Revisiting Time-Series Forecasts of Transport Maintenance Depot Systems in South Africa: A Methodological Validation Study

Nolwazi Mkhize[1], Siyabonga Ndlovu[2,3]

[1] Department of Mechanical Engineering, Wits Business School

[2] Wits Business School

[3] University of the Free State

Author notes

Nolwazi Mkhize is affiliated with Department of Mechanical Engineering, Wits Business School and focuses on Engineering research in Africa.
Siyabonga Ndlovu is affiliated with Wits Business School and focuses on Engineering research in Africa.

Abstract

This study revisits previous work on forecasting transport maintenance depot systems in South Africa to validate methodological approaches. The methodology involves re-analysis of existing data sets using advanced statistical tools such as ARIMA (AutoRegressive Integrated Moving Average) model equations to forecast future maintenance demands and identify trends. A key finding is that the application of robust standard errors significantly improves the accuracy of forecasts, reducing variance by approximately 15% compared to previous studies. The re-analysis confirms the effectiveness of time-series forecasting in predicting maintenance needs with a precision level indicated by the model's confidence interval. Further research should consider incorporating real-time data sources and integrating machine learning techniques for enhanced predictive accuracy. The maintenance outcome was modelled as $Y\{\}=beta\,0+beta\,1\,X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, African, GPS, Markov, Simulation, Regression, Time-Series*

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