African Oil and Gas Engineering

Time-Series Forecasting in Tanzanian Industrial Machinery Fleets: A Replication Study

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Abstract

This study addresses a current research gap in Engineering concerning Methodological evaluation of industrial machinery fleets systems in Tanzania: time-series forecasting model for measuring yield improvement in Tanzania. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of industrial machinery fleets systems in Tanzania: time-series forecasting model for measuring yield improvement, Tanzania, Africa, Engineering, replication study This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, Geographic Information Systems (GIS), Data Mining, Time Series Analysis, Econometrics, Predictive Maintenance, Forecasting Models*

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