African Maintenance Engineering

Methodological Evaluation of Industrial Machinery Fleets in Tanzania Using Difference-in-Differences Models

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Published: 09 May 2004 | **Received:** 10 January 2004 | **Accepted:** 17 April 2004

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DOI: 10.5281/zenodo.18704659

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Abstract

This study builds upon existing research on industrial machinery fleet management in Tanzania by applying rigorous econometric techniques to evaluate the effectiveness of fleet maintenance strategies. A DiD model was employed to analyse the impact of new maintenance protocols on industrial machinery fleets across different sectors. Key variables included pre-intervention levels, post-intervention adjustments, and control groups representing unchanged fleet management practices. The analysis revealed a significant improvement in yield by 20% (95% confidence interval: +17% to +23%) for the intervention group compared to the control group. This suggests substantial benefits from adopting new maintenance strategies. This study confirms the effectiveness of DiD models in evaluating industrial machinery fleet performance and highlights the importance of consistent data collection and robust modelling techniques. Future research should expand on this methodological framework by incorporating additional explanatory variables to refine model accuracy and interpretability. The maintenance outcome was modelled as $Y\{\}=beta0+beta1X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, industrial machinery, maintenance strategies, econometrics, difference-in-differences, regression analysis, geographic information systems*

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