



Bayesian Hierarchical Model for Measuring Adoption Rates of Power-Distribution Equipment in Kenya

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Abstract

The effective deployment of power distribution equipment (PDEs) is critical for ensuring reliable electricity supply in rural and underserved areas of Kenya. A Bayesian hierarchical model was applied to analyse survey data from multiple locations across Kenya. The model accounts for heterogeneity in adoption rates at different administrative levels. The analysis revealed significant variation in the adoption of PDEs between counties, with some areas showing adoption rates exceeding 80% while others were below 30%. The Bayesian hierarchical model effectively captured spatial and temporal variability in adoption patterns, providing a nuanced understanding of PDE deployment. Policy makers should prioritise the rollout of PDEs in regions with lower adoption rates to improve overall coverage and reliability. Bayesian Hierarchical Model, Power Distribution Equipment Adoption, Spatial Modelling, Kenya The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Kenya, Bayesian Hierarchical Model, Adoption Rates, Methodology, Empirical Evaluation, Rural Electrification, Statistical Modelling

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