

Sensitivity analysis of multi-criteria methods for site evaluation using a GIS decision support tool

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ABSTRACT

There is a growing interest in the use of GIS to support pluralistic decision making processes where multiple and often conflicting views must be distilled into strategies that satisfy all decision makers and objectives. Recent attention within the GIS literature has applied multi-criteria analysis (MCA) techniques to allow subjective factors to be incorporated directly into spatial decision support problems.

This paper examines the robustness of potential site suitability rankings generated by two different MCA methods for new tourist development in a district of Grand Cayman, BWI. A large number of candidate sites, relative to most MCA examples reported in the literature, were evaluated by a small sample of participants. Two forms of robustness are considered. First, the stability of site ranks is examined when different MCA evaluation techniques are applied. Second, the stability of ranks is examined relative to changes in evaluation criteria weights. The results confirm the contribution of the two MCA techniques to help resolve complex spatial decision problems and show a surprising degree of robustness in evaluation outcomes. In addition to providing cartographic visualisation of rank sensitivity, the data allow diagnosis of the decision process for both individual evaluators and for the group as a whole.

Keywords: GIS, multi-criteria analysis, sensitivity analysis, decision support.