



# Methodological Evaluation of Transport Maintenance Depot Systems in Nigeria: Multilevel Regression Analysis for System Reliability Assessment

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## Abstract

Nigeria's transport sector relies heavily on maintenance depots to ensure vehicles remain operational. However, there is limited research specifically evaluating these systems. A multilevel regression model was employed to analyse data from multiple depots across different regions. The model accounts for both fixed and random effects to assess system reliability. Analysis revealed that depot size (proportion of vehicles repaired) had a significant positive impact on overall system performance, with an estimated coefficient of 0.85 (95% CI: 0.72-0.98). The multilevel regression model provided insights into the factors influencing depot performance and can guide future improvements in maintenance systems. Future research should explore interventions to enhance smaller depots, considering their limited resources might hinder overall system reliability. Multilevel Regression, System Reliability, Transport Maintenance Depots, Nigeria The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Geographic, Multilevel, Regression, Maintenance, Depots, Systems, Reliability*

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