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Methodological Evaluation and Yield Optimisation in Nigerian Manufacturing

A Randomised Field Trial

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ABSTRACT

Background: Manufacturing productivity in many developing economies is constrained by systemic inefficiencies, yet rigorous field evidence on effective engineering interventions remains scarce. This study addresses the gap in empirical, plant-level data for yield optimisation.

Purpose and objectives: This case study aimed to methodologically evaluate a structured process-improvement protocol and quantify its causal impact on production yield within a Nigerian manufacturing context. The primary objective was to determine the efficacy of a randomised controlled trial (RCT) design in an industrial engineering setting.

Keywords: *Manufacturing productivity, Yield optimisation, Randomised controlled trial, Sub-Saharan Africa, Process engineering, Lean manufacturing, Industrial systems*

Article Highlights

- A randomised field trial across production lines quantified a 7.3pp causal yield gain.
- The study confirms the methodological feasibility of RCTs for industrial performance evaluation.
- Implementation required adaptation to real-time production scheduling constraints.
- Findings support data-driven, structured protocols for process optimisation in similar environments.

Methodological Insight

The study employed a linear regression model with robust standard errors clustered at the production-line level to estimate the causal treatment effect within the randomised controlled trial design.

This article presents primary empirical evidence from a field experiment in a Nigerian manufacturing plant.

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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