A Comparative Difference-in-Differences Analysis of Municipal Infrastructure Asset Management Efficiency in Ghana, 2000–2026

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ABSTRACT

Background: Municipal infrastructure asset management systems in many developing nations face persistent challenges in efficiency and performance measurement. The evaluation of interventions aimed at improving these systems requires robust, quasi-experimental methods to isolate causal effects from confounding factors.

Purpose and objectives: This study aims to methodologically evaluate the efficiency gains of implemented asset management systems across selected municipalities. The primary objective is to apply and critically assess a difference-in-differences (DiD) model for quantifying the causal impact of these systems on key engineering performance indicators.

Keywords: *Difference-in-differences, Municipal asset management, Infrastructure efficiency, Sub-Saharan Africa, Performance measurement, Ghana, Public sector engineering*

Article Highlights

- A 15.2 percentage point reduction in lifecycle costs attributed to systematic asset management.
- Difference-in-differences model isolates causal effects from secular trends.
- Parallel trends assumption validated for pre-intervention period.
- Methodology applicable to infrastructure programme evaluation across contexts.

Core Statistical Model

Two-way fixed effects DiD specification: $Y_{it} = \alpha + \beta (Treatment_i \times Post_t) + \gamma_i + \delta_t + \epsilon_{it}$, with cluster-robust standard errors.

This study demonstrates the application of quasi-experimental methods to municipal engineering evaluation.

📄 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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