



Multilevel Regression Analysis of Power-Distribution Equipment Adoption in Ghana

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Abstract

Power distribution equipment (PDE) in Ghana is crucial for reliable electricity supply, yet its adoption rates vary significantly across different regions. A mixed-methods approach was employed, combining quantitative data from surveys with qualitative insights from interviews. Multilevel logistic regression models were used to analyse the data. The multilevel analysis revealed that socioeconomic status (SES) significantly affects PDE adoption at both national and regional levels, with a moderate effect size. This study contributes by providing robust evidence on how SES influences PDE adoption rates, offering insights for policymakers in designing targeted interventions. Policymakers should focus on improving access to electricity in lower-SES regions through targeted subsidies and technological support. 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: *Geography, Africa, Multilevel, Regression, Analysis, Technology, Socioeconomic*

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