



Methodological Evaluation of Transport Maintenance Depot Systems in Uganda Using Multilevel Regression Analysis for Efficiency Gains

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Abstract

The field of transport maintenance in Uganda is characterized by a need for improved efficiency to meet growing demands and reduce operational costs. A multilevel regression model was employed to analyse data from multiple TMDs across different regions in Uganda. The model accounts for both fixed and random effects, ensuring robust estimates of efficiency gains. The analysis revealed that the proportion of maintenance tasks completed within timeframes increased by approximately 15% when depot staffing levels were optimised based on workload patterns. This study provides evidence supporting the use of multilevel regression for assessing and enhancing the operational performance of transport maintenance depots in developing countries. Based on these findings, it is recommended that Ugandan transport authorities consider implementing staff augmentation strategies to align with regional workload demands for improved depot efficiency. Transport Maintenance Depots (TMDs), Multilevel Regression Analysis, Efficiency Gains, Uganda 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: *African geography, Maintenance systems, Multilevel models, Regression analysis, Efficiency measurement, Transport logistics, Quantitative methods*

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