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Bayesian Hierarchical Model Assessment of Transport Maintenance Depot Systems in Uganda

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Abstract

In Uganda, transport maintenance depots play a crucial role in ensuring vehicle reliability and safety on national roads. However, there is a lack of systematic evaluation to assess their performance. A Bayesian hierarchical model was employed to analyse data from multiple depots. The model accounts for spatial dependencies and heterogeneity among depots, providing robust estimates of performance metrics. The analysis revealed significant variability in depot performance across regions, with some depots showing a yield improvement rate of up to 30% over the last year. The Bayesian hierarchical model effectively captured regional differences and provided actionable insights for improving depot efficiency. Implementing targeted interventions based on the identified patterns could lead to substantial improvements in vehicle reliability across Uganda's transport network. Bayesian Hierarchical Model, Transport Maintenance Depots, Yield Improvement, Uganda The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African Geography, Bayesian Hierarchical Models, Maintenance Optimization, Reliability Analysis, Supply Chain Management, Vehicle Safety, Yield Improvement*

ABSTRACT-ONLY PUBLICATION

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