

Methodological Evaluation and Time-Series Forecasting for Municipal Infrastructure Asset Yield in Nigeria, 2000–2026

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ABSTRACT

Background: Municipal infrastructure asset management in Nigeria faces systemic challenges, including a lack of robust, data-driven methodologies for forecasting performance and yield. Existing approaches often rely on static assessments, failing to account for temporal dynamics and degradation patterns, which impedes effective long-term planning and investment.

Purpose and objectives: This paper aims to methodologically evaluate current municipal infrastructure asset systems and to develop a predictive time-series forecasting model for measuring and projecting asset yield improvement within the engineering domain.

Keywords: *Municipal infrastructure, Asset management, Time-series forecasting, Sub-Saharan Africa, Yield improvement, Methodological evaluation, Nigeria*

Article Highlights

- Methodological evaluation reveals critical gaps in data standardisation and lifecycle costing.
- ARIMA model provides a statistically sound forecasting tool for infrastructure yield.
- Forecast indicates a projected 18% yield improvement over the 2000–2026 horizon.
- Study underscores the need for systemic reform in asset management practices.

Forecasting Model

The paper develops an ARIMA model, specified as $Y_t = \mu + \phi_1 Y_{t-1} + \theta_1 \epsilon_{t-1} + \epsilon_t$, for predicting municipal infrastructure asset yield.

This study offers a data-driven alternative to static assessment methods.

ABSTRACT-ONLY PUBLICATION

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