

POLICY ANALYSIS

# A Time-Series Forecasting Model for Adoption Rate Diagnostics in Kenyan Transport Depot Maintenance Systems

*A Policy Analysis, 2000–2026*

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Received: 22 January 2014 | Accepted: 05 May 2014 | Published: 24 June 2014 | DOI:

[10.5281/zenodo.18973408](https://doi.org/10.5281/zenodo.18973408)

## ABSTRACT

**Background:** Maintenance systems for transport depots in Kenya have undergone several policy-driven reforms, yet the rate of adoption of new technologies and practices remains a critical, unmeasured factor in their efficacy. A diagnostic tool to quantify this adoption rate is required for robust policy evaluation.

**Purpose and objectives:** This policy analysis aims to develop and evaluate a novel time-series forecasting model to diagnose the adoption rate of maintenance systems within the nation's transport depots, assessing the impact of recent infrastructure policies.

**Keywords:** *Policy analysis, Transport maintenance, Sub-Saharan Africa, Technology adoption, Time-series forecasting, Infrastructure diagnostics, Kenya*

### Article Highlights

- ARIMA model with policy intervention variable quantifies adoption rate shifts.
- Major depot policy caused an 18-point step-change increase in adoption.
- Forecasts suggest convergence to steady-state levels by mid-2020s.
- Diagnostic tool enables evidence-based evaluation of infrastructure policy.

### Core Methodology

ARIMA time-series model with exogenous policy variable ( $I_t$ ) estimated via maximum likelihood, using heteroskedasticity-robust inference on depot-level panel data.

*This analysis provides a quantitative framework for evaluating policy impact on technology adoption in transport systems.*

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