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Time-Series Forecasting Model Evaluation for Yield Improvement in South African Manufacturing Plants Systems,

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Abstract

Manufacturing plants in South Africa have experienced varying degrees of yield improvement over time, necessitating robust methodologies for forecasting and enhancing performance. A comprehensive evaluation was conducted, employing advanced statistical techniques including ARIMA (AutoRegressive Integrated Moving Average) to forecast yield trends over time within selected manufacturing facilities. Model performance was assessed using robust standard errors and confidence intervals. The analysis revealed a significant positive correlation between process optimization measures and yield improvement, with an estimated coefficient of determination (R^2) of 0.75 for the forecasting model applied to actual yield data from to . The ARIMA model proved effective in predicting yield trends, offering insights into systemic improvements that could be implemented across various manufacturing sectors in South Africa. Manufacturing plants should prioritise process optimization and quality control measures as recommended by the model. Continuous monitoring and iterative adjustments are suggested to maintain optimal performance levels. ARIMA, forecasting, yield improvement, South African manufacturing

Keywords: *Sub-Saharan, Time-Series, ARIMA, Forecasting, Econometrics, Quality Control, Stochastic*

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