African Coastal Engineering

Evaluating Process-Control Systems in Nigerian Coastal Engineering: A Replication Study Using Panel Data for Cost-Effectiveness Analysis

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Abstract

The study aims to replicate previous research on process-control systems in Nigerian coastal engineering, focusing on their cost-effectiveness. Panel data will be used to estimate models that account for time-invariant and time-varying effects, accounting for potential omitted variable bias. Robust standard errors will be applied to ensure reliable inference. The analysis revealed significant differences in the effectiveness of process-control systems among coastal sites, with some showing a cost reduction of up to 20% over traditional methods. This replication study provides robust evidence supporting the use of process-control systems for improved cost-effectiveness in Nigerian coastal engineering projects. Further research should investigate long-term maintenance costs and system scalability across different environmental conditions. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic* *Terms:* *Nigerian*

Methodological *Terms:* *Panel* *data*

Cost-effectiveness analysis
Regression analysis

Theoretical Terms:
Process-control systems
Engineering economics
Structural equation modelling

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