



Evaluation of Power-Distribution Equipment Systems in Nigeria: Panel Data Estimation for Adoption Rates Analysis

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Abstract

The power distribution sector in Nigeria faces significant challenges related to equipment quality, efficiency, and reliability. A mixed-method approach combining quantitative analysis with qualitative insights was employed. Panel data from multiple years were analysed using a fixed-effects regression model to estimate adoption rates. Panel data revealed that the installation of high-efficiency transformers led to an increase in power distribution efficiency by 15% compared to conventional equipment, as measured over three years. The study provides evidence on the effectiveness of certain power-distribution systems and offers a robust method for analysing adoption rates across different regions in Nigeria. Future research should consider longitudinal studies with additional variables to enhance the predictive accuracy of the models used. Power Distribution, Equipment Systems, Adoption Rates, Panel Data Analysis The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \varepsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Panel data analysis, Power systems, Infrastructure, Econometrics, Energy efficiency, Geographic information systems, Africa*

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