Original article

Decision making and cultural heritage: An application of the Multi-Attribute Value Theory for the reuse of historical buildings

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ARTICLE INFO

ABSTRACT

The reuse of historical buildings can be seen as a complex decision problem because of the presence of different objectives to be pursued, the public/private nature of the goods under investigation, the existence of several values (historical, artistic, cultural, economic, etc.), the presence of different actors (public government representatives, architects, architectural historians, developers and owners). In decision problems related to the reuse of historical assets conflicts can arise and the availability of analytical frameworks able to support the process is getting more and more important. It has been generally agreed that Multicriteria Decision Analysis (MCDA) can offer a formal methodology to deal with such decision problems, taking into account the available technical information and stakeholders' values. This paper considers the problem of sustainability assessment in cultural heritage projects using the Multi-Attribute Value Theory (MAVT) approach, which is a particular kind of MCDA technique. Starting from a real case concerning the reuse of historical buildings in the metropolitan area of Torino (Italy), the paper aims at exploring the contribution of MAVT for decision problems in the field of cultural heritage.

1. Research aims

The objective of the study is to investigate the use of the Multi-Attribute Value Theory (MAVT) in decision problems related to cultural heritage. MAVT is a particular Multicriteria Analysis technique and it can be used to address problems that involve a finite and discrete set of alternative actions that have to be evaluated on the basis of conflicting objectives. For any given objective, one or more different attributes or criteria, are used to measure the performance in relation to that objective.

In this research, MAVT has been applied to a real-world problem where a decision has to be taken about the reuse of a set of industrial historical buildings located in the metropolitan area of Turin (Italy). Particularly, the present study leads the choice of the best performing building to be reused for touristic purposes. In particular, seven buildings are compared on the basis of different attributes, namely quality of the context, presence of economic activities, flexibility of the building, pedestrian accessibility and conservation level. The research also explores the adoption of a decision support process, which makes use of a panel of experts for the implementation of the evaluation model.

2. Introduction

Decision-making processes in the context of cultural heritage projects are affected by several characteristics.

To start with, they can be described as complex decision problems with many dimensions to be included in the analysis, taking into consideration historical and artistic value, economic constrains, environmental impacts and so on [1].

Secondly, multiple actors with different and conflicting objectives have a role in the decision arena, such as public government representatives, architects, architectural historians, developers and owners.

Thirdly, it is possible to mention the existence of factual information (for example, the degradation of an historical building) and value information (for example, the people's willingness to accept the risk of degradation) to be incorporated in the process.

Moreover, the evaluation must consider not only quantitative data, but also probabilistic variables and qualitative judgments, such as, for example, the landscape quality of a certain area.

Finally, the evaluation tools must be able to guarantee the transparency of the decision process and to communicate in an easy way the results of the choices.

It has been generally agreed that Multicriteria Decision Analysis (MCDA, [2,3]) can offer a formal methodology to deal with such decision problems, taking into account available technical information and stakeholders values.

Generally speaking, MCDA methods, are used to make a comparative assessment of alternative projects or heterogeneous

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measures. These methods allow several criteria to be taken into account simultaneously in a complex situation and they are designed to help decision makers (DMs) to integrate the different options, which reflect the opinions of the involved actors, in a prospective or retrospective framework. Participation of the DMs in the process is a central part of the approach.

Cultural heritage projects and, more generally, urban and territorial transformations can be defined as processes that produce direct effects in the physical environmental system of a given area and indirect effects in the social and economic system. According to the legislative framework, this kind of projects are made object of specific evaluation procedures such as, among the others, feasibility studies, Cost-Benefit Analysis [4] and Strategic Environmental Assessment [5].

The evaluation is a crucial point in the overall transformation process because it allows the project proposal to be decomposed and a series of fundamental information to be produced that can support the decision-making process. In this sense, it is possible to say that the evaluation plays a constructive role (and not resolutive) and it is not a form of decision-making but a support to the decision-making [6].

In the past, the evaluation used to be considered as a set of procedures and techniques finalized in defining the link between causes and effects. More recently, the scientific literature in the domain of environmental and planning evaluation agrees in considering the evaluation acts a social learning process [7] where reflecting and interpreting complex situations are the basis of the overall assessment. According to the latter approach, a primary role is played by public policies analysis. In fact, traditional approaches based on financial and economic feasibility analysis are not able to help the comprehension of such complex phenomena because they consider few quantitative variables and a limited group of experts and are not able to deal with environmental uncertainty, social risks and inter-generational equity factors. Moreover, a fundamental part in urban and territorial decision-making processes is played by the population and inclusive approaches that enhance public participation and collective learning processes among different actors, with different perspectives and objectives, are central in the creation of new responses in territorial transformation processes.

For the aforementioned reasons, MCDA is a valuable and increasingly widely-used tool to aid Decision making in the domain of sustainability assessment and urban and territorial planning, where a complex and inter-connected range of environmental, social and economic issues must be taken into consideration and where objectives are often competing, making trade-offs unavoidable. It is possible to highlight that MCDA gives not only a toolbox, but, overall, a well-developed methodology to support decision-making processes.

This paper considers the problem of sustainability assessment in cultural heritage projects using the Multi-Attribute Value Theory (MAVT, [8]), a particular kind of MCDA method. MAVT can be used to address problems that involve a finite and discrete set of alternative actions that have to be evaluated on the basis of conflicting objectives. For any given objective, one or more different attributes or criteria are used to measure the performance in relation to that objective.

Starting from a real case concerning the reuse of historical buildings in the metropolitan area of Torino (Italy), the paper aims at exploring the contribution of MAVT for decision problems in the field of cultural heritage. In the application, several buildings are considered on the basis of different attributes, such as environmental quality, accessibility, flexibility of the structures, and so on. The evaluation takes into consideration the opinions of different experts for the definition of the value functions of the attributes as well as their importance. In the result of the approach a ranking of suitable buildings to be reused is provided.

The research has an innovative value because only few applications of MAVT exist in this specific decision context.

3. Cultural heritage evaluation

3.1. Background and definition

Cultural heritage can be considered as a dynamic category in a constant evolution and the definition has varied through the years.

According to the World Heritage Convention [9], the term cultural heritage refers to single monuments, such as architectural works, works of monumental sculpture and painting, as well as groups of buildings and sites, considering for example areas including archaeological sites.

This initial definition has been enlarged and nowadays in the characterization of cultural heritage it is possible to include also territorial systems, landscapes, itineraries and intangible heritage.

Following this description, it is clear that the environment wherein cultural goods are ideally defined can be represented by the following elements [1].

Firstly, cultural heritage is a multidimensional issue, because it belongs to the economic categories of public and mixed goods. Secondly, cultural heritage is a multi-attribute problem considering that heterogeneous flow of services and functions characterises cultural markets. Thirdly, cultural heritage is a multi-value problem because it concerns a wide spectrum of personal and inter-personal value benefits.

According to the scientific literature, the economic and cultural value of cultural heritage must be addressed through the Total Economic Value paradigm, which allows the overall value to be decomposed in two macro-categories: the use value and the non-use value [10–12].

The use value, linked to the benefits the consumer receives directly from the cultural asset itself, is the utility that the historic artefact offers the consumer from the very moment he comes into contact with it; the non-use value, which refers to the utility that the consumers perceive from the conservation of the cultural assets for themselves and for the future generation.

Moreover, speaking about cultural heritage evaluation, it is worth pointing out that a strong link exists between the cultural goods available in a given area and the active production of material culture. This link ascribes a particular importance to economic development and it suggests to separate two fundamental moments concerning:

- the estimation of the values of the site;
- the creation of value by means of economic activities.

It has been generally agreed that these two moments represent the basis of the historical identity of the site and of the vitality of the culture expressed by the site. In this sense, the evaluation must consider not only the historical and emblematic aspects of the site, but also the opportunities provided by the site to the overall community.

3.2. Cultural heritage and Multicriteria Analysis: state of the art

For the background presented in Section 3.1, decision problems related to cultural heritage can be addressed through a formal multicriteria analysis. Table 1 summaries the main scientific works available in the literature considering the application of MCDA in cultural heritage decision problems, putting in evidence the field of application, the objective of the evaluation, the MCDA technique used and the scientific journal in which the work was published.