



Methodological Evaluation of Municipal Infrastructure Assets Systems in Ghana Using Difference-in-Differences for System Reliability Measurement

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Abstract

The reliability of municipal infrastructure assets in Ghana is crucial for economic development but has been underutilized through traditional evaluation methods. A difference-in-differences approach will be employed to evaluate the changes in system reliability before and after the intervention period. The DID model will account for potential confounders by comparing pre-intervention trends within control groups against those of the treatment group. The DID analysis revealed a statistically significant increase ($p < 0.05$) in average system reliability scores post-intervention, indicating improved infrastructure performance. The study confirms the efficacy of the DID model for measuring system reliability and suggests its applicability to other municipal infrastructure contexts in Ghana. Future research should consider incorporating additional variables into the DID framework and explore potential long-term effects beyond the initial intervention period. Municipal Infrastructure, Difference-in-Differences (DID), System Reliability, Intervention Study The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u + \epsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic, Infrastructure, Reliability, Methodology, Difference-in-Differences, Econometrics, Sustainability*

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