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Methodological Evaluation and Time-Series Forecasting for Manufacturing Plant Efficiency Gains in Ghana, 2000–2026

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ABSTRACT

Background: The manufacturing sector's productivity is a critical determinant of industrial growth and economic development. In many developing economies, systematic evaluation of plant-level efficiency and robust forecasting of gains remain underdeveloped, hindering evidence-based industrial policy formulation.

Purpose and objectives: This policy analysis aims to methodologically evaluate systems within the manufacturing sector and develop a predictive model to forecast efficiency gains. The objective is to provide a quantitative tool for policymakers to assess the impact of interventions and plan resource allocation.

Keywords: *Manufacturing productivity, Industrial policy, Sub-Saharan Africa, Time-series analysis, Plant-level efficiency, Process optimisation, Developing economies*

Article Highlights

- Forecasts a 1.2% average annual efficiency gain for Ghanaian manufacturing.
- Highlights a wide confidence interval (0.7% to 1.8%) indicating forecast sensitivity.
- Proposes integrating forecasting models into regular industrial policy reviews.
- Advocates for investment in digital monitoring to improve model data quality.

Methodological Note

The core model is an ARIMA specification estimated via maximum likelihood, with robust standard errors to account for heteroskedasticity in plant-level panel data.

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