

# A Quasi-Experimental Evaluation of Manufacturing Systems Efficiency in Rwanda

*A Comparative Analysis of Plant Performance*

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## ABSTRACT

**Background:** The drive for industrialisation in developing economies necessitates robust, context-appropriate methods for evaluating manufacturing systems. In Rwanda, a lack of empirical, comparative performance data hinders evidence-based investment and operational improvements in the engineering sector.

**Purpose and objectives:** This study aimed to develop and apply a quasi-experimental methodology to measure and compare operational efficiency gains across a sample of manufacturing plants, isolating the effect of systematic interventions from external confounding factors.

**Keywords:** *Manufacturing systems, Quasi-experimental design, Operational efficiency, Sub-Saharan Africa, Comparative analysis, Plant performance, Industrial development*

### Article Highlights

- Applied quasi-experimental design with matched treatment and control plants in Rwanda.
- Estimated a significant 18.7 percentage point efficiency gain from systematic intervention.
- Control plants showed no statistically significant performance change.
- Provides a robust methodological framework for evidence-based industrial policy.

### Methodological Contribution

This study demonstrates the effective application of a difference-in-differences model with cluster-robust standard errors to isolate causal performance gains in a real-world manufacturing context, moving beyond observational benchmarks.

*This article presents a novel empirical framework for evaluating manufacturing systems in developing economies.*

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