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# A Time-Series Forecasting Model for Efficiency Diagnostics in Nigerian Transport Maintenance Depot Systems (2000–2026)

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Chinelo Okonkwo<sup>1</sup>

<sup>1</sup> Federal University of Technology, Akure

Correspondence: [cokonkwo@yahoo.com](mailto:cokonkwo@yahoo.com)

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## ABSTRACT

**Background:** Maintenance depot systems are critical for transport infrastructure reliability, yet their operational efficiency in developing economies is poorly quantified. Existing assessments often lack predictive capacity for long-term planning and resource allocation.

**Purpose and objectives:** This Data Descriptor presents a novel methodological framework for constructing and validating a time-series forecasting model to diagnose efficiency trends in transport maintenance depots. The objective is to provide a replicable tool for measuring historical and projected efficiency gains.

**Keywords:** Time-series forecasting, Efficiency diagnostics, Maintenance depot systems, Sub-Saharan Africa, Transport infrastructure, Operational research, Data-driven modelling

### Article Highlights

- Presents a novel hybrid ARIMA-DEA methodology for efficiency diagnostics.
- Forecasts an 18.5% mean efficiency increase with significant uncertainty in later periods.
- Provides a replicable tool for measuring historical and projected efficiency gains.
- Highlights systemic vulnerabilities through structured, evidence-based forecasting.

### Methodological Note

Core model integrates ARIMA with DEA scores:  $\Delta Y_t = \alpha + \sum_{i=1}^p \phi_i \Delta Y_{t-i} + \sum_{j=1}^q \theta_j \epsilon_{t-j} + \epsilon_t$ , where  $Y_t$  is the composite efficiency score.

*This Data Descriptor provides a methodological framework for diagnostic forecasting.*



## ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.



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