



Power-Distribution Equipment Adoption Rates in Senegal: A Multilevel Regression Analysis

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Abstract

Power distribution equipment (PDE) adoption in Senegal has been assessed through various studies but lacks a comprehensive multilevel regression analysis. The research utilizes data from multiple sources including government reports and surveys. A multilevel logistic regression model is applied to analyse the factors influencing PDE adoption at both individual and aggregate levels. The multilevel regression analysis reveals that infrastructure investment in rural areas significantly increased PDE adoption rates by 20% compared to urban settings, with a confidence interval of $\pm 5\%$. This suggests a need for targeted policies focusing on rural development initiatives. This study provides evidence-based insights into the factors affecting PDE adoption, contributing to more effective policy and planning in Senegal's power distribution sector. Policymakers should prioritise infrastructure investments in rural areas to enhance overall PDE adoption rates. Additionally, targeted interventions can be implemented to improve adoption among marginalized groups. 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: *Sub-Saharan, Multilevel Modelling, Regression Analysis, Infrastructure Development, Geographic Information Systems, Socioeconomic Factors, Power Sector Reform*

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