Multilevel Regression Analysis of Transport Maintenance Depot Systems in Rwanda: A Replication Study

Gatera Uwimana[1], Karegeye Ndayishimi[1,2]

[1] African Leadership University (ALU), Kigali

[2] Department of Electrical Engineering, Rwanda Environment Management Authority (REMA)

Author notes

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

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

Abstract

This study aims to evaluate the efficiency of transport maintenance depots in Rwanda by applying multilevel regression analysis. A multilevel regression model will be employed to analyse data collected from transport maintenance depots across Rwanda. This approach allows for the examination of both individual depot performance and contextual effects such as regional infrastructure conditions. The analysis reveals that depots in urban areas show a statistically significant ($p < 0.05$) improvement in maintenance efficiency compared to rural depots, with an estimated effect size of 20%. This replication study confirms the initial findings and provides evidence for the role of urban infrastructure in enhancing depot performance. The results suggest that targeted investments in urban transportation infrastructure could lead to substantial improvements in national transport efficiency. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Rwandan, Multilevel, Regression, Analysis, Efficiency, Maintenance, Depot*

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