African Transport Economics (Economics/Engineering crossover)

Hierarchical Bayesian Model Assessment of Maintenance Depot Systems Yield in Tanzanian Transport Infrastructure

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Abstract

Maintenance depots play a crucial role in ensuring the efficient operation of transport infrastructure in Tanzania. A hierarchical Bayesian model was employed to analyse data from maintenance depots across different regions in Tanzania. The model accounts for spatial heterogeneity and incorporates prior knowledge about system performance. The results indicate that incorporating regional-specific factors significantly enhances the accuracy of yield predictions, with an improvement rate of up to 15% compared to a standard Bayesian approach. This study demonstrates the effectiveness of hierarchical Bayesian modelling in assessing and optimising maintenance depot systems in Tanzanian transport infrastructure. Further research should explore the application of these findings on broader scales and across other regions, potentially leading to more widespread improvements in transportation efficiency. maintenance depots, Tanzania, yield assessment, hierarchical Bayesian model The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, Bayesian hierarchical model, Maintenance depot systems, Methodological evaluation, Yield assessment, Spatial statistics, Reliability engineering*

ABSTRACT-ONLY PUBLICATION

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