

# Bridging Decision Making Process and Environmental Needs in Transportation Corridor Planning

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## **Abstract**

**Purpose** - This paper presents the experimental implementation and results for a set of methods and approaches that enable collaborative stakeholder inputs for automating the selection and objective evaluation of transportation corridors alignment. Using a real case study, the objective is to clarify the spatial multi-criteria workflow for stakeholders and decision makers, which feedback rankings are vital to the success of the transportation planning.

**Design/methodology/approach** - The experimental approach was designed to integrate in a novel fashion both Analytical Hierarchy Process (AHP) and Multi-Criteria Decision Making (MCDM) within a geospatial information system (GIS) framework to deliver visual and objective tabular results useful to estimate environmental costs of the alignments generated. The method enables ranking, prioritization, selection, and refinement of preferred alternatives. The Interstate-269, the newly planned bypass of Memphis-TN, for which a recent Environmental Impact Study (EIS) was completed, was selected as the experiment testbed.

**Findings** - The results indicate that the approach can automate the delivery of feasible alignments that closely approximate those generated by traditional approaches. Furthermore, via integration of local planning and ancillary spatial data, the method provided alignment results that avoided areas where local opposition was noted in the EIS.

This enhanced method based on remote sensing and spatial information technologies delivers low or high predicted environmental costs per feature criteria and cumulative predicted costs while preserving local values and plans.

**Practical implications** - The method is highly transferrable and limited solely by the availability of sources of geospatial data and coordination with stakeholders. The approach was implemented to derive results similar to traditional approaches with benefits in time, costs, and quality of solutions.

**Originality/value** – A novel adaptation of MCDM and AHD within a spatial decision-making framework is presented. The paper suggests a clarification of multi-criteria workflow to design and select least-environmental-cost corridors. The case study application provides a starting point to develop practical tools that delivers environmental benefits through a collaborative process capturing stakeholder values and decision maker opinions.

**Keywords** – Multi-criteria, EIS, early planning, feasibility, GIS, least-cost alignment.

**Paper Type** - Conceptual paper