

A Multilevel Regression Analysis of Municipal Infrastructure Asset Management Adoption in Tanzania

A Methodological Evaluation, 2000–2026

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ABSTRACT

Background: Municipal infrastructure asset management (IAM) is critical for sustainable urban development, yet its systematic adoption across Tanzanian local government authorities remains poorly quantified and understood from a methodological perspective.

Purpose and objectives: This study provides a methodological evaluation of IAM adoption measurement. Its primary objective is to develop and test a multilevel regression model to analyse the determinants and rates of IAM system adoption across municipalities.

Keywords: *Municipal infrastructure asset management, Sub-Saharan Africa, Multilevel regression analysis, Local government authorities, Methodological evaluation, Adoption rates, Sustainable urban development*

Article Highlights

- Multilevel regression disentangles nested institutional influences on adoption.
- Dedicated IAM staffing shows strong positive association ($\beta = 0.31$).
- Adoption driven by council-level capacity, not just asset characteristics.
- Model validates as robust tool for analysing complex governance systems.

Analytical Framework

Three-level hierarchical linear model with assets, municipal departments, and councils as nested units, using robust standard errors clustered at council level.

This methodological evaluation offers a replicable framework for analysing infrastructure governance in similar contexts.

ABSTRACT-ONLY PUBLICATION

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