



Methodological Assessment of Urban Infrastructure Assets Systems in Uganda using Quasi-Experimental Design for Risk Reduction Analysis

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Abstract

Uganda's municipal infrastructure assets systems are crucial for urban development but face significant risks due to aging and inadequate maintenance. A quasi-experimental design was employed to assess the impact of improved maintenance protocols on reducing risks associated with municipal assets. The study utilised data from randomly selected municipalities and control areas. The analysis revealed that a 20% increase in investment per capita in asset management led to a 15% reduction in infrastructure failure rates, indicating a positive correlation between funding and risk mitigation effectiveness. Quasi-experimental design provides a robust framework for evaluating municipal infrastructure risk reduction strategies. The findings suggest that targeted investments can significantly improve the resilience of urban infrastructure systems. Municipal authorities should prioritise investment in asset management to enhance the reliability and longevity of critical infrastructure components. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \text{varepsilon}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, urbanization, econometrics, asset management, randomized control, spatial analysis, regression models*

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