



# Methodological Evaluation of Transport Maintenance Depot Systems in South Africa Using Difference-in-Differences Approach

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## Abstract

Transport maintenance depots (TMDs) are critical infrastructure for ensuring vehicle reliability in South Africa's transportation sector. These facilities play a vital role in maintaining and repairing vehicles, which is essential for public safety and operational efficiency. A Difference-in-Differences approach will be employed to analyse the data collected from multiple years, controlling for potential confounding variables such as regional economic conditions and historical vehicle usage patterns. The DiD model reveals that certain regions experienced a significant increase in TMD adoption rates after implementing new maintenance protocols, indicating the effectiveness of these interventions. This study provides insights into how specific policies can enhance the efficiency and reliability of transport maintenance systems in South Africa. Based on the findings, policymakers should prioritise regions with lower adoption rates by promoting targeted training programmes and financial incentives to accelerate system implementation. 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:** *Sub-Saharan, econometrics, randomized trials, spatial analysis, regression discontinuity, infrastructure assessment, maintenance efficacy*

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