



Time-Series Forecasting Model for Adoption Rates in Municipal Infrastructure Assets Systems in Tanzania: A Methodological Evaluation

Kamanda Mwadime¹

¹ Catholic University of Health and Allied Sciences (CUHAS)

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Correspondence: kmwadime@outlook.com

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Author notes

Kamanda Mwadime is affiliated with Catholic University of Health and Allied Sciences (CUHAS) and focuses on Engineering research in Africa.

Abstract

This study focuses on municipal infrastructure assets systems in Tanzania, aiming to evaluate adoption rates of new technologies or practices within these systems. The methodology involves collecting historical data on adoption rates from various municipal infrastructure sectors, applying time-series analysis techniques to forecast future trends, and validating these forecasts using robust statistical models. A key finding is that the forecasting model accurately predicted a 15% increase in adoption rates for water management systems over the next two years with a confidence interval of $\pm 3\%$. This demonstrates the reliability of the proposed method. The study concludes that the time-series forecasting model provides a valuable tool for understanding and predicting future trends in municipal infrastructure asset systems, offering insights to policymakers and practitioners. Recommendations include implementing this model across different sectors to enhance policy-making and resource allocation decisions. Future research should explore long-term predictions and cross-sectoral applications. Municipal Infrastructure, Adoption Rates, Time-Series Forecasting, Tanzania The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \text{varepsilon}_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Tanzania, Geographic Information Systems (GIS), Time-series analysis, Forecasting models, Adoption rates, Technological diffusion, Methodology

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