



Time-Series Forecasting Model for Measuring Adoption Rates of Process-Control Systems in Kenya: A Methodological Evaluation

Omar Kinyua¹

¹ Jomo Kenyatta University of Agriculture and Technology (JKUAT)

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Correspondence: okinyua@aol.com

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Author notes

Omar Kinyua is affiliated with Jomo Kenyatta University of Agriculture and Technology (JKUAT) and focuses on Engineering research in Africa.

Abstract

The adoption of process-control systems in Kenyan manufacturing facilities has been observed to vary over time, influenced by factors such as technological advancements and economic conditions. A time-series forecasting model was employed, incorporating autoregressive integrated moving average (ARIMA) methodology to analyse historical data from selected Kenyan manufacturers. Robust standard errors were used for uncertainty quantification. The ARIMA model predicted a steady increase in adoption rates over the next five years with an estimated growth rate of 12% annually, based on observed trends and external factors like government incentives and technological improvements. The time-series forecasting model demonstrated its effectiveness in predicting future adoption rates, providing valuable insights for manufacturers and policymakers in Kenya's manufacturing sector. Manufacturers should consider the ARIMA forecast to plan their investment strategies. Policymakers could leverage these findings to design targeted interventions that encourage greater adoption of process-control systems. The maintenance outcome was modelled as $Y_t = \beta_0 + \beta_1 X_t + u_t + \text{var}\epsilon_t$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, adoption rates, econometrics, forecasting models, time series, process control systems, African technology assessments*

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