



Methodological Evaluation of Transport Maintenance Depots Systems in Nigeria: Quantifying Risk Reduction Using Difference-in-Differences Analysis

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Abstract

Transport maintenance depots (TMDs) are critical infrastructure in Nigeria for ensuring road safety and serviceability of vehicles. These facilities store spare parts, perform repairs, and provide services to vehicle operators. A DID analysis was conducted using data from TMDs across Nigeria, with pre- and post-intervention periods. The model accounts for potential confounders such as regional variations and operator characteristics. The DID analysis indicated a significant reduction in vehicle breakdowns by 25% within the intervention period compared to non-intervention regions. TMD systems have demonstrated substantial risk-reducing effects, with estimated reductions measured at the 95% confidence interval. Further studies should explore scalability and cost-effectiveness of TMDs in other sectors such as railroads and aviation. Transport Maintenance Depots, Risk Reduction, Difference-in-Differences Analysis, Vehicle Safety 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: *Geographical Information Systems, Infrastructure Management, Difference-in-Differences, Quantitative Methods, Maintenance Logistics, Supply Chain Optimization, Geographic Analysis*

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