



# Methodological Evaluation of Time-Series Forecasting Models for Measuring Adoption Rates in Regional Monitoring Networks Systems in Tanzania: An African Perspective

Kamanda Ngowi<sup>1</sup>

<sup>1</sup> Tanzania Commission for Science and Technology (COSTECH)

**Published:** 05 July 2011 | **Received:** 14 April 2011 | **Accepted:** 06 June 2011

**Correspondence:** [kngowi@aol.com](mailto:kngowi@aol.com)

**DOI:** [10.5281/zenodo.18938445](https://doi.org/10.5281/zenodo.18938445)

### Author notes

*Kamanda Ngowi is affiliated with Tanzania Commission for Science and Technology (COSTECH) and focuses on Computer Science research in Africa.*

### Abstract

Regional monitoring networks systems have been implemented to track adoption rates in various sectors across Tanzania. However, there is a need for rigorous methodological evaluation of these systems to ensure their effectiveness and reliability. This study employed a time-series forecasting approach using an ARIMA (AutoRegressive Integrated Moving Average) model with uncertainty quantified through standard errors, to forecast adoption trends over the next five years. Data from three regional monitoring networks were analysed for consistency in forecasts. The ARIMA model produced a mean absolute error of 5.2% and a confidence interval indicating that the true error rate is likely between 4.8% and 5.6%. This suggests that while the models are reasonably accurate, there remains room for improvement in forecasting precision. The findings indicate that time-series forecasting can be effectively utilised to measure adoption rates within regional monitoring networks systems, although further refinements are necessary to enhance prediction accuracy. Future research should focus on integrating additional variables into the ARIMA model and validating these models across different regions in Tanzania to ensure their generalizability and reliability. Regional Monitoring Networks, Time-Series Forecasting, Adoption Rates, ARIMA Model, Confidence Interval Model estimation used  $\hat{\theta} = \operatorname{argmin} \{ \theta \} \sum_{i=1}^n (y_i - f_{\theta}(\xi))^2 + \lambda \|\theta\|_2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** *Sub-Saharan, Geographic Information Systems, Spatial Analysis, Time-Series Analysis, Econometrics, Model Evaluation, Predictive Analytics*

## ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ **REQUEST FULL PAPER**

**Email:** [info@parj.africa](mailto:info@parj.africa)

Request your copy of the full paper today!

## SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We welcome your submissions!**

Join our community of African scholars and share your groundbreaking work.

**Submit at:** [app.parj.africa](http://app.parj.africa)



Scan to visit [app.parj.africa](http://app.parj.africa)

**Open Access Scholarship from PARJ**

Empowering African Research | Advancing Global Knowledge