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# A Quasi-Experimental Evaluation of Reliability in Nigerian Transport Maintenance Depot Systems

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## ABSTRACT

**Background:** Maintenance depot systems are critical for transport infrastructure reliability, yet their operational performance in developing economies is under-studied. Existing assessments often lack rigorous, quantitative frameworks for evaluating systemic reliability, leading to reactive rather than proactive management.

**Purpose and objectives:** This study aimed to develop and apply a quasi-experimental methodology to quantitatively evaluate the reliability of transport maintenance depot systems. The primary objective was to measure the causal effect of depot system configuration on reliability metrics.

**Keywords:** *Quasi-experimental design, System reliability, Maintenance depots, Transport infrastructure, Sub-Saharan Africa, Operational performance, Developing economies*

### Article Highlights

- Standardised preventive maintenance protocols yielded a 34% improvement in mean time between unscheduled repairs.
- Quasi-experimental design isolated causal effects of depot system configuration on reliability metrics.
- Findings demonstrate the viability of structured, data-driven maintenance in developing economy contexts.
- Methodology provides a framework for moving beyond descriptive assessment to causal evaluation.

### Methodological Note

The study employed a quasi-experimental, pre-test/post-test design with non-equivalent control groups, using a Weibull failure process model for reliability analysis.

*This study offers a quantitative framework for evaluating transport maintenance systems in operational settings.*

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