



Methodological Assessment of Transport Maintenance Depot Systems in Ghana Using Quasi-Experimental Design for Cost-Effectiveness Evaluation

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Abstract

The transportation sector in Ghana faces significant challenges related to vehicle maintenance and logistics management, impacting agricultural productivity and economic growth. A quasi-experimental design was employed to assess the performance of transport maintenance depots. Data were collected through surveys and interviews, with statistical analyses conducted using regression models to measure cost-effectiveness indicators. The analysis revealed that depots operating under a centralized management model reduced vehicle downtime by approximately 20% compared to decentralized setups, indicating better resource allocation and coordination. This study underscores the importance of integrated depot systems for optimising maintenance services in Ghana's agricultural context. Investment in standardised depot infrastructure and training programmes for maintenance staff are recommended to enhance overall system performance. 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 logistics, Quasi-experimental design, Cost-effectiveness, Transportation sector, Evaluation methodology, Logistics management*

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