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Methodological Evaluation and Efficiency Gains in Ghana's Industrial Machinery Fleets

A Difference-in-Differences Analysis

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ABSTRACT

Background: The operational efficiency of heavy machinery fleets is a critical determinant of productivity and cost in industrial sectors. In many developing economies, systematic evaluations of interventions aimed at improving fleet management are lacking, leading to investment decisions based on anecdotal evidence.

Purpose and objectives: This study aims to develop and apply a robust quasi-experimental methodology to quantify the causal impact of a structured maintenance and telematics intervention on the operational efficiency of industrial machinery fleets.

Keywords: *Industrial machinery, operational efficiency, Sub-Saharan Africa, difference-in-differences, fleet management, developing economies, productivity analysis*

Article Highlights

- Intervention increased fleet availability by 17.3 percentage points.
- Reductions in unplanned downtime drove primary efficiency gains.
- Study establishes a causal inference benchmark for African industrial settings.
- Recommends real-time monitoring systems for evidence-based fleet management.

Core Methodology

Difference-in-differences model analysing panel data from treatment and control groups, with inference based on cluster-robust standard errors.

This study presents a novel causal inference application for industrial machinery management.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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