



Evaluation of Power-Distribution Equipment Systems in Tanzania Using Quasi-Experimental Methods for System Reliability Assessment

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Abstract

Power distribution equipment systems (PDES) play a crucial role in delivering reliable electricity to rural areas of Tanzania. However, these systems often face challenges related to reliability and efficiency. A quasi-experimental design was employed to assess the reliability of PDES. Data collection involved surveys, monitoring of equipment operation logs, and interviews with stakeholders. The analysis revealed that over 70% of power distribution points experienced interruptions due to maintenance issues, which could be mitigated by improving infrastructure maintenance schedules. This study highlights the importance of regular system checks and preventive maintenance in enhancing PDES reliability. Future research should focus on developing targeted intervention strategies. Stakeholders are recommended to implement a more robust monitoring system and establish clear maintenance protocols to improve system performance. 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: Tanzania, Power-Distribution Equipment Systems, Reliability Assessment, Quasi-Experimental Design, System Dynamics, Network Analysis, Econometrics

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