Methodological Evaluation of Process-Control Systems in Senegal: Time-Series Forecasting for Efficiency Measurement

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Abstract

This Data Descriptor evaluates process-control systems in Senegal to forecast efficiency gains through time-series forecasting models. A time-series forecasting model is employed, incorporating ARIMA (AutoRegressive Integrated Moving Average) methodology. Confidence intervals are used to quantify forecast uncertainties. The analysis reveals an average annual efficiency improvement rate of 5% across monitored processes, with significant variability in specific sectors. The time-series forecasting model effectively predicts future efficiency trends, highlighting the need for further optimization and monitoring in critical areas. Implementing continuous process reviews and targeted training programmes are recommended to enhance system performance based on forecast outcomes. Process-control systems, Time-series analysis, Efficiency measurement, ARIMA, Senegal The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, econometrics, ARIMA, stochastic processes, forecasting, efficiency, African markets*

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