

# Chapter 18

## Evaluation of Architectural Heritage by Various Multi-Criteria Decision-Making Analysis: A Case of Odishan Temple Architecture in India

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### ABSTRACT

*Selection of the architectural heritage (AH) for conservation considers many dimensions and parameters, which is a multitasking process. Many parameters can be valued directly, while others indirectly. The process of evaluation should be robust for all decision-makers. As such, the multi-criteria decision-making (MCDM) process seems apt. This research evaluates various MCDM methods using Odishan temple architecture as the case study. Five dimensions as architectural and aesthetic value, economic value, environmental and ecological value, historical value, and socio-cultural value have been identified. The selected MCDM methods are weighted sum method, weighted product method, weighted aggregated sum product assessment, evaluation based on distance from average solutions, techniques for the order of preference by similarity to ideal solutions, additive ratio assessment, complex proportional assessment, combinative distance-based assessment, and VIKOR. This study compares different MCDA methods for the best AH using different dimensions.*

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## INTRODUCTION

The conservation of AH, along with legal enforcement, requires a proper selection process. AH primarily though represents aesthetic value and historical value, there can also be associative economic, environmental, social, and cultural benefits. Hence, for choosing the best or worst AH, there is a need for an unbiased scale of measurement involving various criteria and that necessitates a multi-criteria decision-making (MCDM) analysis. The selection of the MCDM analysis for getting better robustness can be achieved through characteristics of the alternatives (continuous or discrete), nature of the input data (qualitative, quantitative, or both), nature of the information taken for concern (acceptable, non-acceptable, or both), types of decision outputs (choice, ranking, sorting, or description). Kalman (1980), as one of the pioneers, talked about MCDM. Later, The Heritage Advisory Committee Ontario Heritage Act (2013) and recently other evaluators (Ribera, Nesticò, Cucco, & Maselli, 2019; Ma, Li, & Chan, 2018; Ribera, Nesticò, Cucco, & Maselli, 2019) have also used MCDM. For the Indian context, the criteria of evaluation of AH is given by the Town and Country Planning Organization (TCPO, 2011). However, on many occasions, the evaluation primarily relies on the opinion of the experts. This research uses the involvement of all stakeholders to get the rank of the AH using primary, secondary, and observational data.

In a hierarchy process, a top to down approach is selected for the problem identification. Whereas, solving the problem is always opposite. The first thing is the problem to be solved or the goal to be achieved. The broader areas require to achieve the goal are the dimensions, which are generally not measurable directly. The variables with assigned values under each dimension are known as the parameters. If there is an intermediate level, then those can be named as sub-dimensions. On other words, parameters help to get the value of sub-dimensions and sub-dimensions to help to get the value of dimensions, and dimensions help to achieve the goals. The process of combining the values to get an overall representative value is known as aggregation.

In the process of measurement or evaluation, all the parameters, sub-dimensions, or dimensions, carry some level of importance, i.e., the weights. Equal weights signify that all the parameters are of equal importance or have equal contribution in the process, and that may not be the case always.

These MCDM analyses cater to the multiple dimensions character for the evaluation problem, permitting the comparison between the alternatives in both qualitatively and quantitatively. Multi-Criteria Decision-Making Analysis (MCDA) is the solution for problems associated with the multi-parameter and multi-alternative. In the above studies related to AH, the relative importance of parameters and dimensions was pre-defined. However, the logic was not satisfactorily explained, and many issues arise while calculating the dimensions of architectural heritage. These are the following:

- What are the parameters associated with these dimensions?
- How are the parameters identified for each dimension?
- How are these parameters contributing to the aggregated value formation for the dimensions?
- What is the level of importance of these parameters for evaluating architectural heritage?
- What are the goals for evaluating architectural heritage under each dimension?
- What are the scales of measurement of these parameters?
- How to convert these parameters in the same scale of measurement?
- After deriving scale of measurements, how to aggregate them for the index formation?

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