

A Methodological Framework for Time-Series Forecasting of Process-Control System Adoption in Tanzania (2000–2026)

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ABSTRACT

Background: The adoption of process-control systems in developing economies is a critical yet understudied component of industrial modernisation. In Tanzania, a lack of robust methodological frameworks has hindered the quantitative analysis and forecasting of this technological transition, limiting strategic planning in the engineering sector.

Purpose and objectives: This article presents a novel methodological framework for forecasting the adoption rates of process-control systems. Its objective is to provide a replicable, statistically rigorous model to measure and project adoption trends, thereby supporting infrastructure and industrial policy.

Keywords: *Time-series forecasting, Process-control systems, Industrial modernisation, Sub-Saharan Africa, Adoption modelling, Developing economies, Methodological framework*

Article Highlights

- Presents a novel ARIMAX time-series model for forecasting technological adoption.
- Integrates socio-economic and technological indicators into a unified framework.
- Quantifies forecast uncertainty with 95% prediction intervals for robust planning.
- Designed for application in developing economies with limited historical data.

Core Contribution

This article provides a technically sound, adaptable methodology for forecasting engineering technology adoption, moving beyond descriptive approaches to offer statistically rigorous projections.

This is a methodology article; empirical results from national data are not reported.

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