

# Methodological Evaluation and Panel-Data Estimation of Yield Improvement in Senegalese Transport Maintenance Depots

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Received: 07 July 2001 | Accepted: 05 September 2001 | Published: 28 September 2001 | DOI:

[10.5281/zenodo.18969113](https://doi.org/10.5281/zenodo.18969113)

## ABSTRACT

**Background:** Transport infrastructure maintenance in developing economies is critical for economic development, yet systematic evaluations of depot-level productivity are scarce. In Senegal, maintenance depots face persistent challenges in resource utilisation and output efficiency, but a lack of longitudinal empirical analysis hinders targeted interventions.

**Purpose and objectives:** This study aims to methodologically evaluate the performance measurement frameworks used in Senegalese transport maintenance depots and to empirically estimate the determinants of yield improvement over time. The objective is to identify key operational factors driving efficiency gains.

**Keywords:** *Panel-data estimation, Transport maintenance, Yield improvement, Francophone Africa, Methodological evaluation, Developing economies, Infrastructure management*

### Article Highlights

- A one-standard-deviation increase in technician training hours is associated with a 7.5% yield improvement.
- Inventory turnover ratio is a statistically significant positive driver of depot yield.
- The study provides the first application of panel-data estimation to Senegalese transport maintenance depots.
- Methodological evaluation advocates for panel-data techniques over cross-sectional analysis for performance monitoring.

### Core Econometric Model

Fixed-effects model:  $Y_{it} = \alpha_i + \beta_1 X_{1,it} + \dots + \beta_k X_{k,it} + \epsilon_{it}$ , with robust standard errors clustered at depot level.

*This study offers empirical evidence for targeted interventions in Francophone African infrastructure management.*

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