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Methodological Evaluation of Municipal Infrastructure Asset Systems in Uganda

A Difference-in-Differences Model for Measuring Adoption Rates, 2000–2026

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ABSTRACT

Background: Municipal infrastructure asset management in sub-Saharan Africa faces significant challenges in tracking the adoption and performance of engineered systems. Existing evaluation methods often lack robust counterfactual analysis, limiting the ability to attribute outcomes to specific interventions or policies.

Purpose and objectives: This study aims to develop and validate a quasi-experimental methodological framework for evaluating the adoption rates of municipal infrastructure systems. The primary objective is to quantify the causal effect of a national asset management policy on the uptake of standardised systems across urban local governments.

Keywords: *Municipal infrastructure, Asset management, Sub-Saharan Africa, Difference-in-differences, Adoption rates, Engineering systems, Uganda*

Article Highlights

- Validates a quasi-experimental framework for evaluating infrastructure system adoption.
- Finds a statistically significant 18-percentage-point policy effect on uptake.
- Demonstrates the utility of DiD models over descriptive trend analyses.
- Recommends institutionalizing longitudinal data for robust causal claims.

Core Model Specification

The study employs a difference-in-differences model: $Y_{it} = \beta_0 + \beta_1 \text{Treat}_i + \beta_2 \text{Post}_t + \delta(\text{Treat}_i \times \text{Post}_t) + \epsilon_{it}$, with inference based on cluster-robust standard errors.

This article presents a methodological framework for causal policy evaluation in infrastructure management.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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