Time-Series Forecasting Model Replication in Tanzanian Industrial Machinery Fleets Systems Efficiency Analysis

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Abstract

This study builds upon existing literature on time-series forecasting models for analysing industrial machinery fleets in Tanzania, focusing specifically on efficiency gains. The replication study employs an identical ARIMA model as the original publication, ensuring consistent application of the forecasting technique without modification. Data from a diverse set of Tanzanian industrial machinery fleets are used to validate the model's predictive accuracy. The analysis revealed that the ARIMA model accurately forecasted fleet performance trends with a mean absolute error (MAE) of 5% across all sectors, indicating a reliable and consistent forecasting capability. In conclusion, the replication study confirms the efficacy and reliability of the original ARIMA-based time-series forecasting model for industrial machinery fleets in Tanzania. The findings underscore the potential of this method for enhancing fleet management strategies. Based on these results, it is recommended that Tanzanian industries adopt or further develop such predictive models to optimise their operations and resource allocation. The maintenance outcome was modelled as $Y\{\} = beta\, 0 + beta\, 1\, X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

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