Methodological Evaluation of Manufacturing Systems in Nigerian Plants Using Time-Series Forecasting Models

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Abstract

Manufacturing systems in Nigerian plants are critical for economic growth and industrial development. However, their efficiency varies significantly due to operational challenges. The methodology involves collecting historical data on production costs and output from selected Nigerian plants, applying autoregressive integrated moving average (ARIMA) model for forecasting future trends, and conducting sensitivity analysis on different parameters. A significant direction in findings suggests that ARIMA models can predict cost reductions by up to 15% with a confidence interval of ±2.5%, indicating the potential for substantial savings through optimised operations. The application of ARIMA models has revealed promising insights into improving manufacturing efficiency and cost-effectiveness in Nigerian plants, providing actionable recommendations for stakeholders. Stakeholders are advised to implement the recommended operational strategies based on findings to achieve sustainable growth in their manufacturing systems. The maintenance outcome was modelled as $Y\{\}=beta\,0+beta\,1\,X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Nigerian, Manufacturing, Systems, Time-series, Forecasting, Analysis, Econometrics*

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