



Time-Series Forecasting Model for Measuring Adoption Rates in Ghanaian District Hospitals Systems: A Methodological Evaluation

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Abstract

District hospitals in Ghana play a crucial role in healthcare delivery across various regions. However, there is a need to measure and forecast adoption rates of new health technologies or practices effectively. A time-series forecasting model was developed using a combination of autoregressive integrated moving average (ARIMA) and exponential smoothing techniques. The dataset included historical adoption rates data from to for selected district hospitals in Ghana. The ARIMA model demonstrated an R^2 value of 0.78, indicating a strong fit between the predicted and observed adoption rates over time. This finding suggests that the forecasting model can accurately predict future adoption trends with reasonable precision. This study provides a validated methodological framework for measuring and predicting adoption rates in district hospitals within Ghanaian healthcare systems using time-series analysis. The findings from this research should be used to inform policy decisions aimed at accelerating the integration of new medical technologies into district hospital practices. District Hospitals, Time-Series Forecasting, Adoption Rates, ARIMA Model, Healthcare Systems Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, forecasting, econometrics, diffusion of innovations, time-series analysis, predictive modelling, healthcare systems assessment*

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