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Methodological Evaluation of Power-Distribution Equipment Systems in Ghana Employing Quasi-Experimental Design

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Abstract

The reliability of power-distribution equipment systems in Ghana is critical for ensuring consistent electricity supply to residential and commercial establishments. A quasi-experimental design was employed, with data collected from 100 randomly selected power distribution centers across Ghana. The study analysed system performance metrics over one year to assess reliability. Findings revealed a significant failure rate of 8.5% in the sampled equipment systems, predominantly due to maintenance lapses and outdated infrastructure components. The quasi-experimental design provided insights into the reliability issues faced by power-distribution equipment systems in Ghana, highlighting areas for improvement in maintenance and infrastructure upgrades. Recommendations include increased investment in maintenance schedules and upgrading of older system components to enhance overall reliability. Power Distribution Systems, Quasi-Experimental Design, Reliability Analysis, Ghana The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, reliability analysis, quasi-experimental, power distribution, equipment systems, grid stability, econometric methods*