Time-Series Forecasting Model Evaluation of Power-Distribution Equipment Systems in Tanzania

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Abstract

Power distribution equipment systems in Tanzania are critical for ensuring reliable electricity supply to various sectors of the economy. A comprehensive analysis using ARIMA (AutoRegressive Integrated Moving Average) model was conducted to forecast future costs and optimise investments. The ARIMA model predicted a reduction in maintenance costs by approximately 15% over the next five years, with an uncertainty of ±3.0% ARIMA proved effective in forecasting power distribution equipment costs, offering significant cost savings for Tanzanian utilities. Implementing these findings could lead to more efficient resource allocation and improved service delivery across Tanzania. Power Distribution, Time-Series Forecasting, ARIMA Model, Cost-Effectiveness, Tanzania The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, ARIMA, Box-Jenkins, Time-Series Analysis, Forecasting, Econometrics, Geographic Information Systems*

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