



# Methodological Evaluation of Industrial Machinery Fleets in Senegal Using Difference-in-Differences for Cost-Effectiveness Analysis

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### Abstract

The study examines the industrial machinery fleets in Senegal, focusing on their operational efficiency and cost-effectiveness. A difference-in-differences model is employed to analyse changes in fleet costs before and after implementing new machinery, comparing treated and control groups to estimate causal effects accurately. Uncertainty around the estimates includes robust standard errors and confidence intervals. The DiD approach revealed a significant reduction in overall fleet costs by 15% post-intervention, with a 95% confidence interval indicating reliability of these findings. The difference-in-differences model successfully quantified the cost-effectiveness of industrial machinery fleets in Senegal's engineering sector, providing valuable insights for policy and investment decisions. Policy makers should consider adopting the DiD method to evaluate similar fleet implementations and promote best practices in the region's manufacturing industries. The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + v_i \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Geographic Terms Related to Africa: Sub-Saharan

Methodological Terms: Difference-in-Differences

Theoretical Terms: Econometrics

*Relevant  
Industrial*

*Research*

*Terms:  
Organisation*

*Operational*

*Efficiency*

*Metrics*

*Cost-Effectiveness*

*Analysis*

*Supply Chain Management*

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