



Methodological Evaluation of Industrial Machinery Fleets Systems in Ghana: A Randomized Field Trial for Cost-Effectiveness Assessments

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Abstract

Industrial machinery fleets are critical for economic growth in Ghana's manufacturing sector. However, their cost-effectiveness varies significantly, and empirical data on fleet optimization is scarce. A randomized field trial was conducted across five industrial sectors in Ghana. Data were collected through surveys and direct observations, with a sample size of 100 companies representing different industries and fleet sizes. The study found that implementing an optimised machinery fleet reduced operational costs by approximately 25% compared to traditional management practices. This randomized field trial methodology provides a robust framework for assessing the cost-effectiveness of industrial machinery fleets in Ghana, offering insights into optimising resource allocation and reducing operational expenses. The findings suggest that policymakers should consider implementing similar randomized trials across various sectors to inform future fleet management strategies. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u + \epsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Sub-Saharan, econometrics, stochastic, simulation, optimization, geographic information systems, regression analysis

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