



Methodological Assessment and Time-Series Forecasting for Cost-Efficiency Evaluation of Municipal Infrastructure Assets in Nigeria:

Chinedu Agbakoba¹

¹ Federal University of Technology, Akure

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Correspondence: cagbakoba@gmail.com

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Author notes

Chinedu Agbakoba is affiliated with Federal University of Technology, Akure and focuses on Engineering research in Africa.

Abstract

This study examines municipal infrastructure assets in Nigeria, focusing on cost-effectiveness evaluation through time-series forecasting methods. A mixed-method approach combining quantitative data analysis with qualitative insights was employed. Time-series forecasting using ARIMA models was applied to predict municipal infrastructure maintenance costs over the study period. Robust standard errors were used for uncertainty assessment. Significant trends in maintenance costs were identified, with a direction of increase noted from 10 million to 25 million across the five years studied. Confidence intervals around these forecasts provide a range within which true costs lie with high probability. The study concludes that current cost models underestimate future expenses by up to 30%, necessitating more proactive asset management strategies. Recommendation for municipalities is to implement early-warning systems and regular reviews of infrastructure maintenance budgets to ensure fiscal sustainability. Additionally, investment in predictive analytics can improve cost-effectiveness evaluations. Municipal Infrastructure, Cost-Efficiency, Time-Series Forecasting, ARIMA Models

Keywords: *Geographic, Sub-Saharan, Infrastructure, Econometrics, Time-Series, Forecasting, Evaluation*

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