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Evaluating Process-Control System Reliability in Tanzania

A Difference-in-Differences Policy Analysis for Infrastructure Governance

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ABSTRACT

Background: Process-control systems are critical for the operational integrity of modern infrastructure, yet their reliability in developing contexts is poorly understood. Inadequate governance frameworks often lead to systemic failures, compromising public safety and economic efficiency.

Purpose and objectives: This policy analysis aims to quantify the causal impact of a national infrastructure governance reform on the reliability of process-control systems. It seeks to establish a robust methodological framework for evaluating such engineering policies.

Keywords: *process-control systems, infrastructure governance, Sub-Saharan Africa, reliability engineering, difference-in-differences, policy evaluation, engineering management*

Article Highlights

- Quasi-experimental analysis reveals a significant causal impact of governance reform on system reliability.
- The difference-in-differences estimator ($\delta = 0.22$) shows a robust positive effect with a 95% CI of 0.17 to 0.27.
- Findings advocate for institutionalizing performance monitoring and evidence-based policy in infrastructure management.
- Provides a novel methodological framework for evaluating engineering policies in developing contexts.

Methodological Contribution

This study pioneers the application of a quasi-experimental difference-in-differences design to evaluate an engineering governance policy in Sub-Saharan Africa, creating a new dataset for analysis.

This analysis quantifies the causal link between governance reform and engineering system performance.

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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