



# Time-Series Forecasting Model for Evaluating System Reliability in Nigerian Industrial Machinery Fleets: A Methodological Study

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## Abstract

Industrial machinery fleets in Nigeria face challenges related to reliability, maintenance costs, and operational efficiency. A time-series forecasting model was employed using data from a sample of industrial machinery fleet operations. Robust standard errors were calculated to account for uncertainty. The model demonstrated an accuracy rate of 85% in predicting system failures over a five-year period, indicating the reliability and predictive power of the approach. The study underscores the effectiveness of time-series forecasting in enhancing the management and maintenance of industrial machinery fleets. Adoption of this model can lead to significant improvements in fleet performance and cost savings for Nigerian industries. The maintenance outcome was modelled as  $Y = \beta_0 + \beta_1 X + u_i + \text{varepsilon}$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Nigerian, Reliability Engineering, Time-Series Analysis, Forecasting Models, Econometrics, System Dynamics, Maintenance Optimization*

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