



Panel Data Assessment of Power-Distribution Equipment Reliability in Ghana: A Replication Study

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Abstract

Power distribution equipment (PDEs) play a critical role in ensuring reliable electricity supply in Ghana. The study employs a fixed effects model to analyse the impact of various factors on PDE reliability using - panel data from Ghana's distribution utilities. Panel data analysis revealed a significant positive correlation between investment in maintenance and PDE reliability, with an estimated coefficient of +0.67 (95% CI: [0.43, 0.91]) for each unit increase in investment. Investment in regular maintenance is crucial for enhancing the reliability of power distribution equipment in Ghana's grid. Distribution utilities should prioritise targeted investments and continuous monitoring to improve system performance. 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: Ghana, Panel Data, Fixed Effects, Econometrics, Reliability Analysis, Power Systems, Methodology

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