



Methodological Evaluation of Transport Maintenance Depot Systems in Rwanda Using Time-Series Forecasting for System Reliability Assessment

Gaterwa Gasimba¹, Kayumba Ndeve², Kabuye Mukakibibi³

¹ African Leadership University (ALU), Kigali

² Rwanda Environment Management Authority (REMA)

³ Department of Sustainable Systems, University of Rwanda

Published: 06 August 2005 | **Received:** 09 March 2005 | **Accepted:** 02 July 2005

Correspondence: ggasimba@gmail.com

DOI: [10.5281/zenodo.18812292](https://doi.org/10.5281/zenodo.18812292)

Author notes

Gaterwa Gasimba is affiliated with African Leadership University (ALU), Kigali and focuses on Engineering research in Africa.

Kayumba Ndeve is affiliated with Rwanda Environment Management Authority (REMA) and focuses on Engineering research in Africa.

Kabuye Mukakibibi is affiliated with Department of Sustainable Systems, University of Rwanda and focuses on Engineering research in Africa.

Abstract

Transport maintenance depots (TMDs) play a crucial role in ensuring efficient vehicle operation within Rwanda's logistics sector. A novel approach combining ARIMA (AutoRegressive Integrated Moving Average) model with robust standard errors was employed for system reliability assessment in Rwanda's transport maintenance depots. The ARIMA model demonstrated a correlation coefficient of 0.95 between actual and forecasted vehicle downtime, indicating high predictive accuracy. This methodological evaluation provides a robust framework for assessing and improving the reliability of TMD systems in Rwanda. Implementing continuous monitoring and maintenance schedules based on ARIMA forecasts can significantly reduce vehicle downtime and enhance fleet efficiency. Transport Maintenance Depots, Time-Series Forecasting, System Reliability, ARIMA Model The maintenance outcome was modelled as $Y_t = \beta_0 + \beta_1 X_t + u_t + \text{varepsilon}_t$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, maintenance systems, forecasting models, time-series analysis, reliability assessment, ARIMA, econometrics*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ **REQUEST FULL PAPER**

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge