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Forecasting Adoption Rates in Nigerian Power-Distribution Equipment Systems Using Time-Series Models

Osita Agbakachiwa[1,2], **Chinedu Ugwuoye**[1,3]

[1] Bayero University Kano

[2] Department of Sustainable Systems, Agricultural Research Council of Nigeria (ARCN)

[3] Agricultural Research Council of Nigeria (ARCN)

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Correspondence: oagbakachiwa@aol.com

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Author notes

Osita Agbakachiwa is affiliated with Bayero University Kano and focuses on Engineering research in Africa.

Chinedu Ugwuoye is affiliated with Agricultural Research Council of Nigeria (ARCN) and focuses on Engineering research in Africa.

Abstract

Nigeria's power distribution equipment (PDE) systems face significant challenges in terms of reliability and efficiency, with adoption rates varying across different regions. A comprehensive analysis using ARIMA (AutoRegressive Integrated Moving Average) model was conducted to forecast future adoption rates based on historical data from various regions. The ARIMA model predicted an average increase of 2.5% in PDE system adoption over the next five years, with a confidence interval ranging from 1.8% to 3.2%. This finding highlights the potential for targeted interventions to boost adoption rates. ARIMA models provide valuable insights into future trends and can aid policymakers in formulating strategies to enhance PDE system performance and user satisfaction. Policymakers should consider implementing ARIMA-based forecasting as a tool for planning and resource allocation, particularly focusing on regions with lower adoption rates. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Nigerian, Power-Distribution, Equipment, Time-Series, Forecasting, Regional, Analysis*

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