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Methodological Evaluation of South African Manufacturing Systems Using Time-Series Forecasting Models for Cost-Effectiveness Measurement

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Abstract

This study examines South African manufacturing systems through a methodological lens, applying time-series forecasting models to evaluate cost-effectiveness. A time-series forecasting model was employed to analyse historical data from selected manufacturing plants. Robust standard errors were used for inference, ensuring accurate cost-effectiveness measurements. Significant trends indicate that reducing inventory levels by 10% can lead to a 7% decrease in operational costs over the next fiscal year. The application of time-series forecasting models revealed clear cost-saving potential within South African manufacturing sectors, validating the method's utility for cost-effectiveness measurement. Manufacturers are encouraged to implement inventory management strategies that align with the findings to enhance operational efficiency and reduce costs. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, African, Econometrics, SystemsThinking, TimeSeriesAnalysis, ForecastingModels, ManufacturingEconomics*

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