



Methodological Assessment of Municipal Infrastructure Assets Systems in Uganda: Multilevel Regression Analysis for System Reliability Assessment

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Abstract

The assessment of municipal infrastructure assets in Uganda is crucial for ensuring reliable service delivery to communities. A multilevel regression model was employed, incorporating both macro-level (e.g., government policies) and micro-level (e.g., community usage patterns) variables to assess system reliability. The multilevel regression analysis revealed that government investment in infrastructure significantly improved service delivery with a coefficient of 0.75. Multilevel regression analysis provides a robust framework for assessing municipal infrastructure systems in Uganda, highlighting the importance of public investments. Communities and policymakers should prioritise funding for infrastructure maintenance to ensure consistent service reliability. multilevel regression, municipal infrastructure, system reliability, Uganda 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: *Uganda, Multilevel Regression, Asset Management, System Reliability, Geospatial Analysis, Econometrics, Data Mining*

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