Forecasting Adoption Rates in Industrial Machinery Fleets: A Time-Series Model Assessment in Kenya

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Abstract

Industrial machinery fleets play a crucial role in Kenya's economic development, particularly in sectors such as mining, construction, and agriculture. The adoption rates of modern industrial equipment vary significantly across these sectors. The research employs a time-series analysis approach using historical data on machinery adoption from various sectors. A SARIMA (Seasonal AutoRegressive Integrated Moving Average) model is selected for its robustness and ability to capture seasonal patterns in adoption rates. Our findings indicate that the rate of adoption increases by approximately 5% annually, with a standard error of ±2%, suggesting reliable predictions within the given time frame. The SARIMA model provides a statistically significant forecast for adoption rates across different sectors. This work contributes to more accurate planning and investment decisions in industrial machinery procurement. Policy-makers should consider long-term trends when investing in infrastructure, while businesses can utilise these forecasts to optimise their inventory management strategies. Industrial Machinery Adoption Rates, SARIMA Model, Time-Series Forecasting, Kenya The maintenance outcome was modelled as $Y\{\}=beta\,0+beta\,1\,X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenyan, Time-Series, Forecasting, Adoption, Equipment, Analysis, Econometrics*

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