Time-Series Forecasting Model for Measuring Adoption Rates in Tanzanian District Hospitals Systems,

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Abstract

In recent years, there has been a growing interest in understanding the adoption rates of new healthcare technologies within Tanzanian district hospitals. However, current methods often rely on cross-sectional data and may not capture temporal trends effectively. A mixed-methods approach was employed, combining quantitative analysis with qualitative interviews to gather data on hospital practices, staff perceptions, and external factors affecting technology uptake. Time-series forecasting models were developed using the SARIMA (Seasonal AutoRegressive Integrated Moving Average) model for predicting future adoption rates based on historical data. The time-series forecasts suggest a significant upward trend in technological adoption within Tanzanian district hospitals over the study period, with an estimated annual growth rate of approximately 5%. This study provides evidence that supports the effectiveness of targeted interventions and highlights the importance of considering seasonal variations when forecasting future adoption rates. The SARIMA model offers a reliable tool for healthcare policymakers to anticipate potential technological advancements in district hospital systems. Policymakers should prioritise continuous monitoring of technology uptake, encourage community engagement, and consider implementing periodic technical upgrades to maintain high levels of innovation within the healthcare sector. Tanzania, District Hospitals, Technology Adoption, Time-Series Forecasting, SARIMA Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Geographic Information Systems (GIS), Quantitative Methods, Time-Series Analysis, Data Mining, Health Informatics, Spatial Epidemiology*

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