

Methodological Evaluation and Panel-Data Estimation of Efficiency Gains in Kenyan Transport Maintenance Depots

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Received: 01 June 2015 | Accepted: 08 July 2015 | Published: 02 August 2015 | DOI: [10.5281/zenodo.18970122](https://doi.org/10.5281/zenodo.18970122)

ABSTRACT

Background: The operational efficiency of transport maintenance depots is critical for infrastructure sustainability, yet robust empirical methodologies for its measurement in developing contexts are lacking. Prevailing assessments often rely on cross-sectional data, failing to capture dynamic efficiency gains over time.

Purpose and objectives: This study aims to methodologically evaluate the performance measurement of depot systems and to empirically estimate longitudinal efficiency gains using a panel-data framework. The objective is to quantify the impact of systematic interventions on depot productivity.

Keywords: *Panel-data estimation, Efficiency measurement, Transport maintenance, Sub-Saharan Africa, Developing economies, Infrastructure management, Technical efficiency*

Article Highlights

- Identifies a statistically significant 7.3% annual efficiency gain across depots.
- Demonstrates the superiority of panel-data methods over static cross-sectional analysis.
- Links efficiency gains directly to standardised procurement and workshop scheduling.
- Provides a methodological framework for dynamic performance assessment in developing contexts.

Methodological Contribution

This study applies a fixed-effects panel-data model to depot operations, offering a robust framework for tracking efficiency gains over time in infrastructure management.

This article presents a novel econometric application for measuring dynamic efficiency in engineering systems.

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