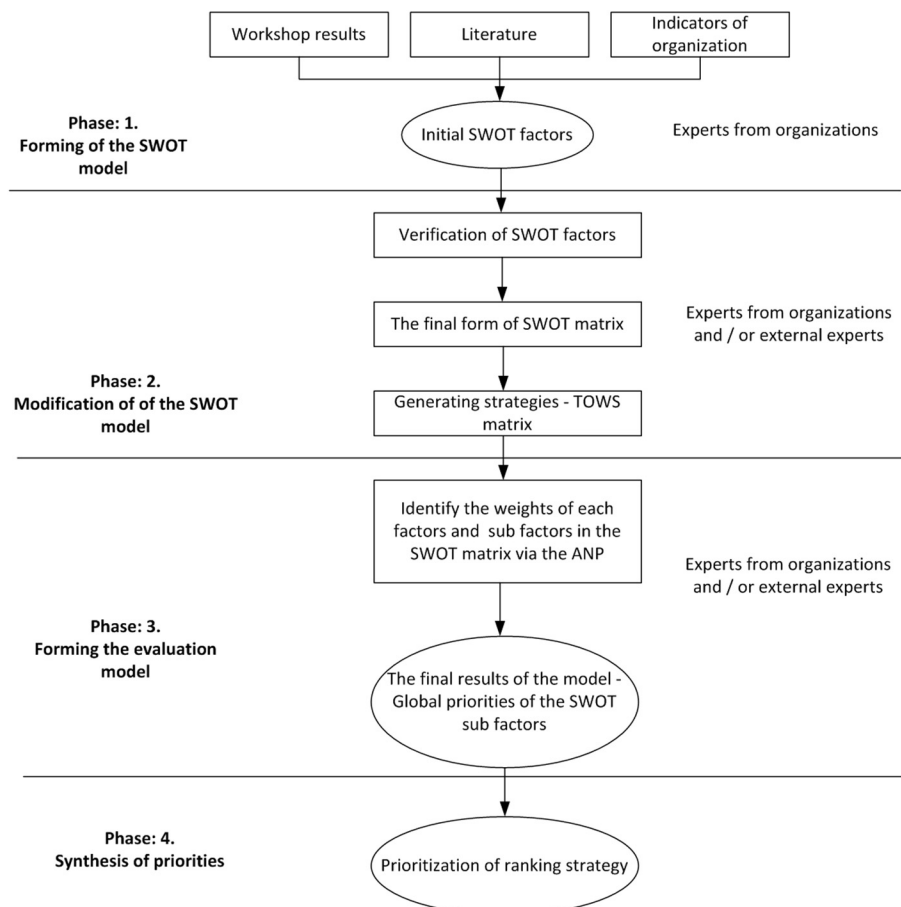

Fig. 2. Phase of proposal hybrid SWOT ANP model.

government and the state authorities with inadequate marketing make the resources of this site insufficiently visible to potential tourists. The use of modern technologies in the promotion of NP, which are the most appropriate nowadays, is used only symbolically.

Years of pollution from the surrounding mining areas undermine the ecological value of the environment as well as in certain parts of NPDJ, thus adversely affecting the attractiveness of the area. There is a latent danger of a Mining Basin complex Majdanpek for causing environmental disasters in some parts of the NP. In this case the state gives priority to the greater production of copper from the mine, so the NP is of secondary importance.

The park can be reached via Belgrade - Požarevac - Golubac highway which is not of satisfying quality and there is not a possibility of arriving there by train. Also, a major drawback is the lack of road connections with the tourist attractions on the national park territory.

Accommodation and catering conditions are of poor quality which are major problems tourists are facing at this destination. There is no accommodation which is highly ranked, i.e. with 4 or 5 stars. In these areas, it is usual that tourists who are staying in private accommodation are not registered so that the owners could avoid paying local taxes. Private accommodation generally does not offer food service.

Hiking trails on the national park territory require the existence of special panels, which would interpret natural values and contents, provide instructions concerning the time needed to switch the arrival from one to the other site and which would also give geographic location details of the area itself.

3.1.3. Opportunities

The potential of river traffic has a major advantage given that in this way the national park is connected to the rest of Europe. Foreign tourists have had the opportunity to come to NP by river cruiser since 2014 and they can come from Belgrade by boat to the dock in Donji Milanovac.

Due to the proximity of the national park, in the future, waterway transport will have good prospects for the tourist purposes of forming the unique sailing routes on the Danube as well as stays in NP Djerdap with sightseeing tours outside the NP (wine tours, Roman settlement Felix Romuliana from IV century BCE).

Given that the broad domestic public is still largely unfamiliar with the concept of ecotourism and the benefits that it offers, an adequate promotion and educational activities of the population can greatly increase the interest of the local population to visit a national park (Batabyal, 2016).

Due to the favorable climatic conditions, with an average annual temperature of 11.3 °C and in the period from May to the end of September 15 °C prevails in this area, the conditions for the development of agricultural activities are very encouraging. Due to the growing interest of many people, the locals through the production of organic food have the opportunity to place their products on the NP market, which would complement the overall tourist offer.

In the process of accession of Serbia to the EU, the accessibility to the EU funds will be increased, which in cooperation with Romanian organizations gives great chances for securing budget from the EU IPA funds for creating a joint ecotourism brand.

With adequate promotion, there are possibilities of securing funds from the Diaspora for investment activities in the NP by opening small and medium enterprises in the field of organic agriculture and hospitality industry which can enrich the content of the tourist offer of this region. The first examples of good practice are already present in Kladovo and Donji Milanovac.

3.1.4. Threats

Unfavorable circumstance is that Serbia is not a member of the EU and the accession process is also very slow which makes NP Djerdap unrecognizable on the European market as a destination for tourist visits.

Table 1
Literature overview of previous researches regarding study topic.

| Author(s)	Country	Specific area	Other tools/methodologies used
Grošelj et al. (2016)	Slovenia	Ranking scenarios for forest area management	SWOT, AHP, FAHP, ANP method
Okan et al. (2016)	Turkey	Ecotourism	SWOT analysis
Daroudi and Daroudi (2015)	Iran	Ranking strategies to developing ecotourism	SWOT, ANP, FANP method
Siswanto (2015)	Indonesia	Ranking strategies ecotourism	IFAS and EFAS matrix analysis
Ghorbani et al. (2015)	Iran	Ranking strategies	SWOT and QSPM
Öztürk (2015)	Turkey	Ranking management strategies	SWOT and R'WOT analysis
Wang (2015)	Taiwan	Perception of ecotourism	Exploratory factor
Bulatović and Tripković Marković (2015)	Monte Negro	Determination of weights of SWOT subfactors	SWOT analysis
Hamadouche et al. (2014)	Algeria	Analyses biodiversity	AHP, ANP, ELECTRE, PROMETHEE method
Akbulak and Cengiz (2014)	Turkey	Determining the strategy for the development of ecotourism	SWOT and AHP method
Sayyed et al. (2013)	Turkey	Determination of weights of SWOT subfactors	SWOT analysis
Moharramnejad et al. (2013)	Iran	Ranking strategies	SWOT analysis
Nouri et al. (2012)	Iran	Ecotourism	SWOT analysis
Reihanian et al. (2012)	Iran	Determination of weights SWOT subfactors and the proposed strategy	SWOT analysis
Sirivongs and Tsuchiya (2012)	Japan	Analyses local residents' perceptions, attitudes and participation in national protected areas	Structural equation modeling (SEM)
Arnberger et al. (2012)	Austria	Analyses affinity and attitudes visitors in national park	Factor analysis
Jozi et al. (2011)	Iran	Ranking strategies	SWOT and AHP method
Sariisik et al. (2011)	Turkey	Manage yacht tourism	SWOT analysis
Hong and Chan (2010)	Malaysia	Proposal of possible strategies for the management of ecotourism	TOWS matrix
Wickramasingne and Takano (2010)	Japan	Ranking strategies	SWOT and AHP method
Tsai et al. (2010)	Taiwan	Ranking national park	
Arabatzis and Grigorodis (2010)	Greece	Visitors' satisfaction, perceptions and gap analysis	MUSA method
Monavari et al. (2010)	Iran	Ranking strategies in NP	SWOT and AHP method
Wolfslehner and Vacik (2008)	Austria	Ranking sustainable forest management	ANP method
Hovardas and Korfiatis (2008)	Cyprus	Comparison periods of ecotourism development	Coding scheme
Wolfslehner et al. (2005)	Austria	Ranking sustainable forest management	AHP and ANP method
Kajanus et al. (2004)	Finland	Tourism management	SWOT and AHP method
Kurttila et al. (2000)	Finland	Ranking forest-certification case	SWOT and AHP method
Masberg and Morales (1999)	USA	Comparison of success factors	Quantitative analysis

a)

b)
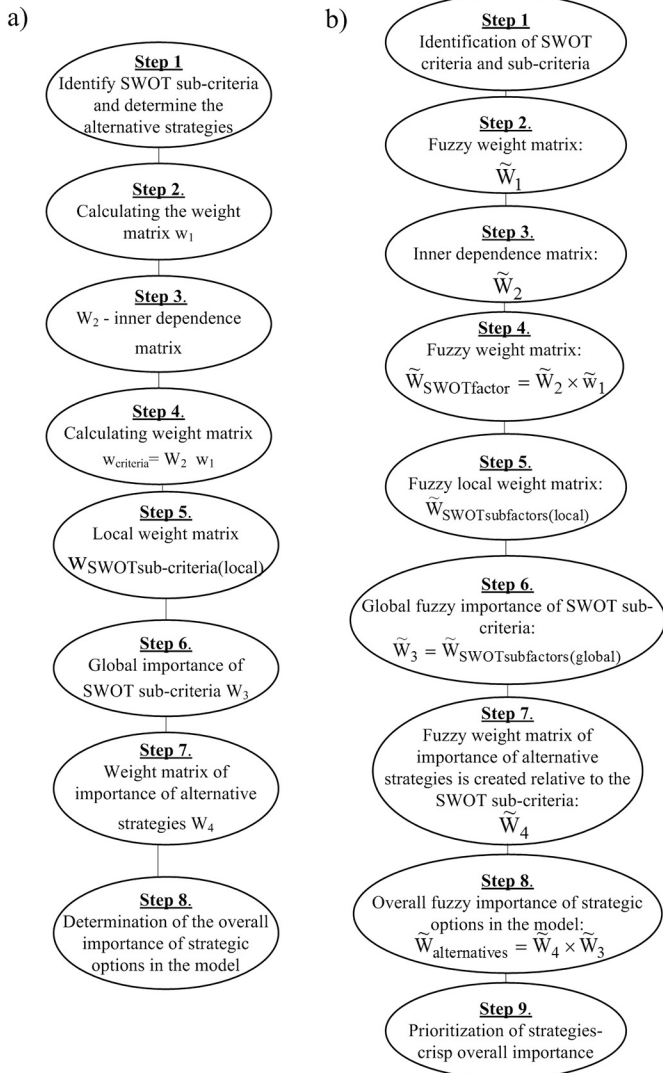
Fig. 3. Comparison of the a) ANP model for strategies prioritization and b) FANP model for strategies prioritization.

Countries in the region that Serbia is bordered on the northeast and east Romania and Bulgaria, respectively, give more attention to tourism development which adversely affects the touristic development of destinations in Serbia due to the increased regional competition (Vladimirov, 2012; Nicula et al., 2013).

Socio-economic conditions in the country during recent years have led to a reduction of purchasing power generally, thus to a reduction of the travel budget. Moreover, there is a market trend in domestic tourism, which shows that Serbs choose destinations abroad, not domestic ones when they go on longer vacations.

The policy of the state through its state plans do not encourage directing major infrastructure projects into the region. Hence, funds for the development of this region are limited. Foreign investors are not interested in financial investment in this region because of numerous obstructive legal regulations and because of high state taxes as well. Investors do not recognize this protected natural area as a good place for their potential investment.

Uncontrolled pollution and waste disposal in the national park is a big threat to the existence of natural ecosystems. The main reason for this is an inadequate implementation of legal regulations relating to the protection of the environment and cultural heritage. Additionally, a significant element of preserving the habitat is the management of solid waste that occurs. Locals widely use natural resources for commercial purposes by selling herbs and flowers, going hunting and fishing during the closed season, unplanned deforestation is taking place, thereby adversely affecting the existence of the ecosystem. Many plant and animal species in the National Park are seriously threatened.

Poor infrastructure of existing accommodation capacity is a big problem due to the lack of financial investments. That is why tourists have partially positive image of the region as an attractive tourist destination they would visit again.

Because of numerous conflicts in the local administration, NP management has not clearly defined and implemented a development plan which would be implemented in practice. Inadequate communication between NP management, local travel agencies, caterers and the locals results in poor economic development of the whole region.

3.2. Development of the quantitative model for strategies prioritization

Due to the constant changes that appear in modern business of national parks, there is a need to apply a systematical framework that allows the structuring of the problem and provides relevant data for analysis and interpretation of results. Hence, the main idea of this paper was to develop a model of strategic decision-making, which aims to define the SWOT factors and carry out their assessment of significance in order to create a quantitative framework for prioritization of considered strategies in this research. A 4-step methodological frame is shown in Fig. 2.

Numerous studies have used the SWOT analysis to define management strategies in the development of sustainable ecotourism for local development of national parks by investing in the protection of biodiversity and cultural resources. Such approach to national parks example, has given good results in both developed and underdeveloped countries: the United States, Sweden, Finland, China, Thailand, Australia,

Table 2
Linguistic values of the Saaty's scale.

	Saaty's scale	Triangular fuzzy number (TFN)	Definition of TFN		
			Bottom	Medium	Top
Equally preferred	1	$\tilde{1}$	1	1	1
Equally to moderately preferred	2	$\tilde{2}$	1	3/2	3/2
Moderately preferred	3	$\tilde{3}$	1	2	2
Moderately to strongly preferred	4	$\tilde{4}$	3	7/2	4
Strongly preferred	5	$\tilde{5}$	3	4	9/2
Strongly to very strongly preferred	6	$\tilde{6}$	3	9/2	5
Very strongly preferred	7	$\tilde{7}$	5	11/2	6
Very strongly to extremely preferred	8	$\tilde{8}$	5	6	7
Extremely preferred	9	$\tilde{9}$	5	7	9

Greece, Bulgaria, Montenegro, Turkey, Iran, Malaysia, Vietnam, Kenya, Taiwan (Shafer, 1999; Arabatzis and Grigorodis, 2010; Hong and Chan, 2010; Arnberger et al., 2012; Mayaka and Prasad, 2012; Liu et al., 2013; Ghorbani et al., 2015; Bulatović and Tripković Marković, 2015; Randle and Hoye, 2016; Kangas et al., 2016).

In the academic literature, there are researches of defining the strategies for the development of tourist destinations with different approaches of defining the key performances on the basis of SWOT analysis (Kurttila et al., 2000; Kajanus et al., 2004; Yuksel and Dagdeviren, 2007; Bojović and Plavša, 2011; Jeon and Kim, 2011; Sariisik et al., 2011; Zhang, 2012a; Reihanian et al., 2012; Zhang, 2012b; Bhatia, 2013; Vladi, 2014; Rauch et al., 2015).

In the application of a SWOT analysis as a tool for generating and ranking optimal strategies numerous tools for multi-criteria decision making have been developed lately, which have expanded its application and opened many opportunities for objective decision-making. Model of multi-criteria decision making that is often used for defining prioritization of strategies is the Analytic Network Process (ANP) (Saaty, 1996; Yuksel and Dagdeviren, 2007; Sevkli et al., 2012; Hsu et al., 2012; Kheirkhah et al., 2014; Shahabi et al., 2014). In recent years, hybrid SWOT - FANP method in fuzzy environment enables the most reliable results obtained (Chang and Huang, 2006; Promentilla et al., 2008; Lin and Hsu, 2011; Sevkli et al., 2012; Gorener et al., 2012; Lee, 2013; Wang et al., 2015; Chatterjee et al., 2015; Najafinasab et al., 2015; Toosi and Samani, 2016). This approach was also used in this study. Other methodologies or ranking can also be used, but in this study area they did not find their wider application. The proposed methodological framework gives brief instructions that could be a useful tool, especially in case of the national parks, where decision making challenges clearly occur.

In Table 1, additional overview of the relevant literature concerning different quantitative models that have been applied to the strategic management of the ecotourism in the national parks is presented in chronological order. Based on the detailed analysis of the previous studies, it could be stated that application of a SWOT analysis in combination with the ANP and FANP method has not been disused in detail manner for this research topic. The intention of this paper is to give a valuable scientific contribution by applying hybrid MCDM (SWOT-ANP in fuzzy environment) methodology which introduces a novel systematic approach to planning and managing the concept of ecotourism in national parks.

Recently, a large number of authors are engaged in the development of multi-criteria model MCDM for strategy prioritization, which

emphasizes the role of AHP and ANP methodologies (Yuksel and Dagdeviren, 2007; Gorener et al., 2012; Zaim et al., 2014; Zhü et al., 2016). ANP represents a generalized form of the AHP method which was developed by Thomas Saaty in 1996 (Saaty, 1996) with the purpose to eliminate the problem of dependence among criteria and/or alternatives in complex multi-criteria models (Yuksel and Dagdeviren, 2007; Shahabi et al., 2014). In addition to becoming a reliable tool for understanding complex decision problems, ANP approach, as stated by Zaim et al. (2014), also solves the problem of the limitation of linear hierarchical structure of the AHP method. The detailed ANP methodology was presented in Fig. 3a. What makes ANP method different from the other models and the reason why it has been applied to decision making on the NPDJ optimal strategy, is the fact that it represents an effective tool for modeling the functional dependencies among the criteria and alternatives - resulting in a higher stability of results. The structuring of the mentioned problem of decision making with functional interdependencies between clusters is seen as a network system, which enables defining network problems and forming a linear hierarchy as well as examining the influences among the network elements. Whereas, ANP approach allows modeling of complex levels and attributes' interdependences. Network dependence of elements contributes to better modeling of real problems, because most of the problems in the real world are not linear and feedback enables precise determination of the priority elements and greater troubleshooting quality (Yuksel and Dagdeviren, 2007).

Human perception and judgments are usually uncertain and unclear, which requires the introduction of fuzzification in the multi-criteria models (Sevkli et al., 2012). Therefore, with ANP methodology, application of fuzzy logic is greatly present, where instead of the discrete-exact scale of $1 \div 9$, for example, TFN scale can be used. TFN linguistic values are defined in Table 2 (Sevkli et al., 2012). In this way, fuzzy ANP methodology or brief FANP is being formed, which is minutely presented at each step in Fig. 3b.

Application of the crisp ANP methodology on the results of the SWOT analysis, which will be used in this study for phase 3 and 4 in a methodological framework (see Fig. 2), is described in detail in the literature (Yuksel and Dagdeviren, 2007; Živković et al., 2015). To apply the ANP and FANP on operations with matrices in order to determine the priority of identifying strategies based on the SWOT analysis, the following steps should be implemented as showed in Fig. 3 (Saaty and Takizawa, 1986; Lee and Kim, 2000; Yuksel and Dagdeviren, 2007).

4. Results

4.1. Suituation analysis (SWOT analysis)

The first two phases in the proposed methodological framework are focused on performing situation analysis (SWOT analysis) for NP Djerdap (see Fig. 2). The SWOT analysis of the National Park Djerdap was performed by taking in consideration several sources of information, such are: literature review, interviews and meetings with key stakeholders, the documentation of public importance for this region, the local database as well as the official data from NPDJ (Lovreta, 2007; "Official Gazette of RS", 2013; Panić and Lovren, 2014; Krasojević and Farkić, 2014). SWOT analysis as a tool for generating strategies has been widely used recently (Živković et al., 2015). This approach will also be used in this study.

Based on the results of the SWOT analysis, conducted in the case of tourist destination NPDJ, and by comparing the SWOT factors: strengths, weaknesses, opportunities and threats, as well as the sub factors within each factor, possible strategies for the future development ecotourism in NPDJ were defined. Based on considered objective strengths, weaknesses, opportunities and threats, SWOT criteria were defined within each of these factors and the results are presented in the form of a TOWS matrix in Table 3.

Table 3, besides internal (strengths and weaknesses) and external factors (opportunities and threats) presents a suggestion of possible strategies for sustainable development of NPDJ. Relying on the inner strength of enterprises using the identified opportunities from the environment, two SO strategy (max-max) are defined. Relying on the power of S_1, S_2, S_3 in order to exploit the opportunities O_1, O_3 from the environment SO_1 strategy is being proposed - Developing ecotourism brand with the involvement of internal and external stakeholders (Sayyed et al., 2013). By maximizing internal power S_3, S_4 and by maximum utilization of opportunities that come from O_2, O_4, O_6 market, strategy SO_2 is being defined - Creating joint eco-

tourism offer with the partners from the Romanian side supported by EU funds. Consolidating interests through mutual cooperation leads to the reduction of regional competition in the industry.

The proposed strategy ST_1 - Promotion and implementations of the EU standards regarding NP through engagement of scientific institutions and NGOs (Hong and Chan, 2010) relies on the advantages of S_1, S_2, S_3, S_4 in order to reduce T_1 threat which comes from the environment. Effective control of fulfilling environmental regulations and requirements in the National Park and his surroundings - ST_2 strategy is the optimal solution for reducing the impact of T_3, T_5, T_6 threats by maximization of internal strengths.

In order to reduce the influence of W_1 and W_6 threats relating to the lack of education on the development of tourism and the simultaneous environmental protection, by maximum utilization of opportunities O_3, O_4, strategy WO_1 can be realized - Education in the field of content ecotourism offer and its promotion (Reihanian et al., 2012). Strategy WO_2 - NP infrastructure organization according to EU standards represents a proposal to the solution used by opportunities O_4, O_6, O_7 in order to eliminate the influence of sub factor W_2.

And as the last strategy was proposed WT_1 - Professionalization of management. This proposed strategy aims to reduce the negative influence of threats: T_1, T_2, T_4, T_6, T_7 and weaknesses: W_1, W_3, W_6.

4.2. Results of proposed SWOT-FANP model

On the basis of SWOT - ANP hybrid model for prioritization of the development strategy, based on the results of SWOT factors, sub factors, defined strategies and a set goal of determining the best strategy, Fig. 4 shows the ANP working model for defining relations between SWOT factors and subfactors with the purpose of prioritization of defined strategies for sustainable development of ecotourism in NPDJ.

Further, in the paper, the problem of determining the priority among defined strategic options by using the ANP methodology was introduced in the fuzzy environment (Sevkli et al., 2012) and minutely presented in nine steps.

Table 3
TOWS matrix for the tourist destination NPDJ.

Internal factors		
Strengths (S)		**Weaknesses (W)**
S_1 -	Unique ecosystems and international importance of the protected bio and geo diversity values	W_1 - Lack of knowledge in the field of tourism and promotion of NP potential
S_2 -	Cultural - historical heritage of world values	W_2 - Insufficient infrastructure investment of the National Park for visitors
S_3 -	The favorable geographical position in the pan-European corridor VII and easy arrival from Belgrade airport	W_3 - Poor cooperation NP administration and the most important stakeholders
S_4 -	The hydropower potential of the Danube	W_4- Inadequate wastewater treatment and municipal landfills
S_5 -	Favorable conditions for organic production	W_5- Poor demographic situation W_6- Insufficient education of the population on the development of environmental awareness

| External factors				
Opportunities (O)	**SO - Strategy**		**WO - Strategy**	
O_1 - Creation of unique tourist product (brand)	SO_1 -	Developing ecotourism brand with the involvement of internal and external stakeholders	WO_1 -	Education in the field of content ecotourism offer and its promotion
O_2 - The potential of the Danube, which is an integral part of the NP	SO_2 -	Creating joint eco-tourism offer with the partners from the Romanian side supported by EU funds	WO_2 -	Arranging NP infrastructure to EU standards
O_3 - The development of SMEs in partnership with NP				
O_4 - Cross-border international cooperation and use of EU funds				
O_5 - Product offers local character (organic foods)				
O_6 - Investments Diaspora				
O_7 - The development of renewable				
Threats (T)	**ST - Strategy**		**WT - Strategy**	
T_1 - Slow Serbia's EU bid and disrespect of EU standards	ST_1 -	Promotion and implementations of the EU standards regarding NP through engagement of scientific institutions and NGOs	WT_1 -	Professionalization of management
T_2 - Unfavorable economic situation in the country	ST_2 -	Effective control of fulfilling environmental regulations and requirements in the National Park and his surroundings		
T_3 - Failure to follow regulations to protect sensitive sites and biodiversity in NP				
T_4 - Shadow economy around, and in the NP				
T_5 - Creating a bad image due to poor visitor experience with infrastructure NP				
T_6 - Unplanned use the resources of NP				
T_7 - The lack of interest of investors to invest in this region				
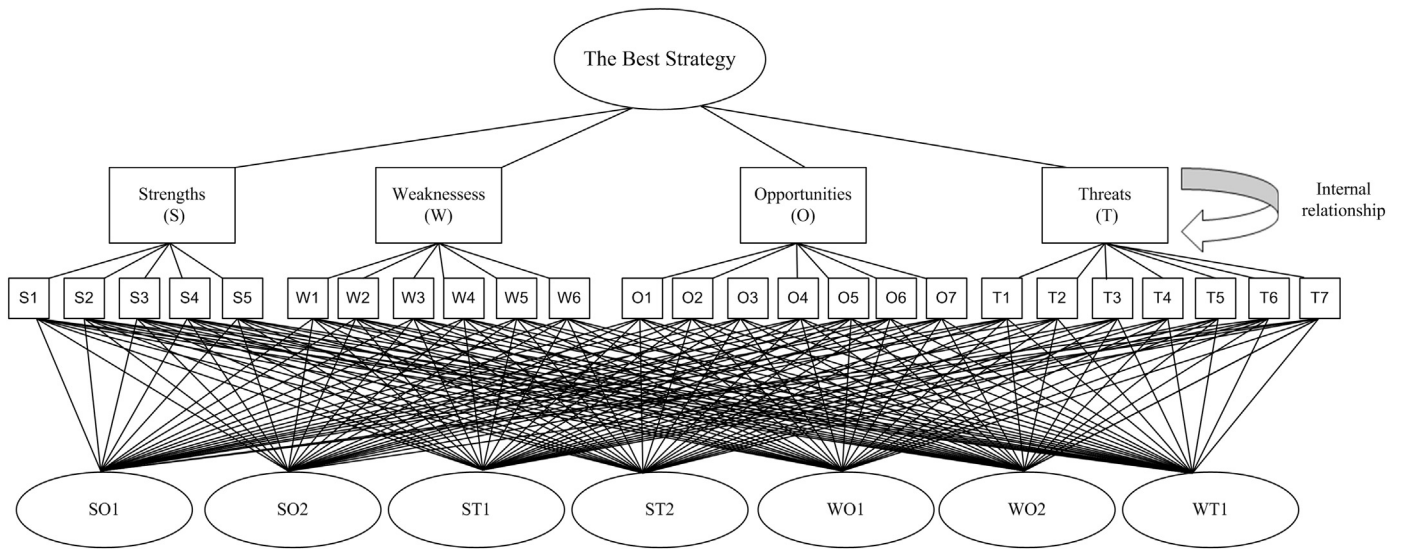
Fig. 4. ANP model for the selection of the best strategies of NPDJ.

Step 1. On the basis of the conducted SWOT analysis and based on the generation of the corresponding SWOT criteria and sub-criteria presented in Fig. 4 and defined in Table 3, the prioritization of the strategies (SO$_1$, SO$_2$, ST$_1$, ST$_2$, WO$_1$, WO$_2$, WT$_1$) is realized on the basis of the FANP approach (Sevkli et al., 2012).

Step 2. In this step the following SWOT criteria were compared: criteria of strengths (Strengths - S), weaknesses (Weaknesses - W), opportunities (Opportunities - O), and threats (Threats - T) relative to the fundamental objective of the ANP hierarchy (see Fig. 4), while at the same time inter-dependence between them was not considered. All estimates of the expert team were fuzzificated based on l, m and u values and then the fuzzy value of the relative weights of each SWOT criterion was determined, which is shown in Table 4.

This implies that the fuzzy matrix is defined as:

$$W_{\sim 1} = \begin{bmatrix} 0.317 & 0.384 & 0.392 \\ 0.183 & 0.183 & 0.178 \\ 0.317 & 0.295 & 0.292 \\ 0.183 & 0.138 & 0.138 \end{bmatrix}$$

Step 3. While taking into account the interdependence between SWOT criteria, the analysis of the impact of each SWOT criterion on other SWOT criteria was now carried out in this step using fuzzy scores of the expert team, obtained by fuzzification of exact scores.

It follows that the fuzzy matrix of interdependencies is equal to:

$$W_{\sim 2} = \begin{bmatrix} 1.000 & 1.000 & 1.000 & 0.333 & 0.460 & 0.460 & 0.454 & 0.557 & 0.571 & 0.454 & 0.496 & 0.531 \\ 0.333 & 0.199 & 0.199 & 1.000 & 1.000 & 1.000 & 0.321 & 0.291 & 0.286 & 0.225 & 0.125 & 0.147 \\ 0.333 & 0.454 & 0.454 & 0.333 & 0.319 & 0.319 & 1.000 & 1.000 & 1.000 & 0.321 & 0.379 & 0.322 \\ 0.333 & 0.347 & 0.347 & 0.333 & 0.221 & 0.221 & 0.225 & 0.143 & 0.143 & 1.000 & 1.000 & 1.000 \end{bmatrix}$$

Table 4
Pairwise comparison of SWOT groups without interdependences between them.

SWOT groups	S	W	O	T	TFN importance of SWOT factors		
					Bottom	Medium	Top
Strengths (S)	$\bar{1}$	$\bar{5}$	$\bar{1}$	$\bar{3}$	0.317	0.384	0.392
Weaknesses (W)		$\bar{1}$	$\bar{2}^{-1}$	$\bar{3}$	0.183	0.183	0.178
Opportunities (O)			$\bar{1}$	$\bar{3}$	0.317	0.295	0.292
Threats (T)				$\bar{1}$	0.183	0.138	0.138

Table 5
The importance of the criteria and sub-criteria of the SWOT analysis.

| SWOT groups - criteria	Importance of the SWOT criterion	SWOT sub-criteria	Local importance of SWOT sub-criterion	The overall importance of SWOT sub-criterion
Strengths - S	(0.302, 0.350, 0.357)	S1	(0.290, 0.359, 0.369)	(0.088, 0.126, 0.132)
		S2	(0.219, 0.248, 0.249)	(0.066, 0.087, 0.089)
		S3	(0.159, 0.169, 0.166)	(0.048, 0.059, 0.059)
		S4	(0.240, 0.154, 0.152)	(0.073, 0.054, 0.054)
		S5	(0.092, 0.069, 0.064)	(0.028, 0.024, 0.023)
Weaknesses - W	(0.216, 0.181, 0.180)	W1	(0.263, 0.336, 0.348)	(0.057, 0.061, 0.063)
		W2	(0.221, 0.244, 0.248)	(0.048, 0.044, 0.045)
		W3	(0.188, 0.173, 0.173)	(0.041, 0.031, 0.031)
		W4	(0.132, 0.114, 0.108)	(0.029, 0.021, 0.019)
		W5	(0.108, 0.074, 0.069)	(0.023, 0.013, 0.012)
		W6	(0.088, 0.059, 0.054)	(0.019, 0.011, 0.010)
Opportunities - O	(0.271, 0.290, 0.286)	O1	(0.257, 0.313, 0.324)	(0.070, 0.091, 0.058)
		O2	(0.205, 0.231, 0.237)	(0.056, 0.067, 0.043)
		O3	(0.131, 0.117, 0.114)	(0.035, 0.034, 0.021)
		O4	(0.153, 0.147, 0.146)	(0.042, 0.043, 0.026)
		O5	(0.095, 0.083, 0.078)	(0.026, 0.024, 0.014)
		O6	(0.095, 0.063, 0.060)	(0.026, 0.018, 0.011)
		O7	(0.064, 0.044, 0.041)	(0.017, 0.013, 0.007)
Threats - T	(0.211, 0.179, 0.177)	T1	(0.176, 0.167, 0.168)	(0.037, 0.030, 0.030)
		T2	(0.253, 0.310, 0.320)	(0.053, 0.055, 0.058)
		T3	(0.202, 0.228, 0.233)	(0.043, 0.041, 0.042)
		T4	(0.096, 0.079, 0.074)	(0.020, 0.014, 0.013)
		T5	(0.131, 0.115, 0.113)	(0.028, 0.021, 0.020)
		T6	(0.079, 0.058, 0.053)	(0.017, 0.010, 0.010)
		T7	(0.063, 0.043, 0.039)	(0.013, 0.008, 0.007)
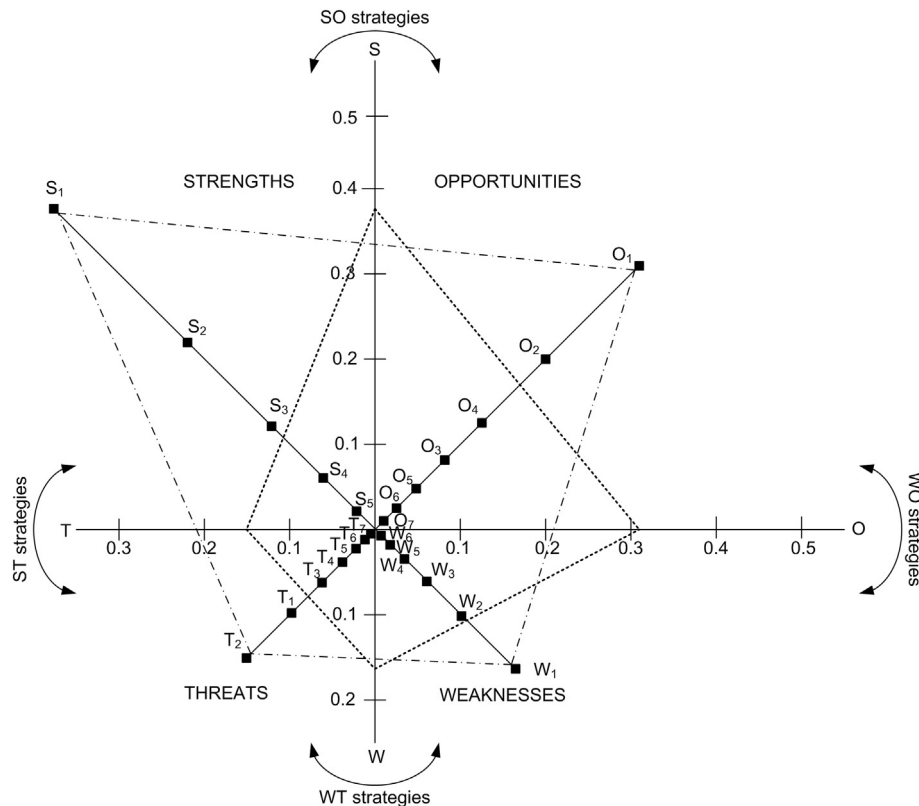
Fig. 5. Graphical representation of the results of pairwise comparisons of SWOT factors and sub-factors based on ANP methodology.

Table 6

Elements of the fuzzy matrix W̄₄.

Strategies	SWOT Sub-criteria																								
	S_1	S_2	S_3	S_4	S_5	W_1	W_2	W_3	W_4	W_5	W_6	O_1	O_2	O_3	O_4	O_5	O_6	O_7	T_1	T_2	T_3	T_4	T_5	T_6	T_7
B - values																									
SO_1	0.143	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.137	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143
SO_2	0.143	0.143	0.172	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.233	0.143	0.166	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143
ST_1	0.143	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.137	0.143	0.166	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143
ST_2	0.143	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.118	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143
WO_1	0.143	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.137	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143
WO_2	0.143	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.118	0.143	0.110	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143
WT_1	0.143	0.143	0.125	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.118	0.143	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143	0.143
M - values																									
SO_1	0.171	0.171	0.137	0.122	0.150	0.125	0.095	0.137	0.167	0.206	0.176	0.166	0.124	0.155	0.146	0.188	0.188	0.150	0.133	0.105	0.117	0.150	0.100	0.125	0.143
SO_2	0.116	0.116	0.199	0.254	0.150	0.125	0.095	0.137	0.083	0.095	0.176	0.166	0.274	0.155	0.217	0.188	0.188	0.100	0.133	0.158	0.176	0.150	0.176	0.187	0.143
ST_1	0.171	0.171	0.137	0.177	0.150	0.250	0.137	0.199	0.167	0.140	0.176	0.166	0.173	0.155	0.217	0.125	0.125	0.150	0.200	0.158	0.117	0.150	0.087	0.125	0.143
ST_2	0.171	0.171	0.095	0.122	0.150	0.125	0.199	0.095	0.083	0.140	0.176	0.111	0.083	0.105	0.102	0.125	0.125	0.150	0.133	0.158	0.117	0.100	0.176	0.125	0.143
WO_1	0.138	0.138	0.173	0.122	0.150	0.125	0.137	0.163	0.167	0.140	0.087	0.143	0.138	0.105	0.089	0.125	0.125	0.150	0.133	0.158	0.142	0.150	0.176	0.151	0.143
WO_2	0.149	0.149	0.163	0.122	0.150	0.125	0.137	0.173	0.167	0.140	0.087	0.135	0.119	0.105	0.081	0.125	0.125	0.150	0.133	0.158	0.151	0.150	0.176	0.160	0.143
WT_1	0.084	0.084	0.096	0.081	0.150	0.125	0.199	0.096	0.167	0.140	0.122	0.113	0.089	0.221	0.148	0.125	0.125	0.150	0.133	0.105	0.179	0.150	0.110	0.127	0.143
T - values																									
SO_1	0.171	0.171	0.137	0.121	0.150	0.125	0.095	0.137	0.167	0.206	0.176	0.166	0.122	0.155	0.145	0.188	0.188	0.150	0.133	0.105	0.117	0.150	0.100	0.125	0.143
SO_2	0.116	0.116	0.199	0.258	0.100	0.125	0.095	0.137	0.083	0.095	0.176	0.166	0.287	0.155	0.220	0.188	0.188	0.100	0.133	0.158	0.176	0.150	0.176	0.187	0.143
ST_1	0.171	0.171	0.137	0.176	0.150	0.250	0.137	0.199	0.167	0.140	0.176	0.166	0.171	0.155	0.220	0.125	0.125	0.150	0.200	0.158	0.117	0.150	0.087	0.125	0.143
ST_2	0.171	0.171	0.095	0.121	0.150	0.125	0.199	0.095	0.083	0.140	0.176	0.111	0.081	0.105	0.102	0.125	0.125	0.150	0.133	0.158	0.117	0.100	0.176	0.125	0.143
WO_1	0.138	0.138	0.173	0.121	0.150	0.125	0.137	0.163	0.167	0.140	0.087	0.143	0.136	0.105	0.089	0.125	0.125	0.150	0.133	0.158	0.142	0.150	0.176	0.151	0.143
WO_2	0.149	0.149	0.163	0.121	0.150	0.125	0.137	0.173	0.167	0.140	0.087	0.135	0.116	0.105	0.078	0.125	0.125	0.150	0.133	0.158	0.151	0.150	0.176	0.160	0.143
WT_1	0.084	0.084	0.096	0.079	0.150	0.125	0.199	0.096	0.167	0.140	0.122	0.113	0.086	0.221	0.147	0.125	0.125	0.150	0.133	0.105	0.179	0.150	0.110	0.127	0.143

Step 4. In this step, the calculation of the matrix of interdependencies is conducted with the aim to correct the fuzzy relative weights of SWOT criteria defined in step 2 of FANP procedure, which implies that:

$$
W_{\sim SWOTcriteria} = W_{\sim 2} \times w_{\sim 1} = \begin{bmatrix} 1.000 & 1.000 & 1.000 & 0.333 & 0.460 & 0.460 & 0.454 & 0.557 & 0.571 & 0.454 & 0.496 & 0.531 \\ 0.333 & 0.199 & 0.199 & 1.000 & 1.000 & 1.000 & 0.321 & 0.291 & 0.286 & 0.225 & 0.125 & 0.147 \\ 0.333 & 0.454 & 0.454 & 0.333 & 0.319 & 0.319 & 1.000 & 1.000 & 1.000 & 0.321 & 0.379 & 0.322 \\ 0.333 & 0.347 & 0.347 & 0.333 & 0.221 & 0.221 & 0.225 & 0.143 & 0.143 & 1.000 & 1.000 & 1.000 \end{bmatrix}
$$

$$
\times \begin{bmatrix} 0.317 & 0.384 & 0.392 \\ 0.183 & 0.183 & 0.178 \\ 0.317 & 0.295 & 0.292 \\ 0.183 & 0.138 & 0.138 \end{bmatrix}
$$

$$
= \begin{bmatrix} 0.302 & 0.350 & 0.357 \\ 0.216 & 0.181 & 0.180 \\ 0.271 & 0.290 & 0.286 \\ 0.211 & 0.179 & 0.177 \end{bmatrix}
$$

Steps 5 and 6. By using fuzzificated comparison matrices, in step 5 the local fuzzy priorities of the SWOT sub-criteria are defined. Following previous step, in step 6 the global fuzzy priority of the SWOT sub-criteria is determined and the obtained values are shown in Table 5.

Comparing SWOT factors and sub-factors by applying ANP methodology for Saaty's crisp numbers in Table 2, crisp values of weight importance of SWOT factors and sub-factors were obtained, which are presented in Fig. 5. According to the results the greatest weight importance of SWOT criteria has Strength factor (0.376), followed by Opportunities (0.310), a quite smaller importance have Weaknesses (0.163) and Threats (0.151) factors. Sub-factors are arranged in such fashion that sub-factor which has the highest global priority represents the outside point on the graph. The following sub-factors have the dominant influence: S_1 - Unique ecosystems and international importance of the protected bio and geo diversity values (0.416 - local importance) and O_1 - Creation of unique tourist product (brand) (0.354 - local importance) as positive sub-criteria. And W_1 - Lack of knowledge in the field of tourism and promotion of NP potential (0.379 - local character) and T_2 - Bad economic situation in the country (0.350 - local importance) as negative sub-criteria.

This implies that the fuzzy matrix $W_{\sim 3}$ is:

$$
W_{\sim 3} = W_{SWOTsub-criteria\ (global)} = \begin{bmatrix} 0.088 & 0.126 & 0.132 \\ 0.066 & 0.087 & 0.089 \\ 0.048 & 0.059 & 0.059 \\ 0.073 & 0.054 & 0.054 \\ 0.028 & 0.024 & 0.023 \\ 0.057 & 0.061 & 0.063 \\ 0.048 & 0.044 & 0.045 \\ 0.041 & 0.031 & 0.031 \\ 0.029 & 0.021 & 0.019 \\ 0.023 & 0.013 & 0.012 \\ 0.019 & 0.011 & 0.010 \\ 0.070 & 0.091 & 0.058 \\ 0.056 & 0.067 & 0.043 \\ 0.035 & 0.034 & 0.021 \\ 0.042 & 0.043 & 0.026 \\ 0.026 & 0.024 & 0.014 \\ 0.026 & 0.018 & 0.011 \\ 0.017 & 0.013 & 0.007 \\ 0.037 & 0.030 & 0.030 \\ 0.053 & 0.055 & 0.058 \\ 0.043 & 0.041 & 0.042 \\ 0.020 & 0.014 & 0.013 \\ 0.028 & 0.021 & 0.020 \\ 0.017 & 0.010 & 0.010 \\ 0.013 & 0.008 & 0.007 \end{bmatrix}
$$

Step 7. Determination of fuzzy relative importance weights of alternative strategies relative to the each SWOT sub-criterion and the formation of the matrix, which is given in Table 6.

Step 8. Comprehensive fuzzy priority of the alternative strategies is defined by the following fuzzy matrix:

$$
W_{\sim alternatives} = \begin{bmatrix} SO1 \\ SO2 \\ ST1 \\ ST2 \\ WO1 \\ WO2 \\ WT1 \end{bmatrix} = W_{4\sim} \times W_{\sim SWOTsub-criteria\ (global)} = \begin{bmatrix} 0.142 & 0.145 & 0.129 \\ 0.151 & 0.159 & 0.140 \\ 0.143 & 0.167 & 0.150 \\ 0.141 & 0.133 & 0.122 \\ 0.142 & 0.139 & 0.126 \\ 0.140 & 0.139 & 0.126 \\ 0.140 & 0.119 & 0.105 \end{bmatrix}
$$

Step 9. Finally, the final strategy prioritization is obtained by converting the TFN values from the previous fuzzy matrix into the crisp values which resulted in the following matrix:

$$W_{alternatives} = \begin{bmatrix} SO1 \\ SO2 \\ ST1 \\ ST2 \\ WO1 \\ WO2 \\ WT1 \end{bmatrix} = \begin{bmatrix} 0.139 \\ 0.150 \\ 0.153 \\ 0.132 \\ 0.135 \\ 0.135 \\ 0.121 \end{bmatrix}$$

Ultimately, Table 7 presents a comparative overview of the ranking results for both applied MCDM methodologies ANP and FANP.

5. Discussion of results

The results, shown in Table 7, obtained by using the ANP and FANP methodology for prioritizing the strategies of sustainable development of ecotourism in NPDJ, indicate the following sequence strategy:

$$ST_1 \rightarrow SO_2 \rightarrow SO_1 \rightarrow WO_1 \rightarrow WO_2 \rightarrow ST_2 \rightarrow WT_1$$

Order in the prioritization of defined strategies was determined by the size of the normalized weight factor w_i for: ST_1 (0.183 and 0.153); SO_2 (0.163 and 0.150); SO_1 (0.149 and 0.139); WO_1 (0.138 and 0.135); WO_2 (0.135 and 0.135); ST_2 (0.129 and 0.132) and WT_1 (0.104 and 0.121). The first values for w_i in parentheses refer to the ANP and the second ones to FANP results. It is obvious that the experts were objective and coexisting in their assessment and that the introduction of fuzzy logic gave the same results that indicate the correctness of the methodology applied.

Based on the advantages of strategy with the obtained highest priority, the performances of the organization will start to grow over the time. However, each strategy in its life cycle reaches some limits so the company has to apply new strategy which allows further growth of performances. Therefore, the management has to consider a plan for future actions in order to achieve sustainable development. The chronological realization plan for the considered strategies is given in Fig. 6, based on the results of the applied hybrid model that could enable long term sustainability of ecotourism concept in NPDJ.

Based on the resulting priorities for the defined strategies, initially ST_1 and SO_2 strategies should be realized simultaneously, due to the approximate values of obtained weights in Table 7. These strategies provide the expected limit in improving the performance of the study area in the field of ecotourism. Moreover, their realization will enable the preconditions for the implementations of the following strategies. Given that ecotourism as a special form of tourism relies primarily on the sustainable use of NP natural resources is exemplified by positive references in the world (Eagles and McCool, 2002; Shen and Redclift, 2012; Xu and Fox, 2014). According to the established model for prioritization of defined strategies, the priority application of ST_1 and SO_2 strategies, aims to make appropriate promotion of ecotourism in NPDJ and create a positive climate for support of the main stakeholders to make NPDJ become a recognized tourist destination in this part of Europe. In cooperation with institutions from Romania, it is realistic to expect provision of initial funding from the EU funds, which can be a powerful driving force for regional stakeholders to support this project. After the limits reached by applying ST_1 and SO_2 strategies, preconditions for the implementation of key strategy SO_1 are being created - developing ecotourism brand with the involvement of internal and external stakeholders can be included, given that the application of the previous strategies (ST_1 and SO_2), created necessary climate and financial resources for this. During the application of the key strategy SO_1, it is necessary to start the implementation of WO_1 to overcome key weaknesses - lack of inadequate knowledge in the field of ecotourism. A good answer to this might be the training of a certain number of staff at the NBA level in acclaimed schools in this area. During the development process of improving NPDJ performances, it is necessary that the funds provided by applying the previous strategies would be used for NPDJ development of infrastructure according to EU standards so that it would become an interesting ecotourism destination for both domestic and foreign tourists (implementation strategy WO_2). When the results of the largest number of performance improvements of NPDJ become visible, scientific institutions and NGOs could put pressure on the state authorities to strictly comply with

Table 7
The importance and ranking of strategies according to the AHP and FAHP methodologies.

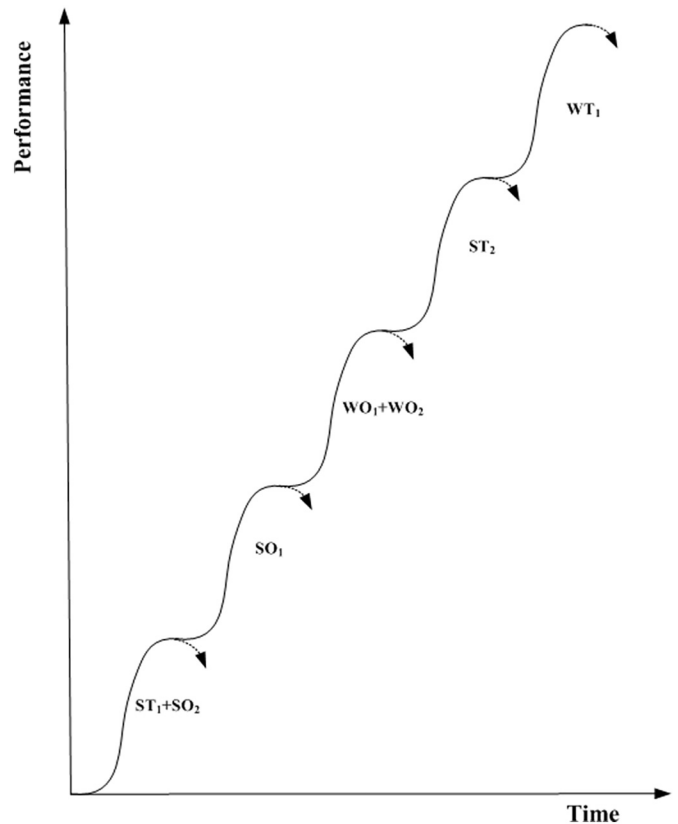| Strategy	ANP		FANP	
	Weights (w_j)	Rank	Weights (w_j)	Rank
SO_1	0.149	3	0.139	3
SO_2	0.163	2	0.15	2
ST_1	0.183	1	0.153	1
ST_2	0.129	6	0.132	6
WO_1	0.138	4	0.135	4
WO_2	0.135	5	0.135	5
WT_1	0.104	7	0.121	7

Fig. 6. A chronological realization of proposed strategies in case of NPDJ.

environmental regulations in NPDJ and its environment as an essential prerequisite for the sustainability of ecotourism in the NPDJ (implementation strategy ST$_2$). Finally, by implementation of mentioned strategies all NPDJ resources would be brought to an acceptable level of organization and visibility of most NPDJ performances. This fact can lead to necessity to involve professional managers that will be capable to govern NPDJ to the continuous improvement of use and protection of NPDJ resources with the simultaneous sustainable economic development of ecotourism in this NP. Furthermore, the implementation of the proposed management plan in the NPDJ, could be a great opportunity for current employees and managers in NPDJ to gather valuable professional experience and qualification in this field of business.

6. Conclusions

Conducted studies show that for the sustainability of NPDJ ecotourism would be the most appropriate industry, which could contribute to the sustainability and its further development. In a country with limited economic resources, such as Serbia, project development of sustainable ecotourism in NPDJ requires a strategic approach based on step by step principle which can lead to continuous improvement of performances and realization of the economic sustainability concept.

On the basis of the SWOT analysis results, it can be concluded with great confidence that NPDJ has the potential to become a recognized ecotourism destination in Europe and beyond. Cooperation with Romania - on the other bank of the Danube with resources at the level of protection of the nature park as well as the creation of a common touristic brand (bearing in mind that Romania has been already the EU member and that Serbia is using pre-accession funds), provides a great opportunity to rapidly improve performances of this tourist destination.

During the realization of ideas of NPDJ as an ecotourism destination, it is realistic to expect some resistance from employees, primarily in NPDJ as well as from the local environment. At the beginning of this project, it is necessary to carry out continuous training of employees in NPDJ and local residents on the benefits of ecotourism as well as the necessary changes in behavior so that the whole project would be sustainable. In parallel with this, it is necessary to continue studying the influence of the presence of tourists in the NPDJ territory on the NPDJ's biodiversity in order to define appropriate content of ecotourism activities in the territory of NP. Finally, the obtained experience in the implementation of ecotourism in NPDJ should be applied in other NPs in Serbia and in the wider environment as well.

Based on the obtained facts, it can be concluded that the proposed SWOT-ANP model in fuzzy environment provides an operational framework for sustainable development of the ecotourism concept in NPDJ. Additionally, one of the crucial contributions of this research is the proposed step-by-step realization of the plan for the strategies by taking in consideration their performance limits i.e. their life cycle.

Finally, the authors believe that this research gives the important contribution to the state of art literature through the validation of the proposed model in the case of strategic management of ecotourism in national parks. Moreover, the practical implication of the proposed model offers the possibility for the relevant stakeholders in this region to achieve some of long term objectives defined by Management plan for NPDJ until 2026, by realizing the generated strategies according to the proposed chronological plan.

Table 1 Literature overview of previous researches regarding study topic.

Table 2 Linguistic values of the Saaty's scale.

Table 3 TOWS matrix for the tourist destination NPDJ.

Table 4 Pairwise comparison of SWOT groups without interdependences between them.

Table 5 The importance of the criteria and sub-criteria of the SWOT analysis.

Table 6 Elements of the fuzzy matrix.

Table 7 The importance and ranking of strategies according to the AHP and FAHP methodologies.

References

Akbulak, C., Cengiz, T., 2014. Determining ecotourism strategies using A'WOT hybrid method: case study of Troia Historical National Park, Çanakkale, Turkey. Int. J. Sust. Dev. World 21 (4), 380–388.
Arabatzis, G., Grigorodis, E., 2010. Visitor's satisfaction, perceptions and gap analysis: the case of Dadia - Lefkimi - Souflion National Park. Forest Policy Econ. 12, 163–172.
Arnberger, A., Eder, R., Allex, B., Starl, P., Burns, R.C., 2012. Relationships between national - park affinity and attitudes towards protected area management of visitors to the Gesaeuse National Park, Austria. Forest Policy Econ. 19, 48–55.
Batabyal, A.A., 2016. Accessibility, vulnerability and resilience in a stochastic model of sustainable ecotourism. Transport. Res. D 43, 71–81.
Benitez, S., 2001. Visitor use fees and concession systems in protected areas: Galapagos National Park case study. Unpublished Report Prepared for the Nature Conservancy (Arlington, Virginia).
Bernard, F., Groot, R., Campos, J.-J., 2009. Valuation of tropical forest services and mechanisms to finance their conservation and sustainable use: a case study of Tapanti National Park, Costa Rica. For. Policy Econ. 11 (3), 174–183.
Bhatia, A., 2013. SWOT analysis of Indian tourism industry. IJAIEM. 2 (12), 44–49.
Biglarfadafan, M., Danehkar, A., Pourebrahim, S., Shabani, A.A., Moeinaddini, M., 2016. Application of strategic fuzzy assessment for environmental planning; case of bird watch zoning in wetlands. Open J. Geol. 6, 1380–1400.
Björk, P., 2000. Ecotourism from a conceptual perspective, an extended definition of a unique tourism form. Int. J. Tour. Res. 2 (3), 189–202.
Bojović, G., Plavša, J., 2011. SWOT analysis of tourism on Kopaonik and the spas of its piedmont. Tourizam 15 (3), 109–118.
Buckley, R., 2004. Environmental Impacts of Ecotourism. CABI Publishing, Wallingford.
Bulatović, I., Tripković Marković, A., 2015. Strategic Management of Tourism in the National Parks (case: National Park Skadar Lake). Tourism. 19 (3), 127–138.
Ceballos-Lascuráin, H., 1996. Tourism, Ecotourism and Protected Areas: The State of Nature Based Tourism Around the World and Guidelines for Its Development. IUCN, The World Conservation Union, Gland, Switzerland, and Cambridge, UK.
Chan, R., Bhatta, K., 2013. Ecotourism planning and sustainable community development: theoretical perspectives for Nepal. SAJTH 6 (1), 69–96.
Chang, H.H., Huang, W.C., 2006. Application of a quantification SWOT analytical method. Math. Comput. Sci. 43, 158–169.
Chatterjee, K., Bandyopadhyay, A., Ghosh, A., Kar, S., 2015. Assessment of environmental factors causing wetland degradation, using Fuzzy Analytic Network Process: a case study on Keoladeo National Park, India. Ecol. Model. 316, 1–13.
Chiu, Y.-T.H., Lee, W.-I., Chen, T.-H., 2014. Environmentally responsible behavior in ecotourism: antecedents and implications. Tour. Manag. 40, 321–329.
Cobbinah, P.B., 2015. Contextualizing the meaning of ecotourism. Tour. Manag. Perspect. 16, 179–189.
Daroudi, M.R., Daroudi, S., 2015. Assessment and evaluation of ecotourism development with using SWOT-FANP technique (case study: Ramsar City). Int. J. Rev. Life. Sci. 5 (7), 15–25.
Das, M., Chatterjee, B., 2015. Ecotourism: a panacea or a predicament? Tour. Manag. Perspect. 14, 3–16.
Drumm, A., Moore, A., 2005. Ecotourism Development - a Manual for Conservation Planners and Managers, an Introduction to Ecotourism Planning. 2nd edition. Elsevier, Arlington.
Eagles, P.F.J., McCool, S., 2002. Tourism in National Parks and Protected Areas: Planning and Management. CABI, Wallingford.
EU Directive 79/409/ECC, 1979. Retrived from. http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm.
Fennell, D., 2008. Ecotourism. third ed. Routledge, London.
Ghorbani, A., Raufirad, V., Rafiani, P., Azadi, H., 2015. Ecotourism sustainable develoipment strategies using SWOT and QSPM model: a case study of Kaji Namakzar Wetland, South Khorsan Province, Iran. Tour. Manag. Perspect. 16, 290–297.
Gorener, A., Toker, K., Ulucay, K., 2012. Application of combined SWOT and AHP: a case study for a manufacturing firm. Procedia Soc. Behav. Sci. 58, 1525–1534.
Grošelj, P., Hodges, D., Stirn, L.Z., 2016. Participatory and multi-criteria analysis for forest (ecosystem) management: a case study of Pohorje, Slovenia. Forest Policy Econ. 71, 80–86.
Hamadouche, M.A., Mederbal, K., Kouri, L., Regagba, Z., Fekir, Y., Anteur, D., 2014. GIS-based multicriteria analysis: an approach to select priority areas for preservation in the Ahaggar National Park, Algeria. Arab. J. Geosci. 7, 419–434.

Haukeland, J.V., Grue, B., Veisten, K., 2010. Turning national parks into tourist attractions: nature orientation and quest for facilities. Scand. J. Hosp. Tour. 10 (3), 248–271.

Honey, M., 2008. Ecotourism and Sustainable Development: Who Owns Paradise? second ed. Island Press, Washington, D.C.

Hong, C.-W., Chan, N.-W., 2010. Strength-weakness-opportunities-threats analysis of Penang National Park for strategic ecotourism management. World App. Sci. J. 10, 136–145.

Hovardas, T., Korfiatis, K., 2008. Framing environmental policy by the local press: case study from the Dadia Forest Reserve, Greece. Forest Policy Econ. 316–325.

Hsu, T.-H., Hung, L.-C., Tang, J.-W., 2012. A hybrid ANP evaluation model for electronic service quality. Appl. Soft Comput. 12 (1), 72–81.

Jeon, Y.A., Kim, J.S., 2011. An application of SWOT-AHP to develop a strategic planning for a tourist destination. Proc. Graduate Students Research Conference. Texas Tech. University. Poster 7.

Jozi, S.A., Rezayan, S., Irankhahi, M., Shakeri, M., 2011. Case study: implementation of indoor recreation in Varjin protected area-Iran. J. Nat. Environ. 63, 329–345.

JP Nacionalni Park Djerdap, 2012. Plan upravljanja područjem Nacionalnog parka Djerdap (2011 − 2020): Donji Milanovac. Retrived from. http://www.npdjerdap.org/wp-content/uploads/2014/12/ppu_npdj_2011_2012.pdf.

Kajanus, M., Kangas, J., Kurttiula, M., 2004. The use of value focused thinking the A'WOT hybriud method in tourism management. Tour. Manag. 25, 499–506.

Kangas, J., Kajanus, M., Leskinen, P., Kurttila, M., 2016. Incorporating MCDS and voting into SWOT - basic idea and experiences. Serb. J. Manag. 11 (1), 1–13.

Ke, L., 2012. The weakness and innovation of China Eco-tourism. International Conference on Solid State Devices and Materials Science, Physics Procedia. 25, pp. 953–957.

Kerstetter, D.L, Hou, J.-S., Lin, C.-H., 2004. Profiling Taiwanese ecotourists using a behavioral approach. Tour. Manag. 25 (4), 491–498.

Kheirkhah, A., Babaeianpour, M., Bassiri, P., 2014. Development of a hybrid method based on fuzzy PROMETHEE and ANP in the framework of SWOT analysis for strategic decisions. Intl. Res. J. Appl. Basic. Sci. 8 (4), 504–515.

Krasojević, B., Farkić, J., 2014. Analiza potencijala za održivi turizam sa biznis planom nacionalnog parka Djerdap. Impresum, Beograd.

Kurttila, M., Pesonen, M., Kangas, J., Kajanus, M., 2000. Utilizing the analytic hierarchy process (AHP) in SWOT analysis-a hybrid method and its application to a forest-certification case. Forest Policy Econ. 1 (1), 41–52.

La Page, W., 2010. Rethinking Park Protection: Treading the Uncommon Ground of Environmental Beliefs. CABI, Wallingford.

Lee, T.H., 2009. A structural model to examine how destination image, attitude and motivation affect the future behavior of tourists. Leis. Sci. 31 (3), 215–236.

Lee, Y.-H., 2013. Application of a SWOT-FANP method. Technol. Econ. Dev. Econ. 19 (4), 570–592.

Lee, W., Kim, S.H., 2000. Using analytic network process and goal programming for interdependent information system project selection. Comput. Oper. Res. 27, 367–382.

Lenao, M., Basupi, B., 2016. Ecotourism development and female empowerment in Botswana: a review. Tour. Manag. Perspect. 18, 51–58.

Lin, L.-Z., Hsu, T.H., 2011. Designing a model of FANP in brand image decision-making. Appl. Soft Comput. 11 (1), 561–573.

Liu, C., Li, J., Pechacek, P., 2013. Current trends of ecotourism in China's nature reserves: a review of the Chinese literature. Tour. Manag. Perspect. 7, 16–24.

Lovreta, S., 2007. Master plan turističke destinacije "Donje podunavlje". Ekonomski fakultet, Beograd.

Luo, F., Moyle, B., Bao, J., Zhong, Y., 2016. The role of institutions in the production of space for tourism: National Forest Parks in China. Forest Policy Econ. 47–55.

Management Plan for the National Park Djerdap for the period from 2017 to 2026, 2016. (Donji Milanovac)

Masberg, B.A., Morales, N., 1999. A case analysis of strategies in ecotourism development. Aquat. Ecosyst. Health Manag. 2, 289–300.

Mayaka, M.A., Prasad, H., 2012. Tourism in Kenya: an analysis of strategic issues and challenges. Tour. Manag. Perspect. 1, 48–56.

Moharramnejad, N., Rahnamai, M.T., Dorbeiki, M., 2013. Development of environmental strategies for sustainable tourism in an Iranian national park. Eur. J. Exp. Biol. 3 (1), 153–160.

Monavari, S.M., Farshchi, P., Ohadi, S., 2010. Environmental strategies of nature tourism in biosphere reserves: a case study of Miankaleh, Iran. J. Food Agric. Environ. 8, 353–357.

Najafinasab, F., Karbassi, A.R., Ghoddousi, J., 2015. Fuzzy analytic network process approach to evaluate land and sea criteria for land use planning in coastal areas. Ocean Coast. Manag. 116, 368–381.

Nepal, S.K., 2004. Indigenous ecotourism in Central British Columbia: the potential for building capacity in the Tl'azt'en Nations Territories. J. Ecotourism 3 (3), 173–194.

Nicula, V., Spanu, S., Neagu, R.E., 2013. Regional tourism development in Romania consistency with policies and strategies developed at EU level. Proc. Econ. Finan. 6, 530–541.

Nouri, J., Arjmandi, R., Moshiri, S.P., 2012. Strategic management for sustainable ecotourism in darabad region in Tehran, Iran. Asian J. Chem. 24 (5), 2265–2270.

Okan, T., Köse, N., Arifoğlu, E., Köse, C., 2016. Assessing ecotourism potential of traditional wooden architecture in rural areas: the case of Papart Valley. Sustain 8 (10):974. http://dx.doi.org/10.3390/su8100974.

Öztürk, S., 2015. Determining management strategies for the Sarikum Nature Protection Area. Environ. Monit. Assess. 187, 113.

Panić, N., Lovren, V.O., 2014. Ekoturizam kao integralni deo upravljanja nacionalnim parkom Djerdap. Zavod za zaštitu prirode Srbije, Beograd.

Promentilla, M.A.B., Furuichi, T., Ishii, K., Tanikawa, N., 2008. A fuzzy analytic network process for multi-criteria evaluation of contaminated site remedial countermeasures. J. Environ. Manag. 88 (3), 479–495.

Puhakka, R., Saarinen, J., 2013. New role of tourism in National Park Planning in Finland. J. Environ. Dev. 22 (4), 411–434.

Randle, E., Hoye, R., 2016. Stakeholder perception of regulating commercial tourism in Victorian National Parks, Australia. Tour. Manag. 54, 138–149.

Rauch, P., Wolfsmayr, U., Borz, S.A., Triplat, M., Krajnc, N., Kolck, M., Oberwimmer, R., Ketikidis, C., Vasiljevic, A., Stauder, M., Mühlberg, C., Derczeni, R., Oravec, M., Krissakova, I., Handlos, M., 2015. SWOT analysis and strategy development for forest fuel supply chains in South East Europe. Forest Policy Econ. 61, 87–94.

Reihanian, A., Mahmood, N.Y.B., Kahrom, E., Him, T.W., 2012. Sustainable tourism development strategy by SWOT analisys: Boujagh National Park, Iran. Tour. Manag. Perspect. 4, 223–228.

Ross, S., Wall, G., 1999. Ecotourism: towards congruence between theory and practice. Tour. Manag. 20 (1), 123–132.

Saaty, T.L., 1996. Decision Making with Dependence and Feedback: The Analytic Network Process. 1st ed. RWS Publications, Pittsburgh.

Saaty, T.L., Takizawa, M., 1986. Dependence and independence: from linear hierarchies to nonlinear networks. Eur. J. Oper. Res. 26, 229–237.

Santarem, F., Silva, R., Santos, P., 2015. Assessing ecotourism potential of hiking trails: a framework to incorporate ecological and cultural textures and seasonality. Tourism Manage Persp. 190–206.

Sariisik, M., Turkay, O., Akova, O., 2011. How to manage yacht tourism in Turkey: a SWOT analysis and related strategies. Proc. Soc. Behav. Sci. 24, 1014–1025.

Sayyed, M.R.G., Mansoori, M.S., Jaybhaye, R.G., 2013. SWOT analysis of Tandooreh National Park (NE Iran) for sustainable ecotourism. Proc. Int. Aca. Ecol. Environ. Sci. 3 (4), 296–305.

Selby, A., Petäjistö, L., Huhtala, M., 2011. The realisation of tourism business opportunities adjacent to three national parks in southern Finland: entrepreneurs and local decision-makers matter. Forest Policy Econ. 13 (6), 446–455.

Sevkli, M., Oztekin, A., Uysal, O., Torlak, G., Turkyilmaz, A., Delen, D., 2012. Development of a fuzzy ANP based SWOT analysis for the airline industry in Turkey. Expert Syst. Appl. 39, 14–24.

Shafer, C., 1999. US National Park Buffer Zones: historical, scientific, social, and legal aspects. Environ. Manag. 23 (1), 49–73.

Shahabi, R.S., Basiri, M.H., Kahag, M.R., Zonouzi, S.A., 2014. An ANP-SWOT approach for interdependency analysis and prioritizing the Iran's steel scrap industry strategies. Res. Policy 42, 18–26.

Shen, Z.F., Redclift, M.R., 2012. Ecotourism: an alternative form of green industry in China. Int. J. Green Econ. 6, 129–136.

Sirakaya, E., Sasidharan, V., Sonmez, S., 1999. Redefining ecotourism: the need for a supply-side view. J. Travel Res. 38 (2), 168–172.

Sirivongs, K., Tsuchiya, T., 2012. Relationship between local residents' perceptions, attitudes and participation towards national protected areas: A case study of Phou Khao Khouay National Protected Area, central Lao PDR. Forest Policy Econ. 92–100.

Siswanto, A., 2015. Eco-tourism development strategy Baluran National Park in the regency of Situbondo, East Java, Indonesia. Int. J. Eviron. Res. Educ. 4 (4), 185–195.

Spatial Plan of the Special Purposes of the National Park Djerdap ("Official Gazette of RS", no. 43/2013 adopted 17.05.2013.)

Steven, R., Castley, J.G., Buckley, R., 2013. Tourism revenues as a conservation tool for threatened birds in protected areas. PLoS One 8 (5). http://dx.doi.org/10.1371/journal.pone.0062598.

The Law on the National Park Djerdap ("Official Gazette of SRS" No. 31 adopted 27.07.1974.)

Toosi, R., Samani, J.M.V., 2016. Evaluating water management strategies in watersheds by new hybrid Fuzzy Analytical Network Process (FANP) methods. J. Hydrol. 534, 364–376.

Trangeland, T., 2011. Why do people purchase nature-based tourism activity products? A Norwegian case study of outdoor recreation. Scand. J. Hosp. Tour. 11 (4), 435–456.

Tsai, W.-H., Chou, W.-C., Lai, C.-W., 2010. An effective evaluation model and improvement analysis for national park websites: a case study of Taiwan. Tour. Manag. 31, 936–952.

Vladi, E., 2014. Tourism development strategies, SWOT analysis and improvement of Albania's image. Eur. J. Sustain. Dev. 3 (1), 167–178.

Vladimirov, Z., 2012. Customer satisfaction with the Bulgarian tour operators and tour agencies websites. Eur. J. Sustain. Dev. 3 (1), 167–178.

Wang, W.C., 2015. Visitor perception, interpretation needs, and satisfaction of ecotourism: The case of Taijiang National Park, Taiwan. Enlightening Tourism. Pathmaking J 5 (2), 180–200.

Wang, X., Liu, Z., Cai, Y., 2015. A rating based fuzzy analytic network process (F-ANP) model for evaluation of ship maneuverability. Ocean Eng. 106, 39–46.

Wesche, R., Drumm, A., 1999. Defending Our Rainforest: A Guide to Community-Based Ecotourism in the Ecuadorian Amazon. Acción Amazonia, Quito, Ecuador.

Wickramasingne, V., Takano, S., 2010. Application of combined SWOT and analytical hierarchy process (AHP) for tourism revival strategic marketing planning: a case of Sri Lanka tourism. J. East. Asia Soc. Transp. Stud. 8, 954–969.

Wolfslehner, B., Vacik, H., 2008. Evaluating sustainable forest management strategies with the analytic network process in a pressure state response framework. J. Environ. Manag. 88, 1–10.

Wolfslehner, B., Vacik, H., Lexer, M.J., 2005. Application of the analytic network process in multi-criteria analysis of sustainable forest management. Forest Eco. Manag. 207, 157–170.

Xu, F., Fox, D., 2014. Modelling attitudes to nature, tourism and sustainable development in national parks: a survey of visitors in China and the UK. Tourism Manage. 45, 142–158.

Yuksel, I., Dagdeviren, M., 2007. Using the analytic network process (ANP) in a SWOT analysis - a case study for a textile firm. Inf. Sci. 177, 3364–3382.

Zaim, S., Sevkli, M., Camgz-Akda, H., Demirel, O., Yaylad, Y., Delen, D., 2014. Use of ANP weighted crisp and fuzzy QFD for product development. Expert Syst. Appl. 41 (9), 4464–4474.

Zhang, O., 2012a. Research on tourism attraction performance promoting method based on the SWOT analysis method. IERI Proc. 1, 254–260.

Zhang, X.M., 2012b. Research on the development strategies of rural tourism in Suzhou based on SWOT analysis. Energy Proc. 16, 1259–1299.

Zhü, K., Zhao, S., Yang, S., Liang, C., Gu, D., 2016. Where is the way for rare earth industry of China: an analysis via ANP-SWOT approach. Res. Policy 49, 349–357.

Živković, Ž., Nikolić, D.J., Djordjević, P., Mihajlović, I., Savić, M., 2015. Analytical network process in the framework of SWOT analysis for strategic decision (case study: technical faculty in Bor, University of Belgrade, Serbia). Acta Polytech. Hung. 12 (7), 199–216.