Multilevel Regression Analysis for Measuring Adoption Rates in Transport Maintenance Depots Systems in Uganda: An Empirical Study

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Abstract

Transport maintenance depots (TMDs) play a crucial role in ensuring efficient vehicle operations in Uganda's transportation sector. Despite their importance, there is limited empirical evidence on how these systems are adopted and utilised across different locations. The research employed multilevel logistic regression models to analyse data from multiple sources including interviews and surveys conducted across different TMDs. The model accounts for both fixed effects (e.g., depot characteristics) and random effects (e.g., location-specific variables). Multilevel analysis revealed that the adoption rate of TMDs in Ugandan depots varied significantly, with a proportion of 45% across different regions. Factors such as local infrastructure support and depot management practices were found to be significant predictors of adoption. The multilevel regression approach provides valuable insights into the factors affecting the adoption rates of TMDs in Ugandan depots, which can inform policy decisions aimed at improving vehicle maintenance efficiency. Policymakers should prioritise supportive local infrastructure and engage with depot managers to enhance the effectiveness of TMDs. Additionally, targeted training programmes for maintenance staff could further improve system utilization. Transport Maintenance Depots, Adoption Rates, Multilevel Regression Analysis, Uganda, Vehicle Operations The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, multilevel modelling, transport maintenance, adoption rates, hierarchical linear models, empirical evaluation, statistical methods*

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