



Evaluation of Municipal Infrastructure Asset Systems in Tanzania Using Panel Data for System Reliability Assessment

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Abstract

The study focuses on evaluating municipal infrastructure asset systems in Tanzania, aiming to enhance system reliability through panel data analysis. Panel data estimation methods were employed to analyse the municipal infrastructure asset systems in Tanzania. The study utilised robust standard errors and confidence intervals to account for potential uncertainties. A significant proportion (35%) of municipal infrastructures exhibited high levels of system reliability, indicating areas that require maintenance or upgrades. The findings suggest that incorporating predictive models into the asset management systems can significantly improve infrastructure reliability in Tanzania. Recommendation for policy makers includes prioritising investments in municipal infrastructure based on system reliability and implementing preventive maintenance strategies to enhance overall resilience. The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \varepsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Pan-African, Municipal Engineering, Panel Data Analysis, System Reliability, Asset Management, Econometrics, Geographic Information Systems (GIS)*

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