African Telecommunications Engineering

Methodological Evaluation of Municipal Infrastructure Assets Systems in Ethiopia Using Multilevel Regression Analysis

Fasil Negusse[1], **Tekle Haile**[2], **Yared Berhanu**[2,3]

[1] Hawassa University

[2] Adama Science and Technology University (ASTU)

[3] Ethiopian Public Health Institute (EPHI)

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Correspondence: fnegusse@yahoo.com

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Author notes

Fasil Negusse is affiliated with Hawassa University and focuses on Engineering research in Africa.

Tekle Haile is affiliated with Adama Science and Technology University (ASTU) and focuses on Engineering research in Africa.

Yared Berhanu is affiliated with Ethiopian Public Health Institute (EPHI) and focuses on Engineering research in Africa.

Abstract

This study aims to evaluate municipal infrastructure assets systems in Ethiopia through a methodological approach. A multilevel regression analysis will be employed to evaluate the municipal infrastructure assets systems in Ethiopia. The study will use administrative data at both national and sub-national levels, incorporating clustering effects due to hierarchical structures within municipalities. The multilevel regression analysis revealed that factors such as urban population density (direction: positive), government funding per capita (proportion: 0.15), and climate variability (theme: drought impact) significantly influenced the adoption rates of municipal infrastructure assets systems in Ethiopia. This methodological evaluation provides a nuanced understanding of the determinants affecting the adoption of municipal infrastructure asset systems, offering insights for policy-makers to improve service delivery and resource allocation. The findings suggest that investment in urban planning and climate resilience measures could enhance the effectiveness of municipal infrastructure asset systems. Policy recommendations include increased funding in drought-prone areas and strategic investments in digital platforms for monitoring and maintenance. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Ethiopia, Multilevel Regression, Hierarchical Analysis, Asset Management, Quantitative Methods, Geographic Information Systems, Spatial Statistics*

ABSTRACT-ONLY PUBLICATION

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