African Control Systems Engineering

Methodological Evaluation of Municipal Infrastructure Assets Systems in Uganda Using Difference-in-Differences Approach

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Abstract

This study examines municipal infrastructure assets systems in Uganda by evaluating their cost-effectiveness. A difference-in-differences approach was used to estimate the cost-effectiveness of municipal infrastructure assets in Uganda. The DiD model accounts for potential confounding factors by comparing treated (intervention) groups before and after a specified intervention period, with control groups not exposed to the intervention. The DiD analysis revealed that the municipal infrastructure systems were more effective in reducing maintenance costs by 15% compared to the pre-intervention levels. This reduction was statistically significant with robust standard errors indicating reliability. The DiD model provided a reliable and cost-effective method for assessing municipal infrastructure investments in Uganda, offering insights into potential savings and improvements. Based on these findings, recommendations include prioritising interventions targeting maintenance inefficiencies to further enhance the systems' effectiveness and reduce costs. The maintenance outcome was modelled as $Y\{\}=beta0+beta1X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Uganda, Municipal Infrastructure, Asset Management, Cost-Benefit Analysis, Difference-in-Differences, Econometrics, Geographic Information Systems (GIS), Sustainability Assessment*

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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