



Methodological Assessment of Municipal Infrastructure Asset Systems in South Africa Using Panel Data for Adoption Rate Measurement

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Abstract

The adoption rate of municipal infrastructure assets in South Africa is a critical issue for urban planning and development. A mixed-methods approach combining qualitative interviews with quantitative econometric analysis, specifically employing a random effects model for estimating adoption rates. Panel data revealed that the average adoption rate varied significantly between municipalities, ranging from 30% to 75%, indicating substantial variation in infrastructure implementation and uptake across regions. The study underscores the need for tailored strategies to improve municipal infrastructure adoption rates, particularly focusing on socio-economic factors influencing uptake. Implementing targeted interventions based on local context can enhance the effectiveness of future municipal infrastructure projects in South Africa. municipal infrastructure, panel data, econometric analysis, adoption rate 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, econometric, urbanization, asset management, panel analysis, qualitative research, governance*

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