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Methodological Evaluation of Municipal Infrastructure Assets Systems in Rwanda Using Multilevel Regression Analysis for Adoption Rates Assessment

Nyarutaremwa Nshimirimana[1], **Shingirai Mudoto**[2], **Kizito Gasana**[3,4]

[1] Department of Sustainable Systems, African Leadership University (ALU), Kigali

[2] University of Rwanda

[3] Rwanda Environment Management Authority (REMA)

[4] African Leadership University (ALU), Kigali

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Correspondence: nnshimirimana@hotmail.com

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Author notes

Nyarutaremwa Nshimirimana is affiliated with Department of Sustainable Systems, African Leadership University (ALU), Kigali and focuses on Engineering research in Africa.

Shingirai Mudoto is affiliated with University of Rwanda and focuses on Engineering research in Africa.

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

Abstract

Municipal infrastructure assets systems in Rwanda are crucial for effective municipal governance and service delivery. However, their adoption rates vary significantly across different regions. A multilevel regression model was employed to analyse data from both urban and rural municipalities. The model accounts for hierarchical structures within the data, incorporating regional and municipal-level variables as predictors of adoption rates. The multilevel analysis revealed that region-specific factors significantly influence the adoption rate of municipal infrastructure systems (e.g., economic status, governance quality). Multilevel regression analysis provides a robust framework for understanding the determinants of municipal infrastructure system adoption in Rwanda. Further research should explore potential interventions to enhance adoption rates and evaluate their impact at both regional and municipal levels. The maintenance outcome was modelled as $Y\{\}=beta0+beta1X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic, Multilevel, Regression, Asset, Infrastructure, Evaluation, Governance*

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