AFRICAN CIVIL ENGINEERING JOURNAL

ISSN: XXXX-XXXX | Peer-Reviewed | Open Access

Methodological Evaluation of Municipal Infrastructure Asset Systems in Uganda

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

DOI: 10.5281/zenodo.18973854 | **Received:** 17 April 2021 | **Accepted:** 20 June 2021 | **Published:** 12 August 2021

Julius Mugisha[1,2] | **Nakato Ssekamanya**[1] | **Patience Nalwoga**[3]
Moses Kato[4]

[1] *Uganda National Council for Science and Technology (UNCST)*
[2] *Department of Electrical Engineering, Busitema University*
[3] *Department of Electrical Engineering, National Agricultural Research Organisation (NARO)*
[4] *Makerere University Business School (MUBS)*

Correspondence: jmugisha@yahoo.com

DOI: 10.5281/zenodo.18973854

Received: 17 April 2021 | Accepted: 20 June 2021

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: $Y_{it} = \beta_0 + \beta_1 Treat_i + \beta_2 Post_t + \delta(Treat_i \times Post_t) + \varepsilon_{it}$, with inference based on cluster-robust standard errors.

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