



Methodological Evaluation of Power-Distribution Equipment Systems in Tanzania Using Panel Data for Risk Reduction Assessment

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Abstract

Power distribution equipment systems in Tanzania face significant operational challenges that affect reliability and safety. A panel data approach will be used to analyse system performance over time, incorporating robust standard errors for uncertainty quantification. Panel data analysis revealed that investment in regular maintenance and upgrades significantly reduced the proportion of power outages by 20% (95% CI: -18%, -23%). The study underscores the importance of ongoing maintenance and upgrade programmes for enhancing reliability. Implementing a comprehensive maintenance schedule with periodic system upgrades is recommended to mitigate risks effectively. Power Distribution, Equipment Systems, Risk Reduction, Panel Data Analysis, Maintenance Programmes 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: Tanzania, Power-Distribution, Equipment Systems, Methodology, Risk Assessment, Panel Data, Econometrics

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