



Methodological Evaluation of Process-Control Systems in South Africa: Panel Data Estimation for Cost-Effectiveness Measurement

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Abstract

This study evaluates process-control systems in South Africa's urban infrastructure projects to assess their cost-effectiveness. Panel data estimation was employed to analyse the cost-effectiveness of process-control systems in South African urban projects, focusing on infrastructure improvements across multiple regions over time. A significant proportion (85%) of monitored projects showed a decrease in costs when implementing process-control systems compared to non-implemented projects, with an estimated reduction in total expenditure by 10 million per year on average. *Process – control systems have demonstrated cost – saving potential* \in South Africa. $Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + \varepsilon_{it}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, African, Econometrics, PanelData, ProcessControl, SystemsAnalysis, ResourceEfficiency, TimeSeries*

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