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

Getachew Abera[1], Mulu Gebru[2]

[1] Gondar University

[2] Ethiopian Institute of Agricultural Research (EIAR)

Author notes

Getachew Abera is affiliated with Gondar University and focuses on Engineering research in Africa.

Mulu Gebru is affiliated with Ethiopian Institute of Agricultural Research (EIAR) and focuses on Engineering research in Africa.

Abstract

Transport maintenance depots (TMDs) play a crucial role in ensuring vehicle reliability and operational efficiency for various transportation sectors in Ethiopia. A comprehensive analysis was conducted to assess the performance of TMDs. The study utilised ARIMA (AutoRegressive Integrated Moving Average) model for forecasting vehicle downtime and predicting future system reliability. The ARIMA model predicted a reduction in average downtime by 15% over the next year, indicating improved maintenance scheduling strategies. The application of ARIMA models demonstrated significant potential for enhancing TMD systems' reliability in Ethiopia. Further research should focus on integrating machine learning algorithms to improve model accuracy and operational efficiency. The maintenance outcome was modelled as $Y\{\}=beta\,0+beta\,1\,X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, maintenance depot, reliability analysis, time-series analysis, forecasting models, system dynamics, stochastic processes*

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