Forecasting Adoption Rates in Senegalese District Hospitals Using Time-Series Models: A Methodological Assessment

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Abstract

This study evaluates the adoption rates of new medical technologies in Senegalese district hospitals, focusing on forecasting models to predict future trends. A mixed-methods approach was employed, including a literature review and expert consultations to inform the selection of appropriate time-series models. Data on technology adoption from four districts were analysed using ARIMA (AutoRegressive Integrated Moving Average) model equations. The analysis revealed that district-specific factors significantly influenced technology adoption rates, with an estimated ARIMA(1,0,1) model capturing 85% of the variance in data series over a one-year forecast period. Variability was quantified using robust standard errors and confidence intervals for prediction. The findings suggest that tailored interventions are necessary to improve technology adoption rates across Senegalese district hospitals. District hospital managers should prioritise stakeholder engagement, training programmes, and supportive policies to facilitate the effective implementation of new medical technologies. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Senegal, forecasting, time-series, econometrics, intervention, evaluation*

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