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Methodological Evaluation of Process-Control Systems in Rwanda Using Time-Series Forecasting Models

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Abstract

This study evaluates process-control systems in Rwanda's electrical engineering sector, focusing on their adoption rates over a five-year period. A time-series forecasting model was applied using an ARIMA (AutoRegressive Integrated Moving Average) model to analyse historical data on the adoption of process-control systems in Rwanda’s electrical engineering sector. Robust standard errors were used for uncertainty assessment. The analysis revealed a steady increase in the adoption rate, with a proportion reaching 45% by the end of the study period, indicating a clear upward trend over five years. Time-series forecasting models provide valuable insights into the adoption patterns of process-control systems in Rwanda's electrical engineering sector. The ARIMA model was effective in predicting future trends and identifying key factors influencing adoption rates. Based on these findings, policymakers should prioritise investments in training and awareness programmes to further increase the adoption rate of process-control systems in the Rwandan electrical engineering industry. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Rwanda, Geographic Information Systems (GIS), Process Control, Forecasting, Time Series Analysis, System Dynamics, Spatial Data Analysis*

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