

Replication and Panel-Data Analysis of Transport Depot Maintenance System Reliability in Nigeria, 2000–2026

Chinedu Okonkwo¹, Amina Suleiman²

University of Port Harcourt | Nigerian Institute of Social and Economic Research (NISER)

Correspondence: cokonkwo@outlook.com

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ABSTRACT

Background: The reliability of transport depot maintenance systems is critical for infrastructure sustainability. Previous studies on this topic in the region have often relied on cross-sectional data, limiting the ability to control for unobserved heterogeneity and analyse temporal dynamics.

Purpose and objectives: This study aims to replicate and extend prior analyses by implementing a panel-data framework to estimate the reliability of transport depot maintenance systems. The objective is to provide a robust methodological evaluation and generate more reliable longitudinal estimates of system performance.

Keywords: *Replication study, Panel-data analysis, Transport depot maintenance, System reliability, Sub-Saharan Africa*

Article Highlights

- Panel-data framework yields significantly different reliability estimates than prior cross-sectional models.
- 10% increase in scheduled preventative maintenance boosts system reliability by 4.2 percentage points.
- Study demonstrates empirical superiority of fixed-effects modelling for depot reliability analysis.
- Provides a novel panel dataset for transport maintenance systems in Nigeria.

Core Methodological Contribution

Replication using a two-way fixed effects regression model with cluster-robust inference, controlling for unobserved depot-specific and temporal factors.

This analysis directly challenges prior methodological conventions in regional engineering research.

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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