

CASE STUDY

# Methodological Evaluation of Process-Control Systems for Yield Improvement in Ghana

*A Panel-Data Estimation Case Study*

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## ABSTRACT

**Background:** Persistent yield inefficiencies in manufacturing and processing sectors present a significant challenge to industrial productivity. The implementation of advanced process-control systems is a proposed solution, but rigorous, longitudinal evaluation of their impact in specific operational contexts is often lacking.

**Purpose and objectives:** This case study aims to methodologically evaluate the efficacy of modern process-control systems on yield improvement within an industrial setting. Its objective is to quantify the causal impact of system upgrades using a panel-data econometric framework.

**Keywords:** *Process-control systems, Yield improvement, Panel-data estimation, Sub-Saharan Africa, Manufacturing productivity, Industrial engineering, Ghana*

### Article Highlights

- Fixed-effects model quantifies causal impact of control systems on manufacturing yield.
- Analysis shows heterogeneous effects: greater gains in lines with historically higher variability.
- Demonstrates value of longitudinal econometric methods for post-implementation engineering evaluation.
- Provides evidence-based framework for capital project assessment in industrial settings.

### Methodological Contribution

Applies panel-data econometrics with cluster-robust inference to isolate the causal effect of process-control upgrades in a real-world manufacturing context.

*This case study offers a replicable framework for evaluating industrial capital investments.*

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## 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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