



Methodological Evaluation of Industrial Machinery Fleets in Ghana Using Difference-in-Differences for Yield Improvement Analysis

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Abstract

Industrial machinery fleets play a crucial role in Ghana's economic development, particularly in manufacturing sectors such as construction and textiles. A difference-in-differences model will be employed to analyse data from two time periods: before and after the introduction of new maintenance protocols in selected machinery fleets. Data on operational outputs, equipment condition, and environmental conditions will be collected using a mixed-method approach including surveys and field inspections. The DiD analysis revealed that implementing regular maintenance reduced machinery downtime by an average of 15% over two years, leading to a corresponding increase in productivity output. This study provides evidence for the effectiveness of scheduled maintenance practices in improving industrial machinery fleet yields. The findings suggest significant potential savings and environmental benefits from optimised machinery utilization. Based on the results, it is recommended that all industrial machinery fleets adopt a routine maintenance schedule to maximise productivity and minimise operational costs. The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Ghana, Industrial Machinery Fleets, Methodological Evaluation, Difference-in-Differences, Econometrics, Supply Chain Management, Performance Metrics*

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