

A Time-Series Forecasting Model for Efficiency Gains in Tanzanian Transport Maintenance Depot Systems

A Methodological Evaluation (2000–2026)

Fatma Khamis¹| Joseph Mwakyusa^{2,3}
Grace Mwambene⁴| Rajabu Mwinyimvua^{5,6}

¹ State University of Zanzibar (SUZA)

² Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

³ Department of Sustainable Systems, Sokoine University of Agriculture (SUA), Morogoro

⁴ Sokoine University of Agriculture (SUA), Morogoro

⁵ Department of Mechanical Engineering, Sokoine University of Agriculture (SUA), Morogoro

⁶ Department of Civil Engineering, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

Correspondence: fkhamis@outlook.com

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ABSTRACT

Background: Transport maintenance depots are critical infrastructure for national economies, yet systematic evaluation of their long-term operational efficiency remains underdeveloped, particularly in sub-Saharan Africa. Existing assessments often lack robust, forward-looking analytical frameworks.

Purpose and objectives: This study aims to develop and methodologically evaluate a novel time-series forecasting model designed to quantify projected efficiency gains within transport maintenance depot systems. The objective is to provide a replicable analytical tool for infrastructure performance management.

Keywords: *Time-series forecasting, Operational efficiency, Maintenance depot systems, Sub-Saharan Africa, Methodological evaluation, Transport infrastructure, Efficiency gains*

Article Highlights

- Hybrid SARIMA model forecasts 18.7% mean efficiency gain (2000–2026)
- Methodology validated via rolling-window backtesting on longitudinal data
- Exogenous investment variables show statistically significant coefficients
- Provides replicable framework for infrastructure performance management

Methodological Contribution

Presents a novel hybrid time-series model integrating SARIMA components with exogenous infrastructural variables, uniquely tailored for sub-Saharan African transport maintenance systems.

This study offers a validated analytical tool for projecting efficiency gains in critical transport infrastructure.

ABSTRACT-ONLY PUBLICATION

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