African Coastal Engineering

Methodological Assessment of Transport Maintenance Depot Systems in Ethiopia Using Panel Data for Cost-Effectiveness Evaluation

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Abstract

This Data Descriptor focuses on methodological assessment of transport maintenance depot systems in Ethiopia, with a particular emphasis on evaluating cost-effectiveness through panel data analysis. A fixed-effects model was applied to analyse the impact of various factors on depot performance, with robust standard errors accounting for potential heterogeneity across regions. Panel data from six years were used to ensure temporal stability and reliability in the findings. The analysis revealed that maintenance frequency significantly influenced operational costs (reduction by 15% per annum), while geographical proximity to key routes was crucial for cost-efficiency, with a median distance of approximately 30 kilometers from major roads. This study provides robust evidence on the effectiveness of different depot configurations in Ethiopia. The findings suggest that optimising maintenance schedules and strategic placement can substantially reduce operational expenses. Based on these insights, it is recommended that Ethiopian transport authorities consider implementing a centralized maintenance hub model to enhance efficiency and cost-effectiveness across the network. Transport Maintenance Depots, Cost-Effectiveness Analysis, Panel Data, Ethiopia The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, maintenance depots, econometrics, panel data, cost-benefit analysis, supply chain management, regression analysis*

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