



# Methodological Evaluation of Manufacturing Systems in Senegal Using Time-Series Forecasting for Risk Reduction Assessment

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## Abstract

Manufacturing systems in Senegal have faced challenges related to production inefficiencies and risk management. The study employs a time-series forecasting model (e.g., ARIMA) to analyse historical data from Senegalese manufacturing plants. Robust standard errors are used to quantify the uncertainty associated with predictions. A clear trend of increasing production risks was observed over the last five years, which can be attributed to fluctuating raw material prices and labour supply challenges. The time-series forecasting model effectively identified risk reduction strategies that could mitigate future uncertainties in Senegalese manufacturing environments. Manufacturing plants are recommended to implement robust procurement strategies for raw materials and enhance workforce management practices to reduce risks. time-series forecasting, manufacturing systems, risk assessment, Senegal The maintenance outcome was modelled as  $Y_t = \beta_0 + \beta_1 X_t + u_t + \varepsilon_t$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Sub-Saharan, ARIMA, Monte Carlo, econometrics, forecasting, supply chain, stochastic models

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