



Multilevel Regression Analysis for Measuring Adoption Rates of Municipal Infrastructure Assets Systems in South Africa: A Methodological Evaluation

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Abstract

The adoption rates of municipal infrastructure assets systems in South Africa have been a subject of interest for researchers aiming to understand how these systems are implemented and utilised across different communities. A multilevel regression model was employed to analyse data collected from various municipalities. The model accounts for both individual-level and area-level factors influencing the adoption rate of these systems. The analysis revealed significant differences in adoption rates across different municipal areas, with a notable proportion (25%) showing high levels of asset system utilization. Multilevel regression analysis provided valuable insights into the complex factors affecting the adoption of municipal infrastructure assets systems. This methodological evaluation can inform future research and policy development. Further studies should explore how to enhance the implementation and maintenance of these systems, leveraging the findings from this study. Municipal Infrastructure, Adoption Rates, Multilevel Regression Analysis, South Africa The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, multilevel regression, nested sampling, hierarchical analysis, econometric modelling, GIS integration, spatial statistics*

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