



Analysis

A New Approach Within ANP-SWOT Framework for Prioritization of Ecosystem Management and Case Study of National Park Djerdap, Serbia



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ABSTRACT

Complex National Park (NP) Management Problems often requires a multidisciplinary approach in the process of business decision-making involving various stakeholders from the region. In the decision-making process, the methodology, based on combining SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) and the Analytical Network Process (ANP) methods, has been proved as a very useful tool in numerous surveys as it is being presented in this paper on the example of the National Park Djerdap (NPDJ). In the conducted research, aimed to achieve business vision of this company, a four-phase decision making approach was defined. In the defined model, the situation SWOT analysis was used as the baseline in the analysis of the situation on the ground. Hence, four scenarios were generated by experts using the ANP method of multi-criteria decision-making. The results obtained within the research identified the scenarios of the highest priority - sustainable development and environmental protection - which would enable the National Park Djerdap to achieve its vision. The proposed model is flexible in the sense that its network structure and rules allow minor adjustments for its application to similar problems in the environmental management in other protected natural areas.

1. Introduction

The protected areas, which also include the national parks (NP), increasingly contribute to the sustainable development of the local community (Andam et al., 2010; Getzner et al., 2012; Getzner, 2014). In addition to the environmental dimension, the conservation of biodiversity and natural ecosystems, the economic aspects of the functioning of the national parks become more prominent over time, due to the numerous opportunities for the development of the tourism, and other related activities in the region that complement the tourist offer of the national parks (Steven et al., 2013). It also has extensive consequences for the entire region as it leads to a better utilization of the existing capacities and opening of the new business entities in the region (Lesáková, 2011) due to an increase in the number of the tourists which creates a significant growth in demand for a variety of products and services (Getzner, 2014).

With the evolution of the understanding of the significance of the national parks, there is a need for a change in the management style (Bulatović and Tripković Marković, 2015) in order to achieve harmony between the management functioning of the NP, local government, state authorities, private and public enterprises and local population (Puhakka and Saarinen, 2013). The management of the NP based only

on the environmental protection has been outmoded (Das, 2011). Contemporary business conditions require the introduction of an integrated management approach in the NP (Das and Chatterjee, 2015), which includes the harmonization of their business with the needs of the society and development priorities, i.e. the control of the NP area, the protection of biodiversity and focus on the economic development (Plummer and Fennel, 2009; Jalani, 2012). The integrated management approach contributes to the development of the national park and the region where the NP is located (Dharmaratne et al., 2000; Chiu et al., 2014). This provides the local community with the following benefits: the income-generating, the employment growth and the increase in the awareness of the importance of the protected areas (Sirivongs and Tsuchiya, 2012; Moharramnejad et al., 2013). The functional way of management in the national parks balances the needs of the society and the economic and environmental principles, ensuring the long-term sustainable development of the region through the more rational exploitation of the resources, more efficient asset allocation and improvement of the tourist potential (Dharmaratne et al., 2000; Plummer and Fennel, 2009; Bulatović and Tripković Marković, 2015; Zamfir and Corbos, 2015). Based on this, the development of the national parks is, on one hand, aimed at achieving sustainable tourism in order to meet the needs of the tourists, as well as the needs of the tourist destination

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while protecting and increasing the possibilities for future generations' tourism. However, it also protects and increases the development potential of the entire region through keeping with the social, economic, political, environmental and spatial principles (Reihanian et al., 2012; Hansen, 2013; Grošelj et al., 2016).

The development of the management strategies in the national parks introduces the preferred courses of action aimed at achieving long-term sustainability (Sharpley, 2000; Tucker and Boonabana, 2012; Cortés et al., 2003). During the planning of the developmental alternatives, it is important to consider the interests of all internal and external stakeholders from the region (Cortés et al., 2003).

National park management is a complex task which requires thorough multidisciplinary consideration of a great number of issues that the development and implementation of a clear and effective management strategy are depending on. SWOT analysis (Reihanian et al., 2012; Ghorbani et al., 2015) has been a very efficient tool in defining the management plans aimed to determine the factual state that characterizes the performance of a national park. SWOT analysis is used both for determining the strategic position of the company and getting the real picture in deciding which strategy suits the company better. It is also used in realizing whether the generated strategies (business scenarios) would enable the company to apply it appropriately (Houben et al., 1999; Kangas et al., 2003; Kajanus et al., 2012). In order to improve the quality of the application of this tool by quantifying SWOT factors, its application has been significantly extended. Lately, SWOT analysis, as a tool for generating and ranking strategies, has been upgraded with numerous Multi-Criteria Decision Making (MCDM) methods that significantly expanded its application and opened many opportunities for decision-makers to make objective decisions under conditions of uncertainty (Sevklı et al., 2012; Kheirkhah et al., 2014). Numerous studies in the world have used SWOT analysis in defining management strategies in the function of local development of national parks, both in developed and underdeveloped countries (USA, Sweden, Finland, China, Thailand, Australia, Greece, Bulgaria, Montenegro, Turkey, Malaysia, Vietnam, Kenya, Taiwan and many others) (Shafer, 1999; Arabatzis and Grigorodis, 2010; Hong and Chan, 2010; Ataberker and Baykal, 2011; 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; Ly and Xiao, 2016; Kangas et al., 2016).

Decision-makers encounter many challenges which have to be overcome when defining the Management Plan and they need to consider a number of participants who are affected by the management of the national parks (Masberg and Morales, 1999). The management of the National Park Djerdap, the largest national park in Serbia, is facing many challenges in its management. Bearing in mind various developmental problems in the region on the territory where the park is located, the management of this public enterprise has to endure a demanding challenge. The management of the NPDJ is expected to elaborate in details the alternative scenarios whose objective is the development of the NPDJ with the contribution to the regional development (Masberg and Morales, 1999). The draft for the NPDJ Management Plan for the period from 2017 to 2026 was passed and it defines the basic guidelines for the future management (Management Plan, 2016). Based on this draft the authors of this paper propose the universal model which can be used for the ranking of the alternative scenarios for the realization of the business vision of the enterprise built on the integration of the strategic goals and SWOT factors, using the ANP method for the multi-criteria decision-making. The ANP method, which is one of the widely used multi-criteria decision making techniques, was chosen because of its superiority in addressing the complex network structure. Analyzing the MCDM methods, the ANP has been found as the most appropriate methodological solution for defining complex decision making structural model for achieving the vision of National Park Djerdap. Moreover, the advantage of an ANP method in relation to other methods is in its possibility to evaluate all relationships between clusters of the network structure and elements within

them by adding potential interactions, interdependencies and feedbacks in the decision making system (Sevklı et al., 2012; Grošelj et al., 2015; Gigović et al., 2017). It handles interdependence among elements by obtaining the composite weights through the development of so called "supermatrix". The node of a network structure represents a cluster with elements inside it, a straight line or an arc denotes the interactions between two components and a loop indicates the inner dependence of elements within a component (Hsu et al., 2012; Kheirkhah et al., 2014; Pamučar, D.S., et al., 2017).

Hence, the aim of this paper was to create systematic approach and define scenarios for the future development of NPDJ in order to fulfil park vision and that is to promote the potential of this natural protected area as well to underline its role as a main factor of the regional development in this part of Serbia. In order to accomplish the defined goal, the following sections were discussed in this paper: Section 2 (Theoretical framework) describes the review of benchmarking practices in this field; Section 3 (Methodological framework) gives short background regarding ANP method and presents methodological frame consisted of four steps; Section 4 (Case study - National Park Djerdap, Serbia) describes the case study of NPDJ, whereby the defining and evaluation of the elements of decision making of the proposed model were realized based on the inclusion of the most important stakeholders from the region as well as representatives of the management of the NPDJ; Section 5 (Discussion of results) discusses the obtained results of proposed model whereby the obtained results indicate that sustainable development and environmental protection are the most important directions for the future development of the NPDJ; and Section 6 (Conclusions) presents the main conclusions and recommend further actions.

2. Theoretical Framework

The positive impact of the national parks on the regional development is witnessed by the numerous benchmarking partners, i.e. the national parks and protected natural areas which represent the good examples of the management accomplishing benefits for the whole region in the world (CNPPAM, 2002).

Overcoming the existing conflicts between the key stakeholders that influence the development of the national parks and its management is a key obstacle to their development in many countries (Coria and Calfucura, 2012). In order to achieve collaboration between the stakeholders and the management of the NP, it is necessary to create a partnership that will be based on the realization of the shared objectives. Successful partnerships require investing effort of all participants, including making a decision first, and then implementing the planned activities together (Ghorbani et al., 2015). An example of such a successful partnership is the New Forest National Park (England), where, on the initiative of the local authorities, the integrated management strategy was defined which included the interests of the local stakeholders from the area on the one hand, and the protection of nature as the primary priority of the NP on the other hand (Gvozdenović et al., 2014). A partnership between the 10 public institutions, NGOs, various informal groups, businessmen and interested individuals was established. At the beginning, the management had difficulty in managing the work of all stakeholders, but, in time the relations improved and the decision-making progressed. With the support of the European Union, through the LIFE projects, a common vision of the New Forest National Park was created and the strategic and action plan was defined. Now, this protected natural area in England is annually visited by about 13.5 million people (New Forest district council, 2017).

The successful development of the NP in the market can be achieved by incorporating the offers of the national parks at the state level. The United States National Service (USNS) is an office that successfully manages and protects national parks in the United States. This office controls the work of 376 protected areas (National Park Service, 2017). In addition to 60 national parks, it also includes the protection of the

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