African Geomatic Engineering

Power-Distribution Equipment Systems Adoption Rates Forecasting in Ethiopia: A Time-Series Model Evaluation

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Abstract

Power distribution systems are crucial for energy supply in Ethiopia, yet adoption rates of various equipment have not been systematically analysed. A time-series analysis was employed to forecast adoption rates using a linear regression model. Uncertainty was quantified through robust standard errors. The forecasting model indicated that the adoption rate of solar-powered inverters increased by approximately 15% over a five-year period, with an uncertainty range of ±3%. The study validated the utility of time-series models in predicting technology adoption trends in Ethiopia's power distribution sector. Further research should explore additional factors influencing equipment adoption and consider more complex forecasting models for comprehensive analysis. Power Distribution, Equipment Adoption, Time-Series Forecasting, Linear Regression, Robust Standard Errors The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Ethiopia, Geographic Information Systems (GIS), Monte Carlo simulation, panel data analysis, regression models, spatial econometrics, time-series analysis*

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