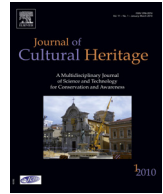




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Original article

An integrated framework to assess complex cultural and natural heritage systems with Multi-Attribute Value Theory



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ABSTRACT

Decisions related to integrated cultural and natural heritage are increasingly complex due to the multiple-use nature of goods and services provided by the environment, the difficulty in monetary evaluation of intangible heritage and the involvement of a large number of stakeholders. Multiple perspectives are thus required to align social and ecological values to promote sustainable solutions for heritage management. In this context, multi-attribute value techniques can be used to synthesize stakeholder preferences because they can accommodate conflicting, multidimensional and incommensurable objectives. The present paper proposes an experimentation employing the Multi-Attribute Value Theory (MAVT), which is a specific Multicriteria Analysis technique, in the domain of collective decisions about public goods. The objective of the work is to provide an integrated framework for planning and design of future actions according to both qualitative and quantitative elements, in order to help and support landscape and urban planners, policy and decision-makers, land managers and public organizations to manage complex territorial systems characterized by multiple values. To the knowledge of the authors, this is the first application of multi-attribute value techniques for dealing with intangible heritage characterized simultaneously by natural, cultural, ecological, historical and architectural values. The present contribution has thus an innovative and trans-disciplinary potential and may influence future applications referring to collective decisions about public goods.

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1. Research aims

The paper proposes an integrated methodological framework for dealing with collective decisions about public goods, with a specific focus on integrated cultural and natural heritage assets. The aim of the research is to highlight the contribution that a multi-attribute approach can have in supporting both tangible and intangible heritage management.

In particular, a Multicriteria Analysis technique named Multi-Attribute Value Theory (MAVT) is proposed in order to answer the urgent demand for transparency, replicability and learning mechanisms in the field of public policy making.

In this research, MAVT has been applied to a real-world problem where a decision has to be taken about the management of a set of disused farms located inside a natural park in Northern Italy. These farms have a high historical and cultural value and together with

the surrounding park create a multi-value resource and opportunity, thus enabling positive synergies for sustainable management and planning. The result of the analysis is represented by a ranking of alternatives to be recovered for touristic purposes.

The proposed framework allows a versatile and case specific use and represents thus an interdisciplinary tool.

2. Introduction

Integrated cultural and natural heritage has a multidimensional profile which includes socio-economic, ecological, technical and ethical perspectives and thus leads to issues that are simultaneously characterized by a high degree of conflict, complexity and uncertainty [1,2].

According to the ICOMOS approach, both tangible and intangible heritage that stimulate the recognition of certain values in man and are able to interact with our memory are to be protected [3]. Choices about what and how to preserve for this and next generations reveal that many different—and sometimes divergent—values (economic, aesthetic, cultural, historical, artistic, educational, political) are subject to discussion.

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Decision problems in this context thus refer to collective decisions which are characterized by the following five major complexities: (i) use of public resources, (ii) presence of multiple stakeholders, (iii) long-time horizons, (iv) need for legitimization and accountability and (v) need for deliberation [4].

To help address these problems, the use of policy analytics [4], which represents a framework for the use of analytics in supporting the policy cycle, has gained attention in recent years. Within this context, Multicriteria Analysis [5] can play a fundamental role in supporting integrated cultural and natural heritage assets' management.

This paper addresses the challenge of designing integrated cultural and natural heritage using the Multi-Attribute Value Theory (MAVT) [6], a particular type of Multicriteria Decision Aiding method [5].

In particular, this contribution proposes a real application of the MAVT for managing a natural protected area with multiple exceptional values (i.e. ecological, cultural, historical, architectural, and social).

International efforts to preserve the natural environment are mainly concerned with large, bio-diverse and relatively untouched ecosystems or with individual animal or vegetable species, either endangered or threatened with extinction. Much less attention, on the other hand, has been paid to green areas in urban contexts and to their benefits to people. Increasing empirical evidence, however, highlights the strategic importance of natural areas and their contribution to the quality of life [7].

The methodological framework proposed in this paper was applied to a complex territorial system where natural and cultural heritage are a vital part of the territorial capital and identity.

The objective of this research is to provide an integrated framework to support the planning and design of future actions in the field of complex territorial systems, according to both qualitative and quantitative elements. This framework is illustrated with a real-world case study and is intended to help landscape and urban planners, policy and decision-makers, land managers and public organizations to understand, evaluate and manage complex territorial systems characterized by multiple values. In particular, the aim of the paper is to highlight the contribution that a multi-attribute framework can have in supporting integrated landscape design processes, where there is a strong need for transparency, replicability and learning mechanisms.

The remainder of the paper is organized as follows: Section 2 illustrates the methodological background and state of the art of the Multi-Attribute Value Theory while Section 3 presents the methodological framework development and application. Finally, Section 4

presents some lessons learned from the overall evaluation process and some insights for further developments.

3. Multi-attribute problems: methodological background and state of the art

Sustainability evaluation of territorial transformation processes is an inherent multi-attribute problem [2]: it is simultaneously characterized by many different dimensions pursuing heterogeneous and often conflicting objectives. The literature suggests several approaches to deal with multi-attribute problems, each characterized by specific mathematical properties, which have very different implications. In this section, we briefly introduce to the reader the methodological background of a specific Multicriteria Analysis technique, named Multi-Attribute Value Theory (MAVT) [6] that has shown to be a very promising line of research in the field of sustainability assessments and strategic planning for territorial transformation processes [8].

Multi-Attribute Value Theory can be used to address problems involving a finite and discrete set of alternative options that have to be evaluated on the basis of conflicting objectives. By being able to handle quantitative as well as qualitative data, MAVT plays a vital role in the field of environmental decision-making where many aspects are often intangible. Moreover, decision-making in this context is frequently complicated by various and conflicting stakeholder views that call for a participative decision process able to include different perspectives and facilitate the discussion.

From the methodological point of view, the framework to be followed to build a MAVT model through a participative approach can be described as shown in Fig. 1.

In particular, the first step concerns the definition of the problem, which implies identifying and structuring the fundamental objectives and related attributes (which measure the degree to which objectives are achieved) [9,10].

The second step consists in the identification and design of alternative options (i.e. the potential solutions to the decision problem). Methods and models such as visioning, problem structuring methods and scenario planning can help to promote creativity for the generation of good strategies and strategic options [11].

Once the alternative options have been identified, it is necessary to assign scores for each alternative in terms of each attribute.

The next step might consist in the definition of a panel of experts for the development of the evaluation. The use of experts' panels expands the knowledge bases and may serve to avoid possible biases, which characterizes the situation with a single expert. On the other side, the use of experts' panels has a range of problems

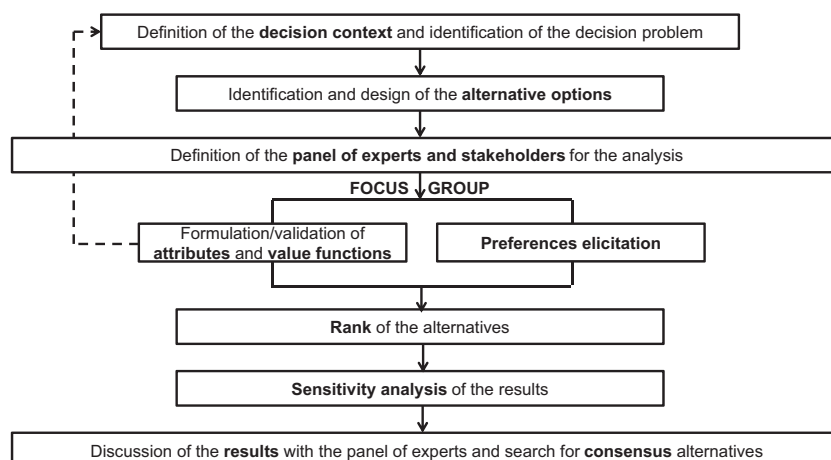


Fig. 1. Methodological steps for the development of a MAVT model making use of an experts' panel.

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