Methodological Evaluation of Industrial Machinery Fleets Systems in Rwanda Using Time-Series Forecasting Models

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Abstract

Industrial machinery fleets in Rwanda are critical for economic development, but their adoption rates vary widely and can be difficult to predict. The study utilised ARIMA (AutoRegressive Integrated Moving Average) model for forecasting machinery adoption rates over time. Uncertainty was quantified using robust standard errors. A significant proportion (35%) of businesses in Rwanda adopted industrial machinery within two years, with a forecasted increase to 40% by the end of the study period. ARIMA models provided reliable forecasts for machinery adoption rates, contributing to better policy-making and resource allocation for future investments. Policy-makers should consider ARIMA-based predictions in their planning strategies, especially regarding funding and infrastructure development for industrial sectors. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Rwanda, Industrial Machinery, Fleet Management, ARIMA, Time-Series Analysis, Forecasting, Methodology*

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