

A Methodological Framework for Time-Series Forecasting of Manufacturing Systems Adoption in Uganda (2000–2026)

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ABSTRACT

Background: The adoption of advanced manufacturing systems in developing economies is a critical driver of industrialisation, yet robust methodologies for forecasting adoption rates are lacking. Existing models often fail to account for the specific infrastructural and economic constraints of these contexts, leading to unreliable projections for policy and investment.

Purpose and objectives: This article presents a novel methodological framework for generating accurate time-series forecasts of manufacturing systems adoption. The primary objective is to provide a replicable, evidence-based model tailored to the structural realities of a developing industrial sector.

Keywords: *Time-series forecasting, Manufacturing systems adoption, Industrialisation, Sub-Saharan Africa, Methodological framework, Developing economies, Uganda*

Article Highlights

- Proposes an ARIMA model integrated with exogenous socio-economic variables for forecasting.
- Demonstrates pronounced sensitivity of adoption forecasts to infrastructure quality.
- Provides a replicable, evidence-based framework tailored to developing industrial sectors.
- Quantifies forecast uncertainty with 95% prediction intervals for policy application.

Methodological Insight

The core forecasting equation incorporates exogenous inputs—grid electricity reliability and access to industrial credit—to model the structural realities of Uganda's manufacturing sector.

This framework offers a statistically rigorous tool for forecasting technological adoption in constrained environments.

ABSTRACT-ONLY PUBLICATION

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