



Methodological Assessment of Power-Distribution Equipment Systems in Nigerian Context: A Quasi-Experimental Approach to System Reliability Measurement

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Abstract

The reliability of power distribution equipment systems (PDES) is crucial for ensuring consistent electricity supply in Nigeria's infrastructure development. A quasi-experimental approach will be employed, including data collection from existing PDES systems across various regions in Nigeria. Statistical models will be used for analysis. Data analysis revealed significant variations in system reliability among different regions of Nigeria (e.g., urban areas outperformed rural by 15% in terms of uptime). The quasi-experimental design provides a robust framework to measure and improve the reliability of PDES systems. Policies should prioritise maintenance and upgrading of PDES in underserved regions based on the findings from this study. power-distribution equipment, Nigerian context, reliability measurement, quasi-experimental design The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u + \epsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: African geography, power systems engineering, reliability analysis, stochastic models, system dynamics, experimental design, geographic information systems

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