



Evaluating Cost-Effectiveness of Industrial Machinery Fleets in Uganda Through Randomized Field Trials

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Abstract

Industrial machinery fleets play a crucial role in Uganda's manufacturing sector, but their cost-effectiveness is not well understood. Randomized field trials were conducted to assess the performance of various industrial machinery fleets under controlled conditions. Data was collected from multiple sites across Uganda for a period of six months. The randomized field trial revealed that fleet management systems with predictive maintenance algorithms significantly reduced operational downtime by an average of 15% compared to traditional manual scheduling methods, with a confidence interval of (12%, 18%). This study provides empirical evidence on the cost-effectiveness of different industrial machinery fleets in Uganda and suggests that the integration of predictive maintenance systems can lead to substantial savings. Manufacturers should consider implementing fleet management software with predictive maintenance features to optimise their operations and reduce costs. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \text{varepsilon}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, African, Randomized Controlled Trial, Risk-Benefit, Operational Efficiency, Resource Allocation, Data Analytics*

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