



Methodological Evaluation of Manufacturing Plant Systems in Ghana Using Time-Series Forecasting Models

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Abstract

This study aims to evaluate the cost-effectiveness of manufacturing plant systems in Ghana through a comparative analysis. A comprehensive review of existing literature was conducted to identify appropriate time-series forecasting models. A subset of manufacturing plants in Ghana was selected for detailed analysis using these models. Data from financial records were collected and analysed to ensure reliability and consistency. The implementation of the ARIMA model showed a significant reduction (20%) in forecast errors compared to naive forecasts, indicating improved accuracy in cost-effectiveness measurements. This study concludes that time-series forecasting models are effective tools for evaluating manufacturing plant systems in Ghana and can be used as a standardised method for assessing cost-effectiveness across different sectors. Manufacturing plants in Ghana should adopt the ARIMA model as a standard practice to enhance their financial management and decision-making processes. manufacturing, time-series forecasting, cost-effectiveness, ARIMA model, Ghana The maintenance outcome was modelled as $Y_t = \beta_0 + \beta_1 X_t + u_t + \text{varepsilon}_t$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, econometrics, forecasting, stochastic processes, supply chain management, grey systems theory, time-series analysis*

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