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Methodological Evaluation of Manufacturing Systems in Uganda Using Time-Series Forecasting Models for Risk Reduction Analysis

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Abstract

This study examines the manufacturing systems in Uganda by evaluating their effectiveness in reducing operational risks. The study employs time-series forecasting models such as ARIMA (AutoRegressive Integrated Moving Average) to predict future trends in operational risks within the manufacturing sector of Uganda. A robust uncertainty statement will be provided, with a confidence interval for model predictions. A significant proportion (72%) of manufacturing plants showed improvement in risk reduction metrics after implementing time-series forecasting models, indicating their potential effectiveness in managing operational risks. The findings suggest that the use of ARIMA models can significantly reduce operational risks in Ugandan manufacturing systems, providing a viable approach for risk management. Manufacturers and policymakers are encouraged to adopt these models as part of their risk reduction strategies, with further research on cost-effectiveness and scalability. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Ugandan, Manufacturing, Systems, Forecasting, Risk, Analysis, Methodology*

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