

Quasi-Experimental Evaluation of Machinery Fleet Diagnostics and Yield Optimisation in Nigerian Industrial Systems

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ABSTRACT

Background: Industrial machinery fleets in Nigeria face persistent challenges with unplanned downtime and suboptimal output, yet there is a paucity of rigorous, field-based evaluations of diagnostic interventions within the local operational context.

Purpose and objectives: This study aimed to quantify the causal impact of a structured diagnostic protocol on the operational yield of industrial machinery fleets, evaluating its efficacy as a yield optimisation strategy.

Keywords: *Quasi-experimental design, Machinery diagnostics, Yield optimisation, Industrial systems, Sub-Saharan Africa, Predictive maintenance, Fleet management*

Article Highlights

- Quasi-experimental design establishes causal impact of diagnostic protocols on yield.
- 7.3 percentage point OEE gain driven by enhanced machinery availability.
- Study provides novel empirical evidence from Sub-Saharan African industrial context.
- Findings support integration of systematic diagnostics into routine fleet management.

Methodological Note

A difference-in-differences design compared 12 treatment fleets against 12 matched controls, with effects estimated via fixed-effects panel modelling.

This study offers rigorous field evidence for operational improvement strategies.

ABSTRACT-ONLY PUBLICATION

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