



# Methodological Assessment of Industrial Machinery Fleet Systems in Uganda: A Randomized Field Trial for Risk Reduction Evaluations

Muzeyinwa Okiep<sup>1</sup>

<sup>1</sup> Department of Sustainable Systems, Kyambogo University, Kampala

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**Correspondence:** [mokiep@outlook.com](mailto:mokiep@outlook.com)

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## Author notes

*Muzeyinwa Okiep is affiliated with Department of Sustainable Systems, Kyambogo University, Kampala and focuses on Engineering research in Africa.*

## Abstract

Industrial machinery fleets in Uganda face significant operational risks that can lead to equipment downtime and increased maintenance costs. A mixed-method approach was employed, including surveys, interviews, and data analysis using statistical models to assess system performance and identify areas for improvement. The randomized field trial demonstrated that the adoption of a predictive maintenance model significantly reduced equipment downtime by an average of 15% compared to traditional fleet management practices. The study concluded that implementing advanced fleet management systems can lead to substantial reductions in risk and operational costs for industrial machinery operations in Uganda. Ugandan industries are encouraged to adopt predictive maintenance models as a standard practice, alongside ongoing training and technological upgrades. Industrial Machinery Fleet Management, Predictive Maintenance, Risk Reduction, Randomized Field Trial 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, Randomized Controlled Trial, Sampling Theory, Quality Control, Lean Manufacturing, Supply Chain Management, Risk Assessment*

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