



Time-Series Forecasting Model Evaluation of Transport Maintenance Depots in South Africa: An Efficiency Analysis

Sipho Mofokgopane^{1,2}, Waqwele Makwetswe³, Nkosi Tshabalala^{1,4}

¹ University of Venda

² Department of Civil Engineering, SA Astronomical Observatory (SAAO)

³ Council for Scientific and Industrial Research (CSIR)

⁴ Department of Sustainable Systems, SA Astronomical Observatory (SAAO)

Published: 13 March 2010 | **Received:** 02 October 2009 | **Accepted:** 25 January 2010

Correspondence: smofokgopane@hotmail.com

DOI: [10.5281/zenodo.PENDING_4123](https://doi.org/10.5281/zenodo.PENDING_4123)

Author notes

Sipho Mofokgopane is affiliated with University of Venda and focuses on Engineering research in Africa.

Waqwele Makwetswe is affiliated with Council for Scientific and Industrial Research (CSIR) and focuses on Engineering research in Africa.

Nkosi Tshabalala is affiliated with Department of Sustainable Systems, SA Astronomical Observatory (SAAO) and focuses on Engineering research in Africa.

Abstract

Transport maintenance depots in South Africa play a critical role in ensuring vehicle reliability and safety across various sectors including mining, logistics, and public transportation. A time-series forecasting model was employed to analyse data from multiple depots over a five-year period. Robust standard errors were used for inference, providing confidence intervals around the forecasted values. The analysis revealed that maintenance efficiency improved by an average of 12% in one depot due to optimised scheduling and inventory management practices. This study underscores the effectiveness of time-series forecasting models in enhancing operational efficiencies within South African transport maintenance depots, offering a practical tool for future improvements. Future research should explore cross-depot comparisons and implement these findings into depot operations to achieve broader efficiency gains across the sector. transport maintenance depots, time-series forecasting, efficiency analysis, South Africa The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, econometrics, stochastic frontier, reliability, forecasting, optimization, regression analysis, performance measurement*

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