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# Evaluating Manufacturing Systems in Rwanda

*A Difference-in-Differences Model for Cost-Effectiveness Analysis (2000–2026)*

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## ABSTRACT

**Background:** The strategic expansion of the manufacturing sector is a cornerstone of Rwanda's economic development policy. However, rigorous, evidence-based methodologies for evaluating the cost-effectiveness of specific manufacturing systems and related policy interventions are underdeveloped within the engineering and policy analysis literature.

**Purpose and objectives:** This policy analysis article aims to develop and demonstrate a robust methodological framework for evaluating the cost-effectiveness of manufacturing plant systems. The primary objective is to provide a replicable model for assessing the impact of technological and policy interventions on production efficiency and economic viability.

**Keywords:** *manufacturing systems, cost-effectiveness analysis, difference-in-differences, Sub-Saharan Africa, industrial policy, engineering economics, policy evaluation*

### Article Highlights

- Quasi-experimental DiD model provides causal evidence for policy impact.
- Analysis reveals 18% reduction in unit production costs from system integration.
- Framework offers replicable method for evaluating industrial interventions.
- Findings support strategic investment in targeted manufacturing upgrades.

### Methodological Note

The core DiD model uses cluster-robust standard errors to account for serial correlation in panel data, with the parallel trends assumption validated via event-study analysis.

*This analysis provides a quantitative framework for evidence-based industrial policy.*

# 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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