African Maintenance Engineering

Methodological Evaluation of Transport Maintenance Depot Systems in Tanzania: A Randomized Field Trial for Cost-Efficiency Assessment

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Abstract

Transport maintenance depots play a critical role in ensuring efficient operation of transport systems in Tanzania. However, their effectiveness and cost-efficiency vary significantly across different depots. A randomized field trial was conducted among five randomly selected depots. Depot performance metrics were collected over a year, and statistical models were used to analyse data for cost-efficiency assessment. The analysis revealed that Depot A achieved the lowest maintenance costs per vehicle while achieving comparable service quality compared to other depots ($p < 0.05$). The randomized field trial provided valuable insights into the operational methodologies of transport maintenance depots in Tanzania, contributing to more cost-effective and efficient depot systems. Future research should focus on replicating this study across a wider range of depots and incorporating predictive models to forecast future costs and efficiencies. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic Terms: Tanzania*

Methodological Terms:
Randomized Controlled Trials (RCTs)
Operational Efficiency
Cost-Benefit Analysis
Logistics Management
Supply Chain Optimization

Theoretical Terms:
Transportation Systems Theory
Resource Allocation Models

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