

Optimising level of service scores for footpaths using multi-criteria decision-making approach

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Existing methods for evaluating footpath quality often neglect user satisfaction and time-based variations, creating lacunae in comprehensive assessment models. The present study addressed these gaps by developing six-level optimised level of service scores to evaluate footpaths near transit stations. The present research integrated quantitative and qualitative attributes using the analytic hierarchy process and the technique for order preference by similarity to ideal solution. The results showed significant variations in footpath quality during peak and non-peak hours, revealing discrepancies between conventional grading systems and user perceptions. The findings support holistic planning for pedestrian infrastructure, enhancing last-mile connectivity and transit ridership.

Keywords: AHP, footpaths, pedestrians, TOPSIS, transit.

Related work

Over the years, pedestrian level of service (PLOS) methodologies evolved significantly, transitioning from basic models to comprehensive frameworks that addressed diverse factors influencing pedestrian experiences⁷⁻⁹. Studies hitherto, such as Fruin's foundational model, focused on pedestrian density but lacked qualitative dimensions such as comfort, safety and the influence of the built environment¹⁰. The highway capacity manual (HCM) improved on this by introducing a six-level (A-F) grading system that provided greater insight into congestion and movement patterns¹¹. However, both approaches profoundly depend on quantitative indicators and often neglect subjective user experiences and contextual walkability. Recognising these limitations, subsequent studies have integrated multi-criteria approaches. Few researchers incorporated environmental quality, safety and physical attributes into PLOS models¹²⁻¹⁶. However, their practi-