



Methodological Assessment of Municipal Infrastructure Asset Systems in Kenya Using Multilevel Regression Analysis for Cost-Effectiveness Evaluation

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Abstract

Municipal infrastructure asset systems in Kenya are crucial for urban planning and development. However, their cost-effectiveness is not uniformly assessed across different levels of governance. Multilevel regression analysis will be employed to account for hierarchical structures within the data, ensuring that variations across different levels are appropriately modelled. The study will use publicly available datasets from multiple sources including government reports and academic literature. The multilevel model revealed significant variation in cost-effectiveness metrics at both district (level-1) and national (level-2) scales, with some infrastructure assets showing higher returns on investment than others across different sectors such as water supply and roads. This study provides a nuanced understanding of the factors influencing municipal infrastructure asset systems' performance in Kenya, offering insights for policymakers aiming to optimise resource allocation. Policymakers should consider implementing targeted interventions aimed at improving cost-effectiveness ratios in sectors where they are notably lower than average. Municipal Infrastructure, Cost-Effectiveness, Multilevel Regression Analysis, Urban Planning, Kenya The maintenance outcome was modelled as

$Y_i = \beta_0 + \beta_1 X_i + u_i + \text{varepsilon}_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Kenya, Multilevel Regression Analysis, Urban Planning, Asset Management, Cost-Benefit Analysis, Hierarchical Models, Quantitative Methods

ABSTRACT-ONLY PUBLICATION

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